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Psychological interventions to foster resilience in healthcare students (Review)

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[Intervention Review]

Psychological interventions to foster resilience in healthcare students

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ABSTRACT

Background

Resilience can be defined as maintaining or regaining mental health during or after significant adversities such as a potentially traumatising event, challenging life circumstances, a critical life transition or physical illness. Healthcare students, such as medical, nursing, psychology and social work students, are exposed to various study- and work-related stressors, the latter particularly during later phases of health professional education. They are at increased risk of developing symptoms of burnout or mental disorders. This population may benefit from resilience-promoting training programmes.

Objectives

To assess the effects of interventions to foster resilience in healthcare students, that is, students in training for health professions delivering direct medical care (e.g. medical, nursing, midwifery or paramedic students), and those in training for allied health professions, as distinct from medical care (e.g. psychology, physical therapy or social work students).

Search methods

We searched CENTRAL, MEDLINE, Embase, 11 other databases and three trial registries from 1990 to June 2019. We checked reference lists and contacted researchers in the field. We updated this search in four key databases in June 2020, but we have not yet incorporated these results.

Selection criteria

Randomised controlled trials (RCTs) comparing any form of psychological intervention to foster resilience, hardiness or post-traumatic growth versus no intervention, waiting list, usual care, and active or attention control, in adults (18 years and older), who are healthcare students. Primary outcomes were resilience, anxiety, depression, stress or stress perception, and well-being or quality of life. Secondary outcomes were resilience factors.

Data collection and analysis

Two review authors independently selected studies, extracted data, assessed risks of bias, and rated the certainty of the evidence using the GRADE approach (at post-test only).

Main results

We included 30 RCTs, of which 24 were set in high-income countries and six in (upper- to lower-) middle-income countries. Twenty-two studies focused solely on healthcare students (1315 participants; number randomised not specified for two studies), including both students in health professions delivering direct medical care and those in allied health professions, such as psychology and physical therapy. Half of the studies were conducted in a university or school setting, including nursing/midwifery students or medical students. Eight studies investigated mixed samples (1365 participants), with healthcare students and participants outside of a health professional study field.

Participants mainly included women (63.3% to 67.3% in mixed samples) from young adulthood (mean age range, if reported: 19.5 to 26.83 years; 19.35 to 38.14 years in mixed samples). Seventeen of the studies investigated group interventions of high training intensity (11 studies; > 12 hours/sessions), that were delivered face-to-face (17 studies). Of the included studies, eight compared a resilience training based on mindfulness versus unspecific comparators (e.g. wait-list).

The studies were funded by different sources (e.g. universities, foundations), or a combination of various sources (four studies). Seven studies did not specify a potential funder, and three studies received no funding support.

Risk of bias was high or unclear, with main flaws in performance, detection, attrition and reporting bias domains.

At post-intervention, very-low certainty evidence indicated that, compared to controls, healthcare students receiving resilience training may report higher levels of resilience (standardised mean difference (SMD) 0.43, 95% confidence interval (CI) 0.07 to 0.78; 9 studies, 561 participants), lower levels of anxiety (SMD −0.45, 95% CI −0.84 to −0.06; 7 studies, 362 participants), and lower levels of stress or stress perception (SMD −0.28, 95% CI −0.48 to −0.09; 7 studies, 420 participants). Effect sizes varied between small and moderate. There was little or no evidence of any effect of resilience training on depression (SMD −0.20, 95% CI −0.52 to 0.11; 6 studies, 332 participants; very-low certainty evidence) or well-being or quality of life (SMD 0.15, 95% CI −0.14 to 0.43; 4 studies, 251 participants; very-low certainty evidence).

Adverse effects were measured in four studies, but data were only reported for three of them. None of the three studies reported any adverse events occurring during the study (very-low certainty of evidence).

Authors' conclusions

For healthcare students, there is very-low certainty evidence for the effect of resilience training on resilience, anxiety, and stress or stress perception at post-intervention.

The heterogeneous interventions, the paucity of short-, medium- or long-term data, and the geographical distribution restricted to high-income countries limit the generalisability of results. Conclusions should therefore be drawn cautiously. Since the findings suggest positive effects of resilience training for healthcare students with very-low certainty evidence, high-quality replications and improved study designs (e.g. a consensus on the definition of resilience, the assessment of individual stressor exposure, more attention controls, and longer follow-up periods) are clearly needed.

PLAIN LANGUAGE SUMMARY

Psychological interventions to foster resilience in healthcare students

Background

Healthcare students (e.g. medical, nursing, midwifery, paramedic, psychology, physical therapy, or social work students) have a high academic work load, are required to pass examinations and are exposed to human suffering. This can adversely affect their physical and mental health. Interventions to protect them against such stresses are known as resilience interventions. Previous systematic reviews suggest that resilience interventions can help students cope with stress and protect them against adverse consequences on their physical and mental health.

Review question

Do psychological interventions designed to foster resilience improve resilience, mental health, and other factors associated with resilience in healthcare students?

Search dates

The evidence is current to June 2019. The results of an updated search of four key databases in June 2020 have not yet been included in the review.

Study characteristics

We found 30 randomised controlled trials (studies in which participants are assigned to either an intervention or a control group by a procedure similar to tossing a coin). The studies evaluated a range of resilience interventions in participants aged on average between 19 and 38 years.

Healthcare students were the focus of 22 studies, with a total of 1315 participants (not specified for two studies). Eight studies included mixed samples (1365 participants) of healthcare students and non-healthcare students.

Eight of the included studies compared a mindfulness-based resilience intervention (i.e. an intervention fostering attention on the present moment, without judgements) versus unspecific comparators (e.g. wait-list control receiving the training after a waiting period). Most interventions were performed in groups (17/30), with high training intensity of more than 12 hours or sessions (11/30), and were delivered face-to-face (i.e. with direct contact and face-to-face meetings between the intervention provider and the participants; 17/30).

The included studies were funded by different sources (e.g. universities, foundations), or a combination of various sources (four studies). Seven studies did not specify a potential funder, and three studies received no funding support.

Certainty of the evidence
A number of things reduce the certainty about whether resilience interventions are effective. These include limitations in the methods of the studies, different results across studies, the small number of participants in most studies, and the fact that the findings are limited to certain participants, interventions and comparators.

Key results
Resilience training for healthcare students may improve resilience, and may reduce symptoms of anxiety and stress immediately after the end of treatment. Resilience interventions do not appear to reduce depressive symptoms or to improve well-being. However, the evidence from this review is limited and very uncertain. This means that we currently have very little confidence that resilience interventions make a difference to these outcomes and that further research is very likely to change the findings.

Very few studies reported on the short- and medium-term impact of resilience interventions. Long-term follow-up assessments were not available for any outcome. Studies used a variety of different outcome measures and intervention designs, making it difficult to draw general conclusions from the findings. Potential adverse events were only examined in four studies, with three of them showing no undesired effects and one reporting no results. More research is needed, of high methodological quality and with improved study designs.

SUMMARY OF FINDINGS

Summary of findings 1. Resilience interventions versus control conditions for healthcare students

Resilience interventions versus control conditions for healthcare students

Patient or population: healthcare students, including students in training for health professions delivering direct medical care (e.g. medical students, nursing students), and allied health professions as distinct from medical care (e.g. psychology students, social work students); aged 18 years and older, irrespective of health status

Setting: any setting of health professional education (e.g. medical school, nursing school, psychology or social work department at university)

Intervention: any psychological intervention focused on fostering resilience or the related concepts of hardiness or post-traumatic growth by strengthening well-evidenced resilience factors that are thought to be modifiable by training (see Appendix 3), irrespective of content, duration, setting or delivery mode

Comparison: no intervention, wait-list control, treatment as usual (TAU), active control, attention control

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Risk with control conditions	Risk with resilience interventions				
Resilience **Measured by:** investigators measured resilience using different instruments; higher scores mean higher resilience **Timing of outcome assessment:** post-intervention	-	The mean resilience score in the intervention groups was, on average, **0.43 standard deviations higher** (0.07 higher to 0.78 higher)	-	561 (9 RCTs)	⊕⊖⊖⊖ **Very low** [a]	SMD of 0.43 represents a moderate effect size (Cohen 1988b)[b]
Mental health and well-being: anxiety **Measured by:** investigators measured anxiety using different instruments; lower scores mean lower anxiety **Timing of outcome assessment:** post-intervention	-	The mean anxiety score in the intervention groups was, on average, **0.45 standard deviations lower** (0.84 lower to 0.06 lower)	-	362 (7 RCTs)	⊕⊖⊖⊖ **Very low** [c]	SMD of 0.45 represents a moderate effect size (Cohen 1988b)[b]
Mental health and well-being: depression **Measured by:** investigators measured depression using different instruments; lower scores mean lower depression **Timing of outcome assessment:** post-intervention	-	The mean depression score in the intervention groups was, on average, **0.20 standard deviations lower** (0.52 lower to 0.11 higher)	-	332 (6 RCTs)	⊕⊖⊖⊖ **Very low** [d]	SMD of 0.20 represents a small effect size (Cohen 1988b)[b]

Mental health and well-being: stress or stress perception: **Measured by:** investigators measured stress or stress perception using different instruments; lower scores mean lower stress or stress perception **Timing of outcome assessment:** post-intervention	-	The mean stress or stress perception score in the intervention groups was, on average, **0.28 standard deviations lower** (0.48 lower to 0.09 lower)	-	420 (7 RCTs)	⊕⊖⊖⊖ **Very low** [e]	SMD of 0.28 represents a small effect size (Cohen 1988b)[b]
Mental health and well-being: well-being or quality of life: **Measured by:** investigators measured well-being or quality of life using different instruments; higher scores mean higher well-being or quality of life **Timing of outcome assessment:** post-intervention	-	The mean well-being or quality of life score in the intervention groups was, on average, **0.15 standard deviations higher** (0.14 lower to 0.43 higher)	-	251 (4 RCTs)	⊕⊖⊖⊖ **Very low** [f]	SMD of 0.15 represents a small effect size (Cohen 1988b)[b]
Adverse events	There were no adverse events reported in association with study participation in 3 of 4 studies measuring potential adverse events.[g]		-	566 (3 RCTs)[h]	⊕⊖⊖⊖ **Very low** [i]	-

*__The risk in the intervention group__ (and its 95% CI) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: confidence interval; **RCT:** randomised controlled trial; **SMD:** standardised mean difference.

GRADE Working Group grades of evidence
High certainty: we are very confident that the true effect lies close to that of the estimate of the effect
Moderate certainty: we are moderately confident in the effect estimate; the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low certainty: our confidence in the effect estimate is limited; the true effect may be substantially different from the estimate of the effect
Very low certainty: we have very little confidence in the effect estimate; the true effect is likely to be substantially different from the estimate of effect

[a]Downgraded by two levels due to study limitations (unclear risk of selection bias, high and unclear risk of performance, detection and attrition bias), by one level due to unexplained inconsistency (I^2 = 75%), and by one level due to indirectness (studies limited to certain interventions (e.g. group setting, face-to-face delivery, moderate and high intensity, unspecified theoretical foundation) and comparators (no intervention, wait-list)).
[b]According to Cohen 1988b, a standardised mean difference (SMD) of 0.2 represents a small difference (i.e. small effect size), 0.5 a moderate difference, and 0.8 a large difference.
[c]Downgraded by two levels due to study limitations (unclear risk of selection bias, high and unclear risk of detection and attrition bias, high risk of performance bias), by one level due to unexplained inconsistency (I^2 = 66%), and by one level due to indirectness (studies limited to certain participants (medical students), interventions (e.g. group setting, moderate and high intensity) and comparators (no intervention, wait-list)).

[d]Downgraded by two levels due to study limitations (unclear risk of selection bias, high and unclear risk of detection bias, high risk of performance and attrition bias), by one level due to unexplained inconsistency (I^2 = 45%), by one level due to indirectness (studies limited to certain participants (medical students), interventions (e.g. group and individual setting, low and high intensity) and comparators (no intervention, wait-list)), and by two levels due to imprecision (< 400 participants; 95% CI wide and inconsistent).

[e]Downgraded by two levels due to study limitations (unclear risk of selection bias, high and unclear risk of detection bias, high risk of performance, attrition and reporting bias), and by one level due to indirectness (studies limited to certain participants (medical and nursing students), interventions (group and individual setting, low and high intensity, mindfulness and unspecific theoretical foundation) and comparators (no intervention, wait-list)).

[f]Downgraded by two levels due to study limitations (unclear risk of selection and detection bias, high and unclear risk of attrition bias, high risk of performance bias), by one level due to indirectness (studies limited to certain interventions (group setting, face-to-face and combined delivery, high intensity)), and by two levels due to imprecision (< 400 participants; 95% CI and inconsistent).

[g] Kötter 2016 also assessed adverse events but did not report the respective data in the report.

[h]For Galante 2018, subgroup data in healthcare students were not available; number of participants in total sample at post-test (CORE-OM data) was 482.

[i]Downgraded by two levels due to study limitations (unclear risk of selection and detection bias, unclear and high risk of attrition bias, high risk of performance and other bias (no systematic and validated assessment of adverse events)), and by one level due to indirectness (studies limited to certain interventions (individual setting, face-to-face, mindfulness based) and comparators (TAU)).

BACKGROUND

For a description of abbreviations used in this review, please see Appendix 1.

Description of the condition

Since the introduction of Antonovsky's salutogenesis as a basis for health promotion (Antonovsky 1979), and the Ottawa Charter for Health Promotion (WHO 1986), the concept of resilience has stimulated extensive research. Resilience describes the phenomenon under which an individual does not, or only temporarily, experiences mental health problems despite being subjected to psychological or physical stressors of short (acute) or long (chronic) duration (Kalisch 2015; Kalisch 2017). By definition, resilience always presupposes the exposure to substantial risk or adversity (Earvolino-Ramirez 2007; Jackson 2007; Luthar 2000; Masten 2001).

Stressor exposure in healthcare students and its consequences

Healthcare students are exposed to a large number of academic, clinical and psychosocial stressors. Substantial academic stressors include, for example, excessive academic workload (e.g. long hours of study, volume of information, difficult academic work), difficulties with studying and time management, competition with peers, examinations (e.g. high frequency), and fear of failing (Edwards 2010; Gazzaz 2018; Hill 2018). Further categories of stressor exposure may include social stressors such as conflicts with work-life balance and relationship management, financial concerns, or uncertainty about the future (Chang 2012; Gazzaz 2018; Santen 2010). In addition to typical life changes during the transition from training (e.g. nursing or medical school) to (clinical) practice, healthcare students also have to adapt to challenges that are specific to their chosen field of work. Due to patient contact in later phases of training, they are exposed to patient-related stressors such as exposure to human suffering and death (Hill 2018). Furthermore, clinical stressors identified among students and trainees in the healthcare sector include, for example, lack of practical skills, a theory-to-practice gap, tense atmosphere among clinical staff and negative attitudes of healthcare professionals, being criticised in front of staff and patients, or hospital ward rotations (Dyrbye 2009; Edwards 2010; Evans 2004; Hill 2018).

Chronic stressor exposure during health professional education has the potential to impact on the students' physical and mental health; for example, medical and nursing students have reported debilitating sleep disorders (Azad 2015; Belingheri 2020). Health professional education is perceived as stressful by many students, with many reporting increased levels of perceived stress (Edwards 2010; Fares 2016; Foster 2018; Heinen 2017; Jacob 2013; Wilks 2010). Healthcare students, especially medical students, are at increased risk of developing symptoms of burnout, such as high emotional exhaustion (Cecil 2014; Dyrbye 2009; Dyrbye 2016; Fares 2016; Santen 2010), and stress-related mental disorders such as depression (Bunevicius 2008; Compton 2008; Dyrbye 2006; Mao 2019; Tung 2018) and anxiety (Bunevicius 2008; Dyrbye 2006; Mao 2019). The experience of stressors and the resulting health impact may negatively affect students' academic (e.g. grades) and clinical performance (e.g. decline in empathy) (Gazzaz 2018; Kötter 2017; Neumann 2011; Yamada 2014; Ye 2018), and could possibly affect also the high attrition rates found among healthcare students (Hamshire 2019) and new graduates (Pine 2007), as demonstrated by some studies (Dyrbye 2011).

Overall, based on these findings, the concept of resilience has become increasingly important for health professional education in recent years (Eley 2014; Hodges 2008; McAllister 2009; Pines 2012; Sanderson 2017; Stephens 2013; Tempski 2012; Thomas 2016; Waddell 2015; Wright 2019).

Definition of resilience

Three different approaches have been discussed in the definition of resilience (Hu 2015; Kalisch 2015). Trait resilience refers to resilience defined as personal resources or static, positive personality characteristics that enhance individual adaptation (Block 1996; Nowack 1989; Wagnild 1993). This approach has been superceded largely by a view of resilience as an outcome rather than a static personality trait (Kalisch 2015; Mancini 2009), i.e. mental health despite significant stress or trauma. According to this outcome-oriented definition, the positive outcome of resilience is partially determined by several resilience factors (Kalisch 2015). To date, a large range of genetic, psychological, social and environmental factors have been discussed in resilience research that often overlap and may interact (Bengel 2012; Bonanno 2013; Carver 2010; Connor 2006; Earvolino-Ramirez 2007; Feder 2011; Forgeard 2012; Haglund 2007; Iacoviello 2014; Kuiper 2012; Mancini 2009; Michael 2003; Ozbay 2007; Rutten 2013; Sapienza 2011; Sarkar 2014; Southwick 2005; Southwick 2012; Stewart 2011; Wu 2013; Zauszniewski 2010). Psychosocial resilience factors that are well-evidenced according to the current state of knowledge and thought to be modifiable include: meaning or purpose in life, a sense of coherence, positive emotions, hardiness, self-esteem, active coping, self-efficacy, optimism, social support, cognitive flexibility (including positive reappraisal and acceptance), and religiosity or spirituality or religious coping (see Appendix 2: level 1). Most recently, resilience has been conceptualised as a multidimensional and dynamic process (Johnston 2015; Kalisch 2015; Kent 2014; Mancini 2009; Norris 2009; Rutten 2013; Sapienza 2011; Southwick 2012). This resilient process is characterised either by a trajectory of undisturbed mental health during or after adversities, or temporary dysfunction followed by successful recovery (Kalisch 2015). In general, resilience is viewed as the outcome of an interaction between the individual and his or her environment (Cicchetti 2012; Rutten 2013), which may be influenced through personal (e.g. optimism) as well as environmental resources (e.g. social support) (Haglund 2007; Iacoviello 2014; Kalisch 2015; Southwick 2005; Wu 2013). As such, resilience is modifiable and can be improved by interventions (Bengel 2012; Connor 2006; Southwick 2011).

Interventions to foster resilience

Interventions to foster resilience have been developed for and conducted in a variety of clinical and non-clinical populations using various formats, such as multimedia programmes or face-to-face settings, and have been delivered in a group or individual context (see Bengel 2012 and Southwick 2011 for an overview). To date, several resilience-training programmes that focus specifically on fostering resilience in healthcare students have been tested (Anderson 2017; Peng 2014). However, the empirical evidence for the efficacy of these interventions is still unclear and requires further research.

Description of the intervention

There is currently little consensus about when to consider a programme as 'resilience training', or what components are needed for effective programmes (Leppin 2014). The diversity across resilience-training programmes in their theoretical assumptions, operationalisation of the construct, and inclusion of core components reflect the current state of knowledge (Joyce 2018; Leppin 2014; Macedo 2014; Robertson 2015; Vanhove 2016), with leading guidelines still under discussion (compare Kalisch 2015; Robertson 2015).

Most training programmes, whether individual or group-based, are implemented face-to-face. Alternative formats include online interventions or combinations of different formats. Resilience-training programmes often use methods such as discussions, role plays, practical exercises and homework to reinforce training content. They usually contain a psycho-educative element to provide information on the concept of resilience, or specific training elements (e.g. cognitive restructuring).

In general, resilience interventions are based on different psychotherapeutic approaches: cognitive-behavioural therapy (CBT; Abbott 2009); acceptance and commitment therapy (ACT; Ryan 2014); mindfulness-based therapy (Geschwind 2011); attention and interpretation therapy (AIT; Sood 2014); problem-solving therapy (Bekki 2013), as well as stress inoculation (Farchi 2010). A number of training programmes focus on fostering single or multiple psychosocial resilience factors (Kanekar 2010), without being assignable to a certain approach. Few interventions base their work on a defined resilience model (Schachman 2004; Steinhardt 2008).

How the intervention might work

Depending on the underlying resilience concept, resilience interventions target different resources and skills. The theoretical foundations of training programmes and the hypotheses on how they might maintain or regain mental health are as diverse as their content. Currently, no empirically-validated theoretical framework exists that outlines the mode of action of resilience interventions (Bengel 2012; Leppin 2014).

As resilience as an outcome is determined by several potentially modifiable resilience factors (see Description of the condition), resilience interventions might work by strengthening these factors (see Appendix 3 for examples of possible training methods). However, depending on the underlying theoretical foundation, there are different theories of change on how certain factors and hence resilience might be affected.

From a cognitive-behavioural perspective, stress-related mental dysfunctions (e.g. depression) are considered to be the result of dysfunctional thinking (Beck 2011; Benjamin 2011). When confronted with adversity, people show maladaptive behavioural responses or experience negative mood states, or both, due to irrational cognition (Beck 1976; Ellis 1975). This is in line with other stress and resilience theories, which assume that it is not the stressor itself, but its cognitive appraisal that may lead to stress reactions (Kalisch 2015; Lazarus 1987). Modifying cognitive processes into more adaptive patterns of thought will therefore probably produce more adaptive responses to stress (Beck 1964). By challenging an individual's maladaptive thoughts, and by teaching coping strategies, CBT-based resilience interventions might be beneficial in promoting the resilience factors of cognitive flexibility and active coping.

As one form of CBT, stress inoculation therapy is based on the assumption that exposing individuals to milder forms of stress can strengthen coping strategies and the individual's confidence in using his or her coping repertoire (Meichenbaum 2007). Resilience-training programmes grounded in stress inoculation therapy might therefore foster resilience by enhancing factors such as self-efficacy.

Problem-solving therapy is closely related to CBT and based on problem-solving theory. According to the problem-solving model of stress and adaptation, effective problem-solving can attenuate the negative effects of stress and adversity on well-being by moderating or mediating (or both) the effects of stressors on emotional distress (Nezu 2013). Resilience interventions based on problem-solving that enhance an individual's positive problem orientation and planful problem-solving might foster participants' psychological adaptation to stress by increasing the resilience factor of active coping.

According to ACT (Hayes 2004; Hayes 2006), psychopathology is primarily the consequence of psychological inflexibility (Hayes 2006), which is also relevant when an individual is confronted with stressors. By teaching acceptance and mindfulness skills on the one hand (e.g. being in contact with the present moment), and commitment and behaviour-change skills on the other (e.g. values, committed action), several resilience factors might be fostered in ACT-based resilience interventions (e.g. cognitive flexibility, purpose in life). In particular, the acceptance of a full range of emotions taught in ACT might result in a better adjustment to stressful conditions.

In mindfulness-based therapy (e.g. mindfulness-based stress reduction (MBSR; Stahl 2010); AIT (Sood 2010)), mindfulness is characterised by the nonjudging awareness of the present moment and its accompanying mental phenomena (i.e. body sensations, thoughts and emotions). Since practitioners learn to accept whatever occurs in the present moment, they are thought to adapt more efficiently to stress (Grossman 2004; Shapiro 2005). As being more aware of the 'here and now' may enhance the sensitivity to positive aspects in life, mindfulness-based resilience interventions might also help participants to gain a brighter outlook for the future (i.e. optimism) or to experience positive emotions more regularly. Teaching mindfulness might also increase participants' cognitive flexibility by learning to accept negative situations and emotions.

Independently of the underlying theory, resilience training might work differently depending on the respective 'delivery format' and 'intervention setting' (Robertson 2015; Vanhove 2016). For example, interventions implemented face-to-face could work better than online formats in increasing resilience, due to the more direct contact between trainers and participants (Vanhove 2016), which might also increase compliance. Resilience training in an individual setting could be more efficient than group-based interventions, as trainers might be better able to attend to participants' individual needs and provide feedback more easily (Vanhove 2016). On the other hand, group-based interventions could enhance participants' social resources. No previous review has examined the role of training duration on effect sizes of resilience interventions. As participants have the opportunity

to apply the taught skills in daily life, high-intensity resilience interventions that include weekly sessions over several weeks (e.g. combined with homework assignments or daily practice) could be more efficient than low-intensity training (e.g. a single session). Joyce 2018, who examined the role of the theoretical foundation of resilience interventions for the first time, found positive effect sizes on resilience for CBT-based, mindfulness-based and mixed interventions (i.e. CBT and mindfulness) compared to control. However, differences in the effects of resilience training based on other theoretical foundations have not so far been considered.

Why it is important to do this review

A large number of systematic reviews and meta-analyses have investigated various forms of interventions to foster healthcare students' mental health, such as stress management, mentoring programmes, emotional intelligence interventions and mindfulness-based training to reduce or prevent burnout, and crisis-focused programmes (see Appendix 4). Although some of these reviews also identified interventions to foster resilience (e.g. Griffiths 2019), the primary review question did not specifically refer to such programmes.

A considerable number of systematic reviews and meta-analyses of interventions to foster resilience (see Appendix 4) have synthesised the efficacy of resilience-training programmes in clinical and non-clinical adult populations (Bauer 2018; Joyce 2018; Leppin 2014; Macedo 2014; Massey 2019; Milne 2016; Pallavicini 2016; Pesantes 2015; Petriwskyj 2016; Reyes 2018; Robertson 2015; Skeffington 2013; Townshend 2016; Vanhove 2016; Van Kessel 2014; Wainwright 2019), or at least have searched for 'resilience' and related constructs (Deady 2017; Tams 2016). In a recent Cochrane Review, our group synthesised the evidence on the efficacy of resilience training in healthcare professionals (Kunzler 2020). There are so far only four relevant meta-analyses (Joyce 2018; Kunzler 2020; Leppin 2014; Vanhove 2016). Previous reviews agree in their conclusion that resilience interventions can generally improve resilience, mental health and (job) performance. Nevertheless, there are some methodological and quality differences between the reviews, which complicate statements about the efficacy of resilience training or result in a variety of effect sizes. These include, for example, heterogeneous eligibility criteria and definitions of resilience training, rather simple and limited search strategies, the lack of a review protocol or PROSPERO registration for most reviews, and different guidelines for the conduct and reporting of the review.

Four systematic reviews of healthcare students (see Appendix 4) have synthesised evidence on the efficacy of resilience-training programmes in this target group (Gilmartin 2017; McGowan 2016; Rogers 2016; Sanderson 2017), with Sanderson 2017 not focusing only on resilience interventions. One other review (Pezaro 2017) and a meta-analysis (Lo 2018) also searched for 'resilience'. The six publications either investigated healthcare students such as medical students (Lo 2018) or combinations of healthcare students and healthcare professionals (i.e. with completed training) (Gilmartin 2017). Overall, they found mixed results for the efficacy of resilience-training programmes. On the one hand, they identified some benefits to healthcare students, for example, in improving resilience or mental health outcomes (e.g. Gilmartin 2017; Pezaro 2017; Rogers 2016). On the other hand, as pointed out by some authors (e.g. McGowan 2016), the reviews' conclusions have been restricted by current limitations of resilience intervention research (e.g. heterogeneous definitions of resilience, and the low methodological rigour of studies). Comparable with reviews in other populations, the publications also suffer from methodological weaknesses, which limit the robustness of their findings (see Appendix 4). Most importantly, the number of RCTs included in previous reviews is rather limited (0 to 24 RCTs among 5 to 36 studies included in the six reviews), and the search period covered by the reviews is up to January 2017 (Gilmartin 2017), thus precluding any conclusions about the efficacy of resilience interventions in healthcare students that have been developed since then.

In our review, which seeks to address the methodological weaknesses of previous reviews, we were also particularly interested in psychological resilience interventions offered to this target group. The interventions had to be scientifically founded, i.e. they had to address one or more of the resilience factors stated above that are known to be associated with resilience in adults according to the state of current research (see Appendix 2: levels 1a to 1c). They also had to state the intention of promoting resilience or a related construct (hardiness, post-traumatic growth). Lastly, the trained population had to fulfil the condition of potential stress or trauma exposure (the concept implicated for resilience), i.e. being a healthcare student (see Description of the condition), in order to clearly distinguish genuine resilience interventions from other interventions focused on fostering associated constructs such as mental health (Windle 2011a).

Resilience as a concept of prevention is highly current, and there is increasing interest worldwide in promoting mental health and preventing disease (WHO 1986; WHO 2004). Due to chronic stressor exposure in healthcare students, and the potentially negative consequences for the students' health (see Description of the condition), healthcare students are viewed as an important target group for resilience interventions (McAllister 2009). This review therefore aims to provide further and more detailed evidence about which interventions are most likely to foster resilience and to prevent stress-related mental health problems in healthcare students. The evidence base for this review might contribute to improving existing interventions and to facilitating the future development of training programmes. In this way, researchers, practitioners and policymakers could benefit from our work.

OBJECTIVES

To assess the effects of interventions to foster resilience in healthcare students, that is, students in training for health professions delivering direct medical care (e.g. medical, nursing, midwifery or paramedic students), and those in training for allied health professions, as distinct from medical care (e.g. psychology, physical therapy or social work students; see Differences between protocol and review).

METHODS

Criteria for considering studies for this review

Types of studies

Randomised controlled trials (RCTs), including cluster-RCTs.

Types of participants

Adults aged 18 years and older, who are healthcare students, i.e. students in training for health professions delivering direct medical care (e.g. medical, nursing, midwifery or paramedic students) and those in training for allied health professions, as distinct from medical care (e.g. psychology, physical therapy, social work, counselling, occupational therapy, speech therapy, medical assistant or medical technician students).

Participants were included irrespective of health status.

At the time of the intervention, individuals had to be exposed to potential risk or stressors, which was ensured by focusing on healthcare students in this review (see Description of the condition; see Differences between protocol and review).

We included studies involving mixed samples (e.g. healthcare and non-healthcare students) in the review. We also considered these studies in meta-analyses (see Data synthesis) provided the data for healthcare students were reported separately or could be obtained by contacting the study authors.

Types of interventions

Any psychological resilience intervention, irrespective of content, duration, setting or delivery mode.

For the purpose of this review, we define psychological resilience interventions as follows: interventions focused on fostering resilience or the related concepts of hardiness or post-traumatic growth, by strengthening well-evidenced resilience factors that are thought to be modifiable by training (see above and Appendix 2; level 1). In order to use highly-objective inclusion criteria, we considered only interventions that explicitly defined the objective of fostering resilience, hardiness, or post-traumatic growth by using one or more of these terms in the publication (see Differences between protocol and review). We did not include studies that examined the efficacy of disorder-specific psychotherapy (e.g. CBT for depression).

We considered the following comparators in this review: no intervention, wait-list control, treatment as usual (TAU), active control, and attention control. We used the term 'attention control' for alternative treatments that mimicked the amount of time and attention received (e.g. by the trainer) in the treatment group. We also considered active controls to involve an alternative treatment (no TAU; for example, treatment developed specifically for the study), but that did not control for the amount of time and attention in the intervention group and was not attention control in a narrow sense.

Types of outcome measures

Due to the different ways in which resilience has been operationalised in previous research, resilience as an intervention outcome could not always be guaranteed in studies. We therefore also defined assessments of psychological adaptation (e.g. mental health) as primary outcomes.

Secondary outcomes included a range of psychological factors associated with resilience, according to the current state of knowledge, and were selected based on conceptual clarity and measurability (levels 1a and 1b; see Appendix 2).

Measures for the assessment of psychological resilience and psychological adaptation, as well as resilience factors, are specified on the basis of previous reviews on resilience interventions (Leppin 2014; Macedo 2014; Robertson 2015; Vanhove 2016) and reviews on resilience measurements (Pangallo 2015; Windle 2011b); see Helmreich 2017 and Appendix 5, Appendix 6, Appendix 7 in this review, respectively.

We considered self-rated and observer- or clinician-rated measures, as well as study outcomes at all time points. The lack of reporting of the primary or secondary outcomes described above was not an exclusion criterion for this review.

Primary outcomes

- Resilience*, measured by improvements in specific resilience scales (Bengel 2012; Earvolino-Ramirez 2007; Pangallo 2015; Windle 2011b), such as the Resilience Scale for Adults (Friborg 2003).
- Mental health and well-being, subsumed into the categories below, and measured by improvements in the respective assessment scales, such as the Depression Anxiety and Stress Scale (DASS-21; Lovibond 1995). See Appendix 6 for further examples.
  - Anxiety*
  - Depression*
  - Stress or stress perception*
  - Well-being or quality of life* (e.g. well-being, life satisfaction, (health-related) quality of life, vitality, vigour)
- Adverse events*

Secondary outcomes

- Resilience factors (Bengel 2012; Haglund 2007; Iacoviello 2014; Southwick 2005; Southwick 2012; Wu 2013), whenever they were available as outcomes, assessed by an increase in the respective instruments (e.g. Life Orientation Test - Revised (LOT-R); Scheier 1994). For further examples see Appendix 7.
  - Social support
  - Optimism
  - Self-efficacy
  - Active coping
  - Self-esteem
  - Hardiness (although hardiness is often used as a synonym for resilience in the literature, we conceptualised it as a resilience factor in this review. See Appendix 2.)
  - Positive emotions

We extracted and reported data on secondary outcomes whenever they were assessed. If possible, we calculated and reported effect sizes.

Where data were available, we used outcomes marked by an asterisk (*) to generate the 'Summary of findings' table. If there was insufficient information, we provided a narrative description of the evidence.

Search methods for identification of studies

We ran the first searches for this review in October 2016, based on the MEDLINE search strategy in the protocol (Helmreich 2017)

before changing the inclusion criteria of the review to focus on healthcare students (see Differences between protocol and review). For the top-up searches in June 2019, we added a new section to the original search strategy using search terms to limit the search to healthcare sector workers and students.

Electronic searches

We searched the electronic sources listed below.

- Cochrane Central Register of Controlled Trials (CENTRAL; 2019, Issue 6) in the Cochrane Library, which includes the Cochrane Developmental, Psychosocial and Learning Problems Specialised Register (searched 26 June 2019).
- MEDLINE Ovid (1946 to 21 June 2019).
- Embase Ovid (1974 to 2019 Week 25).
- PsycINFO Ovid (1806 to June Week 3 2019).
- CINAHL EBSCOhost (Cumulative Index to Nursing and Allied Health Literature; 1981 to 24 June 2019).
- PSYNDEX EBSCOhost (1977 to 24 June 2019).
- Web of Science Core Collection Clarivate (Science Citation Index; Social Science Citation Index; Conference Proceedings Citation Index - Science; Conference Proceedings Citation Index - Social Science & Humanities; 1970 to 26 June 2019).
- International Bibliography of the Social Sciences ProQuest (IBSS; 1951 to 25 June 2019).
- Applied Social Sciences Index & Abstracts ProQuest (ASSIA; 1987 to 24 June 2019).
- ProQuest Dissertations & Theses (PQDT; 1743 to 24 June 2019).
- *Cochrane Database of Systematic Reviews* (CDSR; 2019, Issue 6), part of the Cochrane Library (searched 26 June 2019).
- Database of Abstracts of Reviews of Effects (DARE; 2015, Issue 4) part of the Cochrane Library (final issue; searched 27 October 2016).
- Epistemonikos (epistemonikos.org; all available years, searched 24 June 2019).
- ERIC EBSCOhost (Education Resources Information Center; 1966 to 26 June 2019).
- Current Controlled Trials now ISTRCN registry (www.isrctn.com; 1 January 1990 to 24 June 2019).
- ClinicalTrials.gov (clinicaltrials.gov; 1 January 1990 to 24 June 2019).
- World Health Organization International Clinical Trials Registry Platform (WHO ICTRP; who.int/trialsearch; 1 January 1990 to 24 June 2019)

We report the search strategies for each database in Appendix 8 (up to 2016) and for the revised inclusion criteria, Appendix 9 (2016 onwards). We used the Cochrane Highly Sensitive Search Strategy to identify RCTs in MEDLINE (Lefebvre 2019). We adapted the search terms and syntax for other databases. The searches were not restricted by language, publication status or publication format. We limited our search to the period January 1990 onwards, to account for the fact that the concept of resilience and its operationalisation have developed significantly over the past decades (Fletcher 2013; Hu 2015; Kalisch 2015; Pangallo 2015). Because of the lack of homogeneity for the period 1990 to 2014 (Robertson 2015), it is likely that using a broader time frame would have made it even more difficult to detect resilience-training studies with similar resilience concepts and assessments. Moreover, it appeared plausible to concentrate on the period 1990 to the present, since the idea of resilience as an outcome and a modifiable process has only emerged in recent years, and paved the way for the development of resilience-promoting interventions (Bengel 2009; Southwick 2011). The idea of fostering resilience by specific training was therefore relatively new (Leppin 2014), which can also be seen in the review by Macedo 2014, who searched for studies on resilience interventions every year until 2013 but only found RCTs published after 1990.

As resilience-training programmes should be adapted to scientific findings on a regular basis, and with the current research focusing on the detection of general resilience mechanisms (Kalisch 2015; Luthar 2000), the last five years seemed especially important in synthesising the evidence on newly-developed resilience training.

We performed a further scoping search of four key databases (CENTRAL, CINAHL EBSCOhost, PsycINFO Ovid, ClinicalTrials.gov) in June 2020 prior to the publication of this review. The results are awaiting classification and will be incorporated into the review at the next update.

Searching other resources

In addition to the electronic searches, we inspected the reference lists of all included RCTs and relevant reviews, and contacted researchers in the field as well as the authors of selected studies, to check if there were any unpublished or ongoing studies. If data were missing or unclear, we contacted the study authors.

Data collection and analysis

We report only the methods we used in successive sections in this review. We report preplanned but unused methods in Table 1.

Selection of studies

Two review authors (AK, IH) independently screened titles and abstracts in order to determine eligible studies. We immediately excluded clearly irrelevant papers. At full text level, the same two review authors (AK, IH), working independently, inspected for eligibility in duplicate. We calculated inter-rater reliability at both stages (title and abstract screening and full text screening), resolving any disagreements in study selection by discussion. Where we could reach no consensus, a third review author (AC or KL) arbitrated. If necessary, we contacted the study authors to seek additional information. We recorded all decisions in a PRISMA flow diagram (Moher 2009).

We assessed the feasibility of the selection criteria a priori, by screening 500 studies in order to attain acceptable inter-rater reliability (see Differences between protocol and review). There was good agreement between the review authors (kappa = 0.72), and thus no need to refine or clarify the criteria. For scientific reasons, however, we adapted the eligibility criteria during review development (see Differences between protocol and review).

Data extraction and management

We developed a data extraction sheet (see Appendix 10), based on Cochrane guidelines (Li 2019), and tested it on 10 randomly-selected included studies. This initial test resulted in sufficient agreement between the review authors. For each included study, two review authors (AK, IH) independently extracted the data in duplicate. The extraction sheet contained the following elements:

- source and eligibility;
- study methods (e.g. design);
- allocation process;
- participant characteristics;
- interventions and comparators;
- outcomes and assessment instruments (means and standard deviations (SDs) in any standardised scale);
- results;
- miscellaneous aspects.

We resolved any disagreements in data collection by discussion. Where we could reach no consensus, a third review author (AC or KL) arbitrated. If necessary, we contacted the study authors to seek additional information.

Assessment of risk of bias in included studies

Two review authors (AK, IH) independently assessed the risks of bias of the included studies. We checked the risk of bias for each study using the criteria presented in the *Cochrane Handbook for Systematic Reviews of Interventions*, hereafter referred to as the *Cochrane Handbook* (Higgins 2011a) (see Appendix 11). We resolved any disagreements by discussion or by consulting a third review author (AC or KL). In accordance with Cochrane's 'Risk of bias' tool (Higgins 2011b), we critically assessed each study across the following domains:

- sequence generation and allocation concealment (selection bias);
- blinding of participants and personnel (performance bias);
- blinding of outcome assessment (detection bias);
- incomplete outcome data (attrition bias);
- selective outcome reporting (reporting bias).

We also considered the baseline comparability between study conditions as part of selection bias (random-sequence generation), which is not defined in the *Cochrane Handbook*. In the first part of the assessment, we described what was reported to have happened in the study for each domain, before assigning a judgement for the risk of bias (low, high or unclear) for the entry.

Measures of treatment effect

Dichotomous data

We did not need to use our preplanned methods for analysing dichotomous outcomes (Helmreich 2017), as none of the included studies reported relevant dichotomous data for any of the prespecified primary or secondary outcomes.

Continuous data

Because the included resilience-training studies used different measurement scales to assess resilience and related constructs (see Table 2; Table 3), we used standardised mean difference (SMD) effect sizes (Cohen's d) and their 95% confidence intervals (CIs) for continuous data in pair-wise meta-analyses. We calculated effect sizes on the basis of means, standard deviations (SDs) and sample sizes for each study condition. If the respective data were not provided, we computed Cohen's d from alternative statistics (e.g. t test, change scores). We assessed the magnitude of effect for continuous outcomes using the criteria for interpreting SMDs suggested in the *Cochrane Handbook* (Schünemann 2019a): a value of 0.2 indicates a small effect; 0.5 a moderate effect; and 0.8 a large effect (Cohen 1988b).

Unit of analysis issues

Cluster-randomised trials

As the allocation of individuals to different conditions in resilience intervention studies partly occurs by groups (e.g. work sites, hospitals), we intended to include cluster-randomised studies along with individually-randomised studies. Since we identified no cluster-RCTs, we only included individually-randomised studies in meta-analyses.

Repeated observations on participants

If there were longitudinal designs with repeated observations on participants, we defined several outcomes based on different follow-up periods and conducted separate analyses, as recommended in the *Cochrane Handbook* (Higgins 2019b). One analysis included all studies with measurement at the end of intervention (post-test), while other analyses were based on the period of follow-up (short-term: three months or less; medium-term: more than three months to six months; and long-term follow-up: more than six months). We rated assessments as post-intervention if performed within one week after the intervention. Assessments at more than one week after the intervention were counted as short-term follow-up.

Studies with multiple treatment groups

If selected studies contained two or more intervention groups, two review authors (AK, IH) determined which group was relevant to the review and the particular meta-analysis, based on the inclusion criteria for interventions (see Types of interventions). For all studies that included several intervention groups, we considered only one intervention group as relevant for the review (see Results, specifically 'Interventions').

Dealing with missing data

In the case of studies where there were missing data, such as missing SDs, or where healthcare students had been combined with other participants, we contacted the original authors to enquire if the missing data or subgroup (summary outcome) data were available. To obtain missing summary outcome data for studies solely conducted in healthcare students, we contacted the study authors (at least twice) to request the respective data (i.e. means, SDs and sample sizes for the relevant study conditions, or alternative information to calculate the SMDs; see Measures of treatment effect).

We did not ask for individual-level missing data for outcome data missing due to attrition, and performed no re-analysis using imputation methods. We rated studies with high levels of missing data (≥ 10%) that used no imputation methods at high attrition risk of bias (see Assessment of risk of bias in included studies). If the study authors had reported a complete-case analysis as well as imputed data, we used the summary outcome data based on the imputed dataset (e.g. last observation carried forward (LOCF) in two studies, or ideally expectation maximisation or multiple imputation).

Following the recommendations in the *Cochrane Handbook* (Higgins 2019b), we computed missing SDs for continuous

outcomes on the basis of other statistical information (e.g. t values, P values), since, as expected, we found enough information in all papers to restore SDs from the reported results.

Studies for which authors provided additional data not originally reported (e.g. number of participants analysed) are described in detail in the Characteristics of included studies tables. We recorded missing data and attrition levels for each included study in the 'Risk of bias' tables (beneath the Characteristics of included studies tables).

Assessment of heterogeneity

We assessed the presence of clinical heterogeneity by comparing study and population characteristics across all eligible studies, by generating descriptive statistics. In accordance with the *Cochrane Handbook* (Deeks 2019), we explored if studies were sufficiently homogeneous for participant characteristics, interventions and outcomes.

We assessed methodological diversity by inspecting the included studies for variability in study design and risks of bias (e.g. method of randomisation). In accordance with previous reviews that have already described the great heterogeneity in resilience intervention studies (Joyce 2018; Leppin 2014; Macedo 2014; Robertson 2015; Vanhove 2016), we discuss the similarities and differences between the included studies for these study characteristics in the Results and Discussion sections.

To assess statistical heterogeneity between the included studies within each pair-wise meta-analysis (i.e. heterogeneity in observed treatment effects that exceeds sampling error alone), we relied on forest plots, Chi^2 test, tau^2, and I^2 statistic, as suggested by Deeks 2019. We also considered G^2, in order to take small-study effects into account (Rücker 2011). Significant statistical heterogeneity is indicated by a P value in the Chi^2 test lower than 0.10. Since resilience-training studies are often conducted with relatively small sample sizes (e.g. Loprinzi 2011; Sood 2014), we acknowledge that the Chi^2 test has only limited power in such cases. Tau^2 also provides an estimate of between-study variance in a random-effects meta-analysis. The I^2 is a descriptive statistic, which reflects the percentage of total variation across studies that is due to heterogeneity rather than to chance. In accordance with guidelines (Deeks 2019), we assumed non-important heterogeneity for I^2 values of 0% to 40%, moderate heterogeneity for I^2 values of 30% to 60%, substantial heterogeneity for I^2 values of 50% to 90%, and considerable heterogeneity for I^2 values between 75% and 100%. G^2 indicates the proportion of unexplained variance, having allowed for possible small-study effects (Rücker 2011). No statistical heterogeneity is indicated by a G^2 near zero. We also calculated the 95% prediction intervals from random-effects meta-analyses (see Data synthesis; pooled analyses with more than two studies) to present the extent of between-study variation (Deeks 2019).

Assessment of reporting biases

We produced (contour-enhanced) funnel plots for the primary outcomes at post-test, plotting the effect estimates of studies against their standard errors on reversed scales (Page 2019; Peters 2008), in order to explore potential publication bias as part of our assessment of the certainty of the evidence and to create the 'Summary of findings' table (see Data synthesis). We considered the fact that funnel plot asymmetry does not necessarily reflect publication bias but can stem from a number of reasons (Page 2019). To differentiate between real asymmetry and chance, we followed the recommendations in Page 2019, and also used Egger's test (regression test; Egger 1997) to test for funnel plot asymmetry.

We did not assess reporting bias as planned for the remaining outcomes at other time points (Helmreich 2017), due to an insufficient number of studies (fewer than 10 studies) included in the meta-analyses for each outcome (see Effects of interventions).

Data synthesis

We synthesised the results, in narrative and tabular form, by describing the resilience interventions, their theoretical concept (when possible), as well as the populations and outcomes studied (see Results). We performed the statistical analyses either in Review Manager 5 (RevMan 5; Review Manager 2014) or in R (R 3.6.3 2019; libraries used: meta (Balduzzi 2019) metafor (Viechtbauer 2010) and metasens (Schwarzer 2019), when appropriate.

We combined outcome measures of included studies through pair-wise meta-analyses (any resilience training versus control), in order to determine summary (pooled) intervention effects of resilience-training programmes in healthcare students. The decision to summarise numerical results of RCTs in pair-wise meta-analyses depended on the number of studies found (at least two studies for a specific outcome and time point), as well as the homogeneity of the included studies by population (for age, sex), resilience interventions (i.e. comparable content and modalities), comparisons, outcomes measured (i.e. the same prespecified outcome, albeit with different assessment tools), and methodological quality (risk of bias) of selected studies. We conducted meta-analyses where intervention studies did not differ excessively in their content, outcomes (measures) were not too diverse and there were no individual studies predominantly at high risk of bias.

For summary statistics for continuous data, we reported SMDs using an inverse variance random-effects model. We used random-effects pair-wise meta-analyses since we anticipated a certain degree of heterogeneity between studies, as indicated by the results of previous reviews (Joyce 2018; Leppin 2014; Macedo 2014; Robertson 2015; Vanhove 2016), and given the nature of the interventions included. We calculated the 95% prediction intervals from random-effects meta-analyses (see Assessment of heterogeneity). As part of our sensitivity analyses, we also performed fixed-effect analyses (see Sensitivity analysis). We analysed continuous data reported as means and SDs in some studies separately from outcomes where SMDs and the respective standard error were taken from different data (e.g. independent t test). We subsequently combined these values using the generic invariance method in RevMan 5 (Review Manager 2014).

We also included studies with mixed samples (i.e. healthcare students and non-healthcare students) in meta-analyses, provided the subgroup data for healthcare students were reported separately or could be obtained from the study authors. If subgroup data were not available, we provided a narrative report of the findings of these studies in a separate section (see Effects of interventions, studies with mixed samples) for each outcome.

All studies measuring resilience used only one resilience scale. If a study reported more than one instrument for mental health and well-being outcomes or for a specific resilience factor, we used the measure most often used among the included studies for effect size calculation. For the outcome of depression, we preferred depression scales over burnout scales if both measures were reported. Where studies reported both general measures of well-being or quality of life and work-related assessments (e.g. job satisfaction, work-related vitality), we preferred general measures.

Once we had produced a summary of the evidence to date, and only if a pair-wise meta-analysis (any resilience training versus control) was possible, we examined whether the data were also suitable for a network meta-analysis (NMA). There was insufficient evidence to perform a NMA.

Summary of findings

In this review, we used the software developed by the GRADE Working Group, GRADEpro: Guideline Development Tool (GRADEpro GDT), to create a 'Summary of findings' table for the comparison: resilience interventions versus control conditions for healthcare students.

We included all primary outcomes at post-test in the 'Summary of findings' table. For each outcome, we assessed the certainty of the body of evidence using the GRADE approach proposed by the GRADE working group (Schünemann 2013; Schünemann 2019b), across the following five GRADE considerations:

- limitations in the design and implementation of available studies (i.e. unclear or high risk of bias of studies contributing to the respective outcome; Guyatt 2011a);
- high probability of publication bias (i.e. high risk of selective outcome reporting bias for studies contributing to the outcome, based on funnel plot asymmetry, Egger's test, different results of published versus unpublished studies, and whether the evidence consisted of many small studies with potential conflicts of interest) (Guyatt 2011b);
- imprecision of results (i.e. small number of participants included in an outcome and wide CIs; Guyatt 2011c);
- unexplained heterogeneity or inconsistency of results (i.e. heterogeneity based on variation of effect estimates, CIs, the statistical test of heterogeneity and I^2, but the subgroup analyses fail to identify a plausible explanation; Guyatt 2011d); and
- indirectness of evidence (i.e. included studies limited to certain participants, intervention types, or comparators; Guyatt 2011e).

According to the GRADE system, meta-analyses for continuous outcomes should include sample sizes of at least 400 participants for sufficient statistical precision. Where there was both substantial inconsistency ($I^2 \geq 60\%$) for an outcome and imprecision, we did not downgrade for imprecision, as the heterogeneity might have influenced the CI (i.e. precision) and we did not wish to double-downgrade for the same problem.

Two review authors (AK, IH), working independently, conducted the assessment of the certainty of the evidence in duplicate, resolving any disagreements by discussion or by consulting a third review author (AC, KL). We interpreted the magnitude of effect for continuous outcomes according to the criteria suggested in the *Cochrane Handbook* (Schünemann 2019a) (i.e. 0.2 as a small effect, 0.5 as a moderate effect, 0.8 as a large effect).

We rated the certainty of the evidence as high, moderate, low or very low (Schünemann 2013). High-certainty evidence indicates high confidence that the true effect lies close to that of the estimate of effect. Very-low certainty evidence indicates that we have very little confidence in the effect estimate and that the true effect is likely to be substantially different from the estimate of effect.

See Differences between protocol and review.

Subgroup analysis and investigation of heterogeneity

Due to the limited number of studies that we could include in our meta-analyses for the primary outcomes (fewer than 10 studies; Deeks 2019), we were not able to conduct the planned subgroup analyses to examine key characteristics of studies that may be associated with the substantial heterogeneity detected for several outcomes (see Effects of interventions). We were also unable to perform a subgroup analysis for training intensity (post hoc addition).

Sensitivity analysis

Due to the limited number of studies we were able to include in our meta-analyses for the primary outcomes (fewer than 10 studies; Deeks 2019), we did not conduct most of the planned sensitivity analyses to test the robustness of the findings of this review.

However, for the primary outcomes at post-test (i.e. the main analyses of this review), we performed the planned sensitivity analysis using a fixed-effect model in addition to random-effects meta-analyses.

RESULTS

Description of studies

Results of the search

We ran the first searches for this review in October 2016 according to the protocol (Helmreich 2017). We used the strategies in Appendix 8 to find studies in which the participants included any adults aged 18 years and older. Due to the large number of potentially eligible studies, we decided to split the review and changed the inclusion criteria to focus on healthcare sector workers and students (see Differences between protocol and review). Before running the top-up searches in June 2019, we revised the original search strategy by limiting the population to healthcare sector workers and students (Appendix 9). Following these searches, we further revised the inclusion criteria to healthcare students only, which is the focus of this review.

In total, the database searches retrieved 37,737 records. We found an additional 663 records by searching other resources. Following de-duplication, we screened the remaining 24,703 records by title and abstract. We deemed 21,629 records to be irrelevant and sought the full texts of the remaining 3074 records for further assessment. At the level of title/abstract screening, we achieved a good agreement (kappa = 0.70) for the original search, and an excellent agreement for the top-up searches (kappa = 0.99). The full-text screening resulted in excellent inter-rater reliability for both the original search (kappa = 0.95) and the top-up searches (kappa = 1).

After revising the eligibility criteria to focus broadly on the healthcare sector (including healthcare professionals and healthcare students; see Differences between protocol and review), we identified 80 studies that were performed in any of these groups. We also identified nine ongoing studies and 29 studies awaiting classification. We found six additional reports of studies during the top-up searches.

Finally, after revising the eligibility criteria to focus on **healthcare students**, we reassessed these 118 studies (from 144 reports). In total, for healthcare students, we included 30 studies (from 34 reports). We excluded a total of 3010 full text reports (see Figure 1); this figure includes 15 reports (13 excluded studies), which we needed to examine in detail to determine eligibility, and which are described in the Characteristics of excluded studies. We identified 22 studies awaiting classification (see Studies awaiting classification) and three ongoing studies (see Ongoing studies). For further details of our screening process, see the study flow diagram (Figure 1). We present the results of both searches in more detail in Appendix 12.

Figure 1. Study flow diagram for all searches.

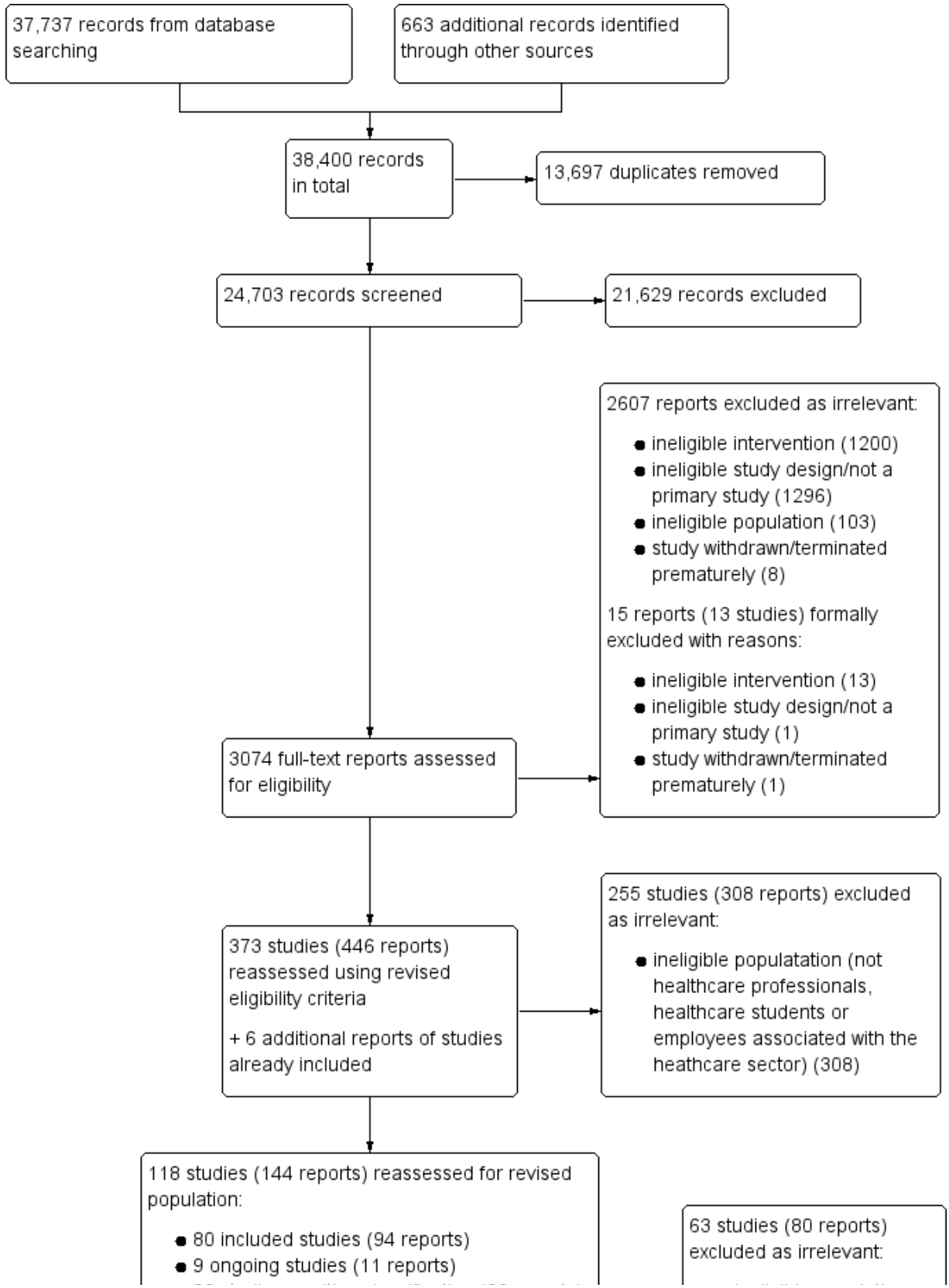
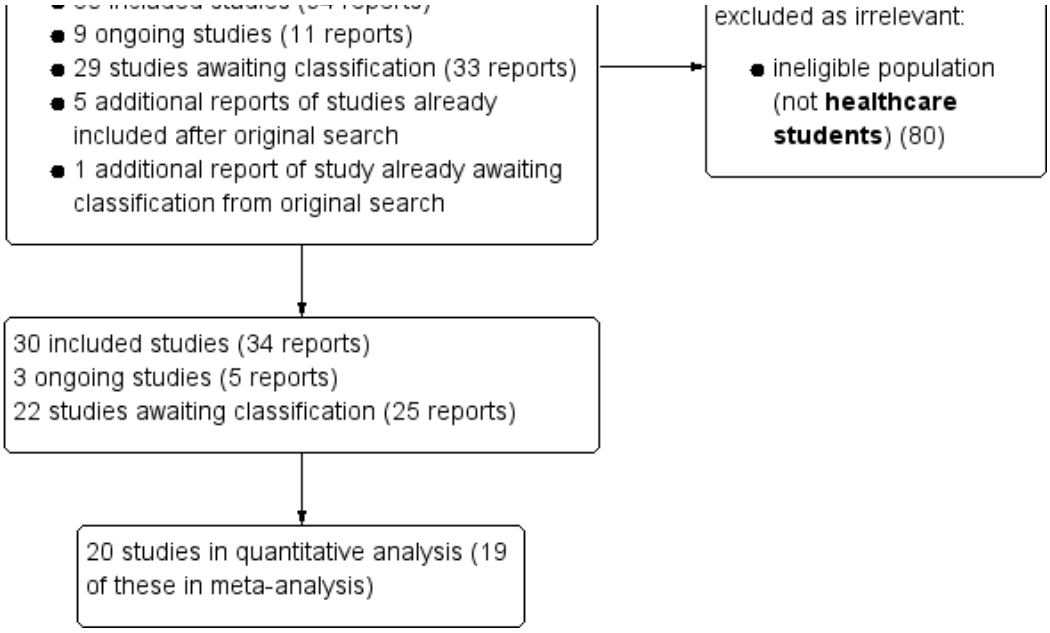


Figure 1. (Continued)



From an updated (pre-publication) search of four key databases in June 2020, we have added 16 studies (from 16 reports) to the Characteristics of studies awaiting classification tables. The results of these studies are not yet included in this review and will be incorporated at the next update. We also found an additional report of the included study by Houston 2017 (First 2018: a qualitative study in a subsample of Houston 2017).

Included studies

We present the corresponding references for the description of included studies in Appendix 13.

Study design

All 30 included studies were parallel-group designs, published between 2005 and 2019, with the exception of one completed but unpublished trial: ISRCTN64217625.

Location

Eleven studies were conducted in the USA, four in Canada, and three in Iran. Two studies apiece were performed in Australia, Germany, China, and the UK. The remaining studies took place in Belgium (Geschwind 2015), India (Mathad 2017), Switzerland (Recabarren 2019), and The Netherlands (Smeets 2014).

Settings

Training programmes were delivered at university or in schools (e.g. nursing school, school of medicine) in 11 studies. For nine studies, the intervention site was not further specified. As four studies included online or mobile resilience interventions, there was no concrete venue and participants could participate regardless of location. Three interventions took place in a laboratory. Two training programmes could be performed in the home setting (using a spoken compact disc (CD)). One resilience training was conducted in a mixed setting (online training plus face-to-face sessions with implementation site not further specified) (ISRCTN64217625).

Participants

Participants were mainly young women, due to the student sample (one study in doctoral candidates, Barry 2019). Most studies evaluated a resilience-training programme in nursing or midwifery students, closely followed by medical students with an almost equal number of studies.

The total number of healthcare students randomised across 20 of the 30 included studies was 1315 (including one completed but unpublished study: ISRCTN64217625 (targeting number: 50)). For eight studies with mixed samples (Barry 2019; Galante 2018; Geschwind 2015; Goldstein 2019; Houston 2017; Recabarren 2019; Venieris 2017; Victor 2018), the total number of participants randomised was 1365 participants. While the original number of healthcare students randomised in most of these mixed-sample studies is unclear, we received information from the authors for five studies (Barry 2019; Geschwind 2015; Houston 2017; Recabarren 2019; Victor 2018). For two studies, Kelleher 2018 and Samouei 2015, it was unclear how many participants were randomised. Overall, eight studies randomised 100 or more participants, and five studies randomised 30 participants or fewer.

Where data on age were available, the mean age across 13 studies in healthcare students (no studies with mixed samples) ranged from 19.5 to 26.83 years (SDs ranging from 0.77 to 5.12 years), with an average of 22.29 years (mean SD = 2.12 years). For mean age in studies with mixed samples, six out of eight studies reported a range of 19.35 to 38.14 years (SD ranging from 1.98 to 11.33 years) for the total samples, including healthcare students, with an average of 25.14 years (mean SD = 4.65 years). Three studies did not report mean age, but only the age range of participants (Houston 2017; Waddell 2005; Waddell 2015), and two studies (Galante 2018; Delaney 2016) considered participants aged 17 or 18 years and above, respectively. Six studies did not specify the age of the sample or were unclear (Chen 2018a; ISRCTN64217625; Kelleher 2018; Mejia-Downs 2016; Miu 2016; Samouei 2015).

Women outnumbered men in seven studies conducted solely in healthcare students, and men predominated in a further six studies. Three studies included only women. For six studies, the sex of the participants was unclear (Chen 2018a; ISRCTN64217625; Kelleher 2018; Mejia-Downs 2016; Samouei 2015; Waddell 2005). For 14 studies presenting the total numbers of men and women investigated, the proportion of women was 63.3%. Women outnumbered men in seven of the eight studies with mixed samples; one mixed-sample study included only women. The proportion of women in eight studies with mixed samples that reported total numbers by sex was approximately 67.3%.

Eight studies included solely nursing or midwifery students, and seven were conducted in medical students. Three studies involved paramedic students and two involved psychology students. Two studies included physical therapy students. The eight remaining studies were performed with mixed samples, i.e. healthcare students combined with other individuals such as volunteers or students in other fields. Relevant subgroups within these studies included: university students (Goldstein 2019; Houston 2017); doctoral candidates in different health fields (Barry 2019); psychology students (Geschwind 2015; Recabarren 2019; Victor 2018); 'Clinical medicine' and 'Humanities and social sciences' students (p e76; Galante 2018); students in 'Health & Wellness' and 'Social and Behavioral Sciences' (p 146; Venieris 2017).

Twelve of the 30 studies assessed mental health at baseline. All studies measuring mental health used self-report (screening) measures covering one or a small number of mental dysfunctions (e.g. Depression Anxiety and Stress Scales (DASS) in Barry 2019). Only one of these studies also conducted comprehensive baseline diagnostics with the use of a structured interview (Mini-International Neuropsychiatric Interview (MINI); (Recabarren 2019). Seventeen studies provided no data about the mental health status of the sample. For one unpublished trial (ISRCTN64217625) and one study published as a conference abstract (Goldstein 2019), the baseline mental health status was unclear, although both of them assessed mental health at baseline. Eight studies included mentally healthy participants only (Akbari 2017; Recabarren 2019), participants without severe psychiatric illness (not further specified; Mathad 2017), participants showing symptoms below a cut-off on a screening instrument (Barry 2019; Wang 2012; Warnecke 2011) or participants without certain mental disorders or suicidality, e.g. bipolar disorder, psychosis (Miu 2016; Victor 2018). Wang 2012 only considered participants with a mental crisis. Since Victor 2018 focused on burdened students, they included participants with a symptom burden of four or more on the Global Severity Index of the Brief Symptom Inventory.

Interventions

All 30 studies examined the effects of a psychological intervention to foster resilience, hardiness or post-traumatic growth in healthcare students, compared to a control condition. Most studies evaluated group interventions (17 studies), that were delivered face-to-face (17 studies) and were structured on mindfulness-based theoretical approaches (eight studies). High-intensity interventions (11 studies) and training programmes of low intensity (10 studies) were relatively balanced.

Two studies had multiple intervention arms (Kötter 2016; Venieris 2017). In a three-arm study (Kötter 2016), one intervention group (IG1) participated in a one-hour psycho-educative seminar (e.g. emotional reactions towards stressors) plus two individual coaching sessions, with the latter designed to foster individual stress-management resources (i.e. resilience) using techniques such as eye movement desensitisation and neurolinguistic programming. IG2 received the psycho-educative seminar only. Due to an unexpected shortfall in the sample size, the study authors combined both intervention arms in the quantitative analyses. Venieris 2017 was a three-arm study comparing a positive psychology intervention (PPI; IG1) to an informative stress intervention (IG2) or a wait-list control group. The PPI asked participants to engage in one of five activities (e.g. '3 grateful things') everyday for three weeks, whereas IG2 provided information about stress and positive coping mechanisms. Since the study authors hypothesised an increase in resilience in the PPI group compared to the remaining groups, we considered this group to be relevant for our review.

Setting

Seventeen interventions were performed in groups. Seven studies were conducted in an individual setting. Four studies were performed in a variety of training settings. Two studies did not specify the type of setting (Chen 2018a; Miu 2016).

Delivery format

Seventeen studies delivered resilience interventions face-to-face. Five studies used multimodal delivery of interventions (e.g. face-to-face group sessions and internet-based training). Four studies examined online or mobile-based resilience-training programmes, and two studies tested interventions that were conducted in a laboratory setting and unlikely with face-to-face contact.Two studies used an audio intervention.

Training intensity

Treatment duration varied between a 20-minute single intervention session (Geschwind 2015) and 40 hours in total, i.e. one hour a day for five days a week over eight weeks (Mathad 2017). Eleven studies included high-intensity training (more than 12 hours or more than 12 sessions). Ten RCTs investigated low-intensity interventions (i.e. less than five hours or three sessions or fewer), and seven studies evaluated moderate-intensity training (i.e. more than five hours to 12 hours or less, or more than three sessions to 12 sessions or fewer). The intensity of the training was unclear for two interventions (Barry 2019; Venieris 2017).

Theoretical foundations

We categorised the interventions into six groups, based on their content and the descriptions provided by the study authors. We present a synthesis of the characteristics of studies within a specific theoretical foundation and the respective intervention content in Appendix 14.

Eight studies evaluated mindfulness-based resilience interventions, including MBSR (Erogul 2014; Kelleher 2018) and content related to mindfulness-based (self-)compassion (e.g. Chen 2018a; Smeets 2014). Seven RCTs examined nonspecific resilience interventions that did not give details of the type of resilience-training programmes conducted or their theoretical orientation, but aimed at fostering one or several prespecified resilience factors (see Appendix 2, level 1, e.g. self-esteem, social support, active coping by problem-solving, spirituality). Six studies included interventions based on a combination of two or more explicit

theoretical foundations (e.g. CBT and positive psychology). Of these, two were based on mindfulness (e.g. MBSR) and CBT or cognitive therapy (ISRCTN64217625; Recabarren 2019), and four combined interventions that could not be clustered any further (Delaney 2016; Goldstein 2019; Kötter 2016; Victor 2018). Four resilience-training programmes were based on positive psychology. Three interventions included only elements of CBT. Resilience-training programmes based on coaching approaches were tested in two studies.

Comparators

With the exception of one study (Victor 2018), all 30 included studies involved only one comparator. In Victor 2018, the intervention group PRM (see Interventions) was compared to attention control and wait-list control groups. For this review, we considered only the attention-control group to be relevant.

Most studies included wait-list control groups (10/30 studies) and no intervention comparators (7/30 studies), followed by attention control (6/30 studies; Victor 2018 (second CG)), active control (3/30 studies) and TAU (3/30 studies). Two studies did not specify the type of control group (Anderson 2017; Wang 2012).

Of the six studies comparing a resilience intervention with an attention-control group, two studies conducted in a laboratory setting either instructed participants to think about a typical day and visualise this scenario for five minutes (Geschwind 2015), or used the 'Wisdom On Wellness' (WOW) intervention, which included some level of social interaction (Goldstein 2019). Further attention-control comparators included a single laboratory session on the role of the brain and information processing (participants had to read an article, read testimonials from others and write to others about what they learned; Miu 2016); a time management intervention (Smeets 2014); an educational intervention on Twitter consisting of nursing trivia or questions related to nursing knowledge (Stephens 2012); and individual coaching sessions on the ABC (Activating event, Belief, Consequences) model (e.g. challenging dysfunctional and testing alternative thoughts) (Victor 2018).

In three studies, active control groups included a booklet and a worksheet on therapeutic communication (Delaney 2016); brochures about scientific information unrelated to psychology (Samouei 2015); and a standard, group-based resilience training (Mind's resilience intervention; ISRCTN64217625). We considered the last intervention to use an active control group, rather than TAU, because the Mind's group-based resilience intervention for emergency personnel had been newly developed in a recent study (Wild 2016), and was not yet considered as established standard care.

In three studies, TAU referred to usual mental health support (Galante 2018), or a standard undergraduate curriculum group for nursing students (Waddell 2015). Warnecke 2011 did not further specify the content of the TAU group.

One study used a design where a control group plus resilience intervention was compared to the control group alone (Galante 2018). One completed but unpublished study (ISRCTN64217625) examined the impact of a face-to-face resilience intervention (control group) versus the same resilience intervention with an additional internet-based top-up session (intervention group).

Outcome measures

The included RCTs used a diversity of outcome measures, but some studies measuring the same outcomes (e.g. perceived stress) used the same instrument (e.g. Perceived Stress Scale; Cohen 1983b; Cohen 1988a). All outcomes were based on self-reported assessments and most studies used validated scales.

Primary outcomes

We defined treatment efficacy as an improvement in resilience, assessed by specific resilience scales, or an improvement in four categories of mental health and well-being (i.e. anxiety, depression, stress or stress perception, and well-being or quality of life). For each outcome, the studies used heterogeneous scales (see details in Table 2). Among the 30 included studies, 17 assessed resilience using a resilience scale, followed by stress or stress perception (13 studies), depression (e.g. depressive symptoms; 10 studies), anxiety (nine studies) and well-being or quality of life (six studies).

Secondary outcomes

The authors of the included studies used a heterogeneous group of instruments to assess the secondary outcomes (see details in Table 3). Most of the included studies assessed self-efficacy (seven studies), followed by positive emotions (six studies). Social support and optimism were assessed by four studies each. Active coping and self-esteem were assessed by two studies each, while hardiness was an outcome measure in one study.

Funding sources

Funding sources for the included studies were various, and in six studies included universities (e.g. certain faculties, medical schools) and university research funds. In four studies, further funding was provided by different foundations. Two studies received funding from the nursing organisation Sigma Theta Tau. Single studies were supported by a scholarship (Waddell 2005), the Graduate and Professional Student Association (Venieris 2017), the US Substance Abuse and Mental Health Services Administration through a university's Disaster and Community Crisis Center (Houston 2017), and the Social Sciences and Humanities Council (Waddell 2015). Four studies reported a combination of funding sources (e.g. Canadian Mental Health Association, Campus Capacity Development Grant and Justice Institute of British Columbia; university, National Institute for Health Research Collaboration and Care East England; award and graduate research fellowship; university and charity). Seven studies did not report their funding sources (Mathad 2017; Miu 2016; Smeets 2014; Victor 2018; Wang 2012) or did not offer the information (e.g. conference abstract) (Chen 2018a; Kelleher 2018). Three studies received no funding support (Mueller 2018; Samouei 2015; Sahranavard 2018).

Excluded studies

We excluded 3010 irrelevant full text reports.

We excluded 13 studies that seemed to merit inclusion but on closer inspection did not (see Characteristics of excluded studies). Most of these studies (11/13) were excluded for an ineligible intervention (Brady 2016; De la Fuente 2018; De Vibe 2013; Duan 2019; Dvořáková 2017; Esch 2013; Huennekens 2018; Pogrebtsova 2018; Sampl 2017; Song 2015; Van Dijk 2015). Of these, eight studies only briefly mentioned the concept of resilience or a related construct (e.g.

in the introduction or discussion section of a publication), but did not explicitly state the aim of fostering resilience, hardiness or post-traumatic growth through the intervention (Brady 2016; De la Fuente 2018; De Vibe 2013; Dvořáková 2017; Esch 2013; Huennekens 2018; Pogrebtsova 2018; Song 2015). It was also unclear in Dvořáková 2017 whether healthcare students were included. Duan 2019 evaluated an intervention based on strengths-based CBT to build resilience (Padesky 2012). However, the authors did not specify the intention of fostering resilience. Sampl 2017 (psychology students included) often mentioned the concept of resilience, but we excluded the study as, according to the investigators, it primarily focused on (measured) constructs such as mindfulness. Van Dijk 2015 was excluded, as the study mentioned resilience in a publication reporting baseline results of the RCT, but not in the final report.

We excluded one study due to ineligible study design: Victor 2017 evaluated a strengths-based CBT intervention to foster resilience in first-year psychology students by randomising participants to either the training or to a no-intervention control group. However, as participants were free not to follow the invitation, the authors pointed out that randomisation may have been jeopardised by self-selection bias. We therefore excluded this study for an ineligible study design.

Finally, we did not include ACTRN12617000300370, as we received information from the primary investigators that the trial in university staff failed to obtain human resources approval to proceed, and that the authors did not have any data relevant to the meta-analysis.

Studies awaiting classification

We identified 22 studies awaiting classification.

For 20 studies, it was unclear whether the final sample also included healthcare students (Arch 2014; Bauman 2014; Beadel 2016; Chen 2018b; DRKS00011265; DRKS00013765; Enrique 2019; Gerson 2013 (study 1); Gerson 2013 (study 2); Harrer 2018; Herrero 2019; ISRCTN17156687; Kanekar 2010; Liu 2016; NCT02867657; NCT03903978; Oman 2008; Roghanchi 2013; Seligman 2007; Zhang 2018). In six studies (Arch 2014; Bauman 2014; Beadel 2016; Gerson 2013 (study 1); Gerson 2013 (study 2); Oman 2008), for example, the study authors reported partial recruitment in psychology departments. However, whether psychology students had been included in the final sample was not specified in the reports and could not be obtained from the study authors. Similarly, 14 studies only described recruiting university or college students in general, and based on the available reports it was unclear if the final samples included healthcare students at all (Chen 2018b; DRKS00011265; DRKS00013765; Enrique 2019; Harrer 2018; Herrero 2019; ISRCTN17156687; Kanekar 2010; Liu 2016; NCT02867657; NCT03903978; Roghanchi 2013; Seligman 2007; Zhang 2018).

In one study (NCT03669016) resilience was assessed as a secondary outcome, but we could not clearly determine the extent to which the trial focused on fostering this construct based on the trial registration, and received no response from the authors. The same applied to Chen 2018b, for which resilience or a related construct was not mentioned in the available conference abstract.

The study design of Ye 2016 could not be clearly determined, since the full text was not available and we identified no contact details to ask the study authors for more information. The same applied to Zhang 2018 (available as a conference abstract) and to Liu 2016, for which, besides the potential inclusion of healthcare students, randomisation was also unclear.

Details of these studies can be found in the Characteristics of studies awaiting classification tables.

Sixteen studies from the updated search in June 2020 were also added to the Characteristics of studies awaiting classification tables. They will be incorporated into this review at the update stage.

Ongoing studies

We found three ongoing studies that are likely to meet our inclusion criteria (Harrer 2019; NL7623; Wild 2018). All three studies are RCTs with parallel assignment. In a sample of German distance-learning students experiencing elevated levels of depression (including psychology students), Harrer 2019 assessed the impact of TAU (e.g. general practitioner visits, counselling services) plus StudiCare Fernstudierende (a seven-week online intervention with feedback on demand) versus usual care plus attention control (online psycho-education). The intervention involved information about stress, systematic problem-solving, muscle and breath relaxation, mindfulness, acceptance and tolerance, self-compassion and creating a master plan (e.g. recognising physiological warning signs, creating a plan for the future). Using a longitudinal observation cohort study with a nested RCT, a Dutch study (NL7623) randomised students at the Erasmus University Medical Center in Rotterdam to either resilience training or an active control (psycho-education about chronic stress and burnout prevention). In contrast to the other ongoing studies, the intervention group did not receive only one treatment, but followed a maximum of three intervention periods (e.g. mindfulness training, stress management training) of eight weeks each. Wild 2018 examined the impact of an internet-based cognitive training for resilience (iCT-R) versus attention control (mind-online) and TAU (usual support by university) in a sample of paramedic students.

Further details of these studies can be found in the Characteristics of ongoing studies tables.

Risk of bias in included studies

The main limitations we found for risks of bias (≥ 20% high risk) across the 30 studies were in the following domains: performance bias, detection bias, attrition bias, and reporting bias. See Figure 2 and Figure 3 for 'Risk of bias' graphs, and Characteristics of included studies tables for further information. A large number of studies provided insufficient information to adequately judge the risk of selection bias. We identified the greatest variation across studies for attrition and reporting biases.

Figure 2. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.

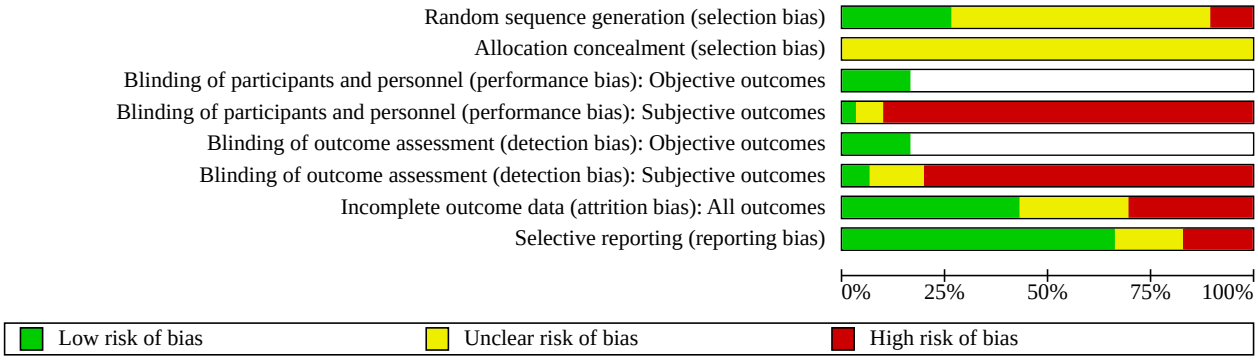


Figure 3. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.

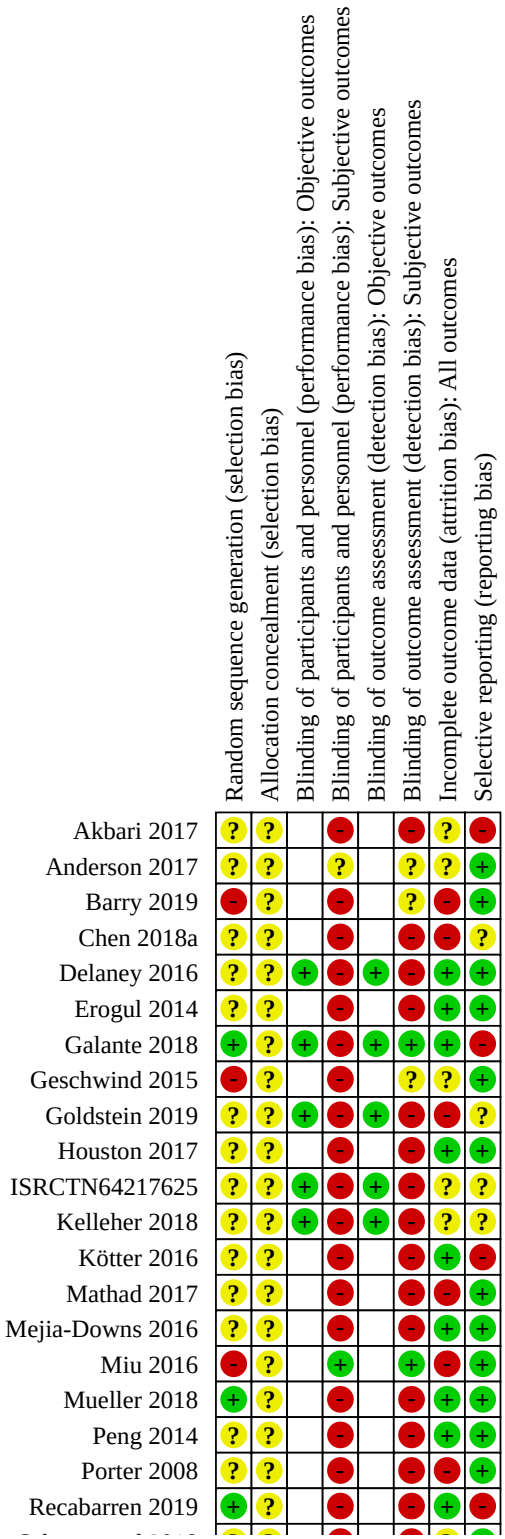
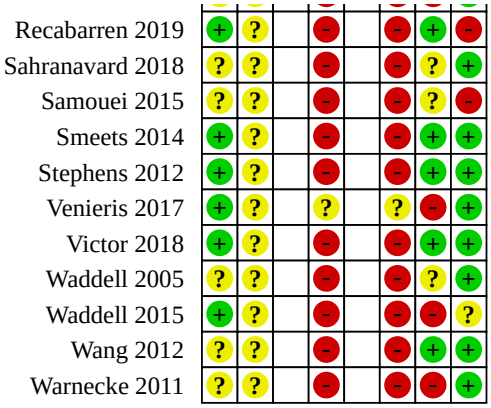


Figure 3. (Continued)



Allocation

Sequence generation

We rated eight studies at low risk of selection bias, since the investigators described a random component in the sequence-generation process (e.g. computer-generated random sequence, shuffling cards). For five of these, there was verified baseline comparability between study groups for sociodemographic characteristics (i.e. potential confounding factors) as well as outcome variables (Mueller 2018; Smeets 2014; Venieris 2017; Victor 2018; Waddell 2015). For three studies, there was evidence of a genuine random assignment (e.g. computer-generated random sequence), but the authors provided no information (Galante 2018) or only partial information about potential baseline differences in sociodemographic and outcome measures (Recabarren 2019; Stephens 2012).

We rated 14 studies as having unclear risk of selection bias because there was no description of the sequence-generation process (Akbari 2017; Anderson 2017; Delaney 2016; Erogul 2014; Houston 2017, Kötter 2016; Mathad 2017; Peng 2014; Porter 2008; Sahranavard 2018; Samouei 2015; Waddell 2005; Wang 2012; Warnecke 2011). Nine of these RCTs did not specify further the baseline comparability of groups for (some) sociodemographic characteristics or outcomes of interest, or both (Akbari 2017; Houston 2017; Kötter 2016; Mathad 2017; Peng 2014; Porter 2008; Sahranavard 2018; Samouei 2015; Waddell 2005). Based on the limited information in conference abstracts or trial registrations, we considered five further studies at unclear risk of bias (Chen 2018a; Goldstein 2019; ISRCTN64217625; Kelleher 2018; Mejia-Downs 2016).

We judged three studies to be at high risk of selection bias since, despite randomisation, baseline comparability in sociodemographic characteristics or outcomes (or both) could not be verified by the investigators based on statistical analysis (Barry 2019; Geschwind 2015; Miu 2016).

Allocation concealment

Allocation concealment was not well reported and we rated all 30 included studies at unclear risk of selection bias for this domain.

Five studies described the randomisation process being concealed from participants or from personnel recruiting participants, or both, but neglected to specify further the method of allocation concealment (Erogul 2014; Miu 2016; Mueller 2018; Recabarren 2019; Waddell 2015).

The authors of 20 studies provided either insufficient or no information about the allocation concealment process (Akbari 2017; Anderson 2017; Barry 2019; Delaney 2016; Galante 2018; Geschwind 2015; Houston 2017; Kötter 2016; Mathad 2017; Peng 2014; Porter 2008; Sahranavard 2018; Samouei 2015; Smeets 2014; Stephens 2012; Venieris 2017; Victor 2018; Waddell 2005; Wang 2012; Warnecke 2011). In Barry 2019, the random-sequence generation was probably concealed from the participants (sealed trial pack that participants were instructed to open only after the baseline assessment), but the allocation concealment for the investigators enrolling the participants was not specified. Similarly, for the two randomisation procedures used in Kötter 2016, the study authors described the allocation concealment in sufficient detail (sealed, opaque envelopes) for the second randomisation (IG1 versus IG2), but it was unclear for the first randomisation to either treatment or control group.

There was limited information in conference abstracts or trial registrations to reach a decision on the risk of bias for five studies, and we therefore rated them as having an unclear risk of bias (Chen 2018a; Goldstein 2019; ISRCTN64217625; Kelleher 2018; Mejia-Downs 2016).

Blinding

Blinding of participants and personnel

Objective outcomes

Five of the 30 studies assessed one or several objective outcomes such as physical activity by accelerometers, heart/breathing rate or grade point average (Delaney 2016; Galante 2018; Goldstein 2019; ISRCTN64217625; Kelleher 2018). Although study personnel were not blinded in most of these studies (see next paragraph on subjective outcomes below), we judged these studies to be at low risk of performance bias in relation to objective outcomes.

Subjective outcomes

We considered only one of the 30 studies to be at low risk of performance bias for subjective outcomes (Miu 2016), as this was a double-blind RCT.

We rated two studies at unclear risk of performance bias (Anderson 2017; Venieris 2017). Anderson 2017 performed a (blended) online resilience intervention without specifying the blinding of participants and personnel. Venieris 2017 also delivered a training programme through an online educational system, and the blinding of participants was probably ensured (i.e. participants were not specifically informed about the number or nature of study conditions, but only informed that they may or may not be asked to participate in different activities), but there was insufficient information about the potential blinding of study personnel.

We judged 22 studies to be at high risk of performance bias because resilience interventions were performed entirely face-to-face (Akbari 2017; Chen 2018a; Delaney 2016; Erogul 2014; Galante 2018; Goldstein 2019; Houston 2017; Kelleher 2018; Kötter 2016; Mathad 2017; Mejia-Downs 2016; Peng 2014; Porter 2008; Recabarren 2019; Sahranavard 2018; Samouei 2015; Victor 2018; Waddell 2015; Wang 2012), or included face-to-face elements (ISRCTN64217625; Smeets 2014; Waddell 2005), resulting in a lack of blinding of personnel. Some of these studies explicitly indicated the lack of blinding of both participants and personnel (e.g. Galante 2018; Kötter 2016; Recabarren 2019). We also rated five other studies at high risk of performance bias for the following reasons. Barry 2019 and Warnecke 2011, which were described as single-blind studies, provided participants with a spoken CD. While Warnecke 2011 described no blinding of participants, it was unclear whether or not study personnel or participants had been blinded in Barry 2019. Mueller 2018 performed an online, self-guided intervention and indicated no blinding of participants; blinding of study personnel was unlikely also, as they monitored discussion-board postings within the intervention. Stephens 2012 conducted a resilience-training programme on Twitter by only one researcher who also performed the outcome assessment. Geschwind 2015 included a resilience intervention that was conducted in a laboratory. Although there was no face-to-face contact, the study personnel in these studies were not blinded, as verbal communication with participants was possible and participants were observed by the intervention providers.

Blinding of outcome assessment

Objective outcomes

We considered all five studies measuring objective outcomes to be at low risk of detection bias. Although two of these studies did not adequately describe the blinding of outcome assessment (Delaney 2016; Galante 2018), we judged them to be at low risk of detection bias, since they used objective outcomes (e.g. physiological parameters), which we considered unlikely to be influenced by the lack of blinding. We applied the same rating to three other studies that used objective outcomes, even though there was insufficient information in the conference abstracts, posters or trial registrations (Goldstein 2019; Kelleher 2018; ISRCTN64217625).

Subjective outcomes

We judged only two studies to be at low risk of detection bias for the assessment of subjective outcomes (Galante 2018; Miu 2016), for the following reasons: data were collected using web-based software to ensure masking of outcome assessors (Galante 2018), or researchers blind to condition provided a link to an online survey (Miu 2016).

We considered four studies to be at unclear risk of detection bias, because the study authors did not adequately describe the blinding of the results (Anderson 2017; Barry 2019; Geschwind 2015; Venieris 2017), and the risk of performance bias (i.e. blinding of participants) was low or unclear (see blinding of participants and personnel).

Finally, we rated 24 studies at high risk of detection bias. Blinding of outcome assessment seemed unlikely in Kötter 2016 for the assessment after first randomisation, since the group allocation was concealed neither from study personnel nor from the participants (unclear blinding for the second assessment). In Stephens 2012, the outcome assessor was the same individual who provided the intervention and therefore could not be blinded. For the remaining 22 studies, due to (potential) performance bias (no blinding of participants), we judged that the participants' responses to questionnaires may be likely to be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received) (Akbari 2017; Chen 2018a; Delaney 2016; Erogul 2014; Goldstein 2019; Houston 2017; ISRCTN64217625; Kelleher 2018; Mathad 2017; Mejia-Downs 2016; Mueller 2018; Peng 2014; Porter 2008; Recabarren 2019; Sahranavard 2018; Samouei 2015; Smeets 2014; Victor 2018; Waddell 2005; Waddell 2015; Wang 2012; Warnecke 2011).

Incomplete outcome data

We assessed 13 studies as having low attrition bias because they met at least one of the following criteria: the losses were similar across intervention and control groups; the reasons for missing data were unlikely to be related to the true outcome (e.g. dropout due to pregnancy); the losses were not substantial (< 10% from number of randomised participants; e.g. two dropouts from 70 participants in Wang 2012) and/or study authors accounted for dropouts and losses to follow-up by using statistical analyses aimed at reducing bias (e.g. multiple imputation) or preventing false-positive conclusions (e.g. last observation carried forward) (Delaney 2016; Erogul 2014; Galante 2018; Houston 2017; Kötter 2016; Mejia-Downs 2016; Mueller 2018; Peng 2014; Recabarren 2019; Smeets 2014; Stephens 2012; Victor 2018; Wang 2012). Four studies performed an intention-to-treat (ITT) analysis (Galante 2018; Kötter 2016; Recabarren 2019; Victor 2018). Based on data provided by the original investigator, Mejia-Downs 2016 analysed all randomised participants, but it is unclear if there were any missing data that were imputed. The same applied to Peng 2014, who reported results for all participants randomised but did not state the level of missing data. Smeets 2014 provided contradictory information about the number of participants analysed (available-case analysis according to p 797 versus ITT analysis according to Table 2 in the report), but we judged the study to be at low risk of bias, as the dropout was not substantial. Delaney 2016 did not clearly specify the number of participants analysed and we relied on the numbers reported in the publications, as we had no response from the study authors.

We rated eight studies at unclear risk of attrition bias. Four studies did not fully account for dropouts throughout the study or whether this differed between groups (Akbari 2017; Anderson 2017; Geschwind 2015; Samouei 2015). Samouei 2015 did not report the number of participants randomly allocated to each group. Anderson 2017 and two other studies (Sahranavard 2018; Waddell 2005: especially after phase two) did not clearly specify the number of participants analysed and we relied on the numbers reported in the publications, having received no response from

the study authors, or had to derive these indirectly from other statistical values in the report with the help of the statistician (JK). We could not judge the risk of attrition bias from the information available in conference abstracts or trial registrations for two studies (ISRCTN64217625; Kelleher 2018), which we consequently rated at unclear risk of bias.

We considered nine studies to be at high risk of attrition bias. In three of these, the reasons for missing data were unlikely to be related to the true outcome (e.g. similar levels of missing data between groups with a difference of two or less lost individuals); however, there was substantial attrition (10% or more compared to the randomised sample), and study authors did not impute the missing data and performed an available-case analysis (i.e. participants for whom outcomes were obtained at assessments) or a per-protocol analysis (i.e. only participants who complied with their allocated intervention or attended a certain number of sessions), or both (Mathad 2017; Porter 2008; Warnecke 2011). Despite an imbalance in the levels of missing data between groups in Warnecke 2011, the investigators ensured that reasons for missing data were unlikely to be related to the true outcome, based on non-significant differences in demographic and outcome variables between completers and non-completers of the study (i.e. random loss). Missing data in the study were treated as absent and the study authors performed an available-case analysis. Two studies did not provide sufficient information about dropouts, such as the number of participants randomised to each group or attrition by group (Chen 2018a; Waddell 2015). Based on the number of participants analysed, we presumed an available-case or per-protocol analysis, or both (e.g. no hypothesis testing in Chen 2018a due to dropout), and considered both studies to be at high risk of bias because of substantial dropout (≥ 10%). In four other studies at high risk of attrition bias (Barry 2019; Goldstein 2019; Miu 2016; Venieris 2017), reasons for missing data were likely to be related to the true outcome because of imbalance in missing data between groups, and an available-case or per-protocol analysis (or both) was conducted in all four studies. Not all studies reported reasons for missing data (e.g. Venieris 2017).

Selective reporting

To assess potential reporting bias for 22 non-registered studies or those without a published study protocol (Anderson 2017; Barry 2019; Delaney 2016; Erogul 2014; Galante 2018; Geschwind 2015; Houston 2017; Mathad 2017; Miu 2016; Mueller 2018; Peng 2014; Porter 2008; Sahranavard 2018; Samouei 2015; Smeets 2014; Stephens 2012; Venieris 2017; Victor 2018; Waddell 2005; Waddell 2015; Wang 2012; Warnecke 2011), we considered whether the outcome measures described in the Methods section of the paper were reported in the Results section. We were unable to assess reporting bias for three additional, non-registered studies, for which only conference abstracts were available (Chen 2018a; Goldstein 2019; Kelleher 2018).

Of the 25 non-registered studies, we considered 19 to be free of reporting bias because the published results corresponded to those expected in these types of studies (Anderson 2017; Barry 2019; Delaney 2016; Erogul 2014; Geschwind 2015; Houston 2017; Mathad 2017; Miu 2016; Mueller 2018; Peng 2014; Porter 2008; Sahranavard 2018; Smeets 2014; Stephens 2012; Venieris 2017; Victor 2018; Waddell 2005; Wang 2012; Warnecke 2011). We rated four studies (including three reported as conference abstracts) at unclear risk of reporting bias (Chen 2018a; Goldstein 2019; Kelleher 2018; Waddell 2015); in Waddell 2015, although the published report seemed to include all expected outcomes, the reported assessment at time four was not further specified (i.e. it is unclear whether it is a 12-month follow-up period or a post-test assessment). We judged two studies to be at high risk of bias, largely because not all prespecified outcomes were reported (Galante 2018; Samouei 2015).

Five studies were prospectively or retrospectively registered (Akbari 2017; ISRCTN64217625; Kötter 2016; Mejia-Downs 2016; Recabarren 2019). Of these registered studies, we considered one study to be at low risk of reporting bias as the (unpublished) report included all expected outcomes in the prespecified way (Mejia-Downs 2016); no full text (dissertation) was available for this study, but we considered the risk of reporting bias to be low based on the Results section, which was provided by the study author in response to our email request. For one registered trial (ISRCTN64217625) we could not determine the risk of reporting bias on the basis of trial registration, as the study was completed but unpublished and no further information was provided by the study authors during the publication process. We judged three registered studies to be at high risk of reporting bias because not all of the prespecified outcomes (Recabarren 2019) or time points (Akbari 2017; Kötter 2016) were reported. According to the study authors, Recabarren 2019 was only the first publication for this study, so future publications reporting the other prespecified outcomes are possible.

Effects of interventions

See: **Summary of findings 1** Resilience interventions versus control conditions for healthcare students

See: Summary of findings 1.

Overall, across the included studies in healthcare students, we were able to perform 14 pooled analyses that combined at least two studies.

We analysed effects on all primary outcomes at immediate post-intervention and at short-term follow-up (except for well-being or quality of life). No meta-analyses were possible for any of the primary outcomes at medium-term or long-term follow-up. For the secondary outcomes, we performed meta-analyses for social support, optimism, self-efficacy and positive emotions at post-intervention, and social support at short-term follow-up. For several secondary outcomes, i.e. active coping, self-esteem and positive emotions, only single-study results were available at short-term follow-up (three months or less). No secondary outcome was measured at medium- or long-term follow-up.

We present the different outcome measures that we used to assess the primary and secondary outcomes in the included studies in Table 2 and Table 3, respectively. For the primary outcomes of resilience and well-being or quality of life, as well as all secondary outcomes (social support, optimism, self-efficacy, active coping, self-esteem, hardiness, positive emotions), positive values indicate a higher (i.e. better) level of the corresponding outcome in the intervention group compared to the control group (e.g. higher resilience), whereas negative values refer to lower levels of the respective outcome in the intervention arm. For the remaining primary outcomes of anxiety, depression and stress or stress perception, negative values indicate a lower (i.e. better) level of these outcomes in the intervention arm (e.g. fewer depressive

symptoms) compared to the control arm, while positive values refer to a higher level of depression, anxiety and stress or stress perception in the intervention group compared to control.

We report P values exactly, and where provided by the study authors, unless P values are lower than 0.001, in which case they are expressed as P < 0.001. T values and P values of Egger's tests were rounded.

Resilience interventions versus control conditions in healthcare students

Primary outcomes

Resilience

Post-intervention

Thirteen studies evaluated the effect of resilience interventions compared to control groups on resilience at immediate post-intervention.

Nine studies reported data suitable for quantitative analysis (Anderson 2017; Barry 2019; Erogul 2014; Houston 2017; Mathad 2017; Mueller 2018; Peng 2014; Stephens 2012; Wang 2012), including two studies with mixed samples (Barry 2019; Houston 2017) for which we obtained subgroup data for healthcare students by contacting the study authors. The pooled effect estimate suggests evidence of a moderate effect of resilience interventions on resilience at post-intervention (standardised mean difference (SMD) 0.43, 95% confidence interval (CI) 0.07 to 0.78; P = 0.02; 9 studies, 561 participants; I^2 = 75%; Tau^2 = 0.21; P for heterogeneity < 0.001; G^2 = 55.9%; 95% prediction interval: −0.54 to 1.41; Analysis 1.1; very-low certainty evidence, see Summary of findings 1).

For resilience at post-intervention, we found no evidence of asymmetry based on funnel plots and Egger's test (t = −1.42; df = 7; P = 0.20; see Appendix 15 and Appendix 16).

Indicators of statistical heterogeneity were mixed, with I^2 and Chi^2 values indicating substantial to considerable heterogeneity, while G^2 suggested moderate heterogeneity.

Single-study results

Four studies also measuring resilience at post-intervention could not be pooled with the studies above for the following reasons: for one unpublished study (ISRCTN64217625) we could not obtain the data from the study authors (i.e. trial completed, but publication process still ongoing). The same applied to two studies only available as conference abstracts (Chen 2018a; Kelleher 2018). Without indicating statistical values, Kelleher 2018 (sample size not specified) reported higher resilience scores at post-intervention in the intervention group compared to the control group. For another study graphically reporting the results for resilience (Delaney 2016), we could not obtain the quantitative data from the study authors. However, Delaney 2016 (probably 37 participants included) reported no evidence of a difference in resilience between intervention and control groups at post-test.

Short-term follow-up (≤ 3 months)

Seven individually-randomised studies, including one study with a mixed sample (Victor 2018), assessed the effect of resilience-training programmes versus control groups on resilience at short-term follow-up. We were able to combine the data from four of these studies, including one mixed-sample study with available subgroup data (Victor 2018), in a meta-analysis (Mejia-Downs 2016; Stephens 2012; Victor 2018; Wang 2012). The pooled SMD for resilience was 0.20 (95% CI −0.44 to 0.84; P = 0.53; 4 studies, 209 participants; I^2 = 80%; Tau^2 = 0.34; P for heterogeneity = 0.002; G^2 = 99.7%; 95% prediction interval: −2.66 to 3.07; Analysis 1.2), suggesting little or no evidence of a difference between resilience training and control.

The statistical values indicated substantial to considerable heterogeneity for this outcome.

Single-study results

Three studies also measuring resilience at short-term follow-up could not be pooled with the studies above, for the following reasons: we could not obtain data by contacting the authors of two studies available as conference abstracts (Chen 2018a; Kelleher 2018). One of these (Kelleher 2018; sample size not specified) reported higher resilience scores for the resilience intervention compared to the control group at one-month follow-up. Samouei 2015 reported statistical values (e.g. means), but the number of participants randomised to and analysed in each group was not specified and not available from the study authors. The investigators found no significant difference between intervention and control groups for resilience at three-month follow-up (P = 0.27).

Medium-term follow-up (> 3 to ≤ 6 months)

One of three studies comparing a resilience intervention to control at medium-term follow-up provided suitable data for quantitative analysis (Erogul 2014). Using the Resilience Scale (RS-14; range 14 (worst) to 98 (best); Wagnild 1993) in 57 participants, Erogul 2014 reported no statistically significant difference between the intervention group (mean = 82.4; SD = 9.8) compared no intervention (mean = 77.3; SD = 12.5) at six-month follow-up (P = 0.12). Similarly, the calculated mean difference (MD) for this outcome showed little or no evidence of a difference between resilience intervention and control at medium-term follow-up (MD 5.10, 95% CI −0.72 to 10.92; P = 0.09; Analysis 1.3)

Single-study results

For one study presenting only graphical results for resilience (Delaney 2016), we could not obtain the numerical data from the study authors. The same applied to one unpublished study (ISRCTN64217625). Delaney 2016 (probably 37 participants included) showed no evidence of a difference between resilience training and control at four-month follow-up.

Mental health and well-being: anxiety

Post-intervention

Eight studies (including four with mixed samples: Barry 2019; Goldstein 2019; Houston 2017; Recabarren 2019) evaluated the effect of resilience interventions compared to controls on self-reported anxiety at immediate post-intervention. Seven studies reported data suitable for quantitative analysis (Barry 2019; Houston 2017; Kötter 2016; Recabarren 2019; Sahranavard 2018; Wang 2012; Warnecke 2011), including three studies with mixed samples for which subgroup data in healthcare students were available (Barry 2019; Houston 2017; Recabarren 2019). The pooled effect estimate for 362 participants suggests evidence for a

moderate effect of resilience training on post-intervention anxiety (SMD −0.45, 95% CI −0.84 to −0.06; P = 0.02; I^2 = 66%; Tau^2 = 0.17; P for heterogeneity = 0.008; G^2 = 99.3%; Analysis 1.4; 95% prediction interval: −2.09 to 1.13; very-low certainty evidence, see Summary of findings 1).

Based on funnel plots and Egger's test, we found no statistically significant asymmetry for anxiety at post-intervention (Egger's test: t = −1.61; df = 5; P = 0.17; see Appendix 15 and Appendix 16).

The statistical indicators of heterogeneity suggest there is substantial (I^2 and Chi^2) or considerable heterogeneity (G^2) in the results for anxiety at post-test.

Studies with mixed samples

One study with a mixed sample (Goldstein 2019; 45 participants analysed in total sample), measured anxiety at post-intervention. However, the (subgroup) results for healthcare students were neither reported in the conference abstract nor in the poster, and we could not obtain them from the study authors.

Short-term follow-up (≤ 3 months)

At short-term follow-up, three studies compared the impact of resilience interventions versus controls on anxiety. We were able to combine the data from two studies with a total of 91 participants in a meta-analysis (Porter 2008; Wang 2012). The pooled SMD for short-term, self-reported anxiety was −0.88 (95% CI −1.32 to −0.45; P < 0.001; I^2 = 0%; Tau^2 = 0; P for heterogeneity = 0.80; G^2 = 0%; 95% prediction interval: incalculable due to only two studies; Analysis 1.5), and revealed evidence of a large difference between groups in favour of resilience training for this outcome (large effect size).

We detected no statistical heterogeneity for anxiety at short-term follow-up.

Studies with mixed samples

We were unable to pool the data from one study measuring anxiety at short-term follow-up in a mixed sample with the data from the above studies, due to unavailable subgroup data for healthcare students (Goldstein 2019; 45 participants analysed in total sample).

Mental health and well-being: depression

Post-intervention

Seven studies (including four mixed studies: Barry 2019; Goldstein 2019; Houston 2017; Recabarren 2019) assessed the effect of resilience interventions versus controls on self-reported depression (or burnout; see Helmreich 2017 and Appendix 6 in this review) at post-intervention. For three studies investigating healthcare and non-healthcare students, we were able to retrieve the relevant subgroup data from the study authors (Barry 2019; Houston 2017; Recabarren 2019). Analysis of six studies (332 participants) providing data suitable for pooling (Barry 2019; Houston 2017; Kötter 2016; Recabarren 2019; Wang 2012; Warnecke 2011) suggested little or no evidence for a difference between resilience training and control group for post-intervention depression (SMD −0.20, 95% CI −0.52 to 0.11; P = 0.20; I^2 = 45%; Tau^2 = 0.07; P for heterogeneity = 0.11; G^2 = 99.1%; 95% prediction interval: −1.16 to 0.74; Analysis 1.6; very-low certainty evidence, see Summary of findings 1).

We found no indication of asymmetry for depression immediately post-intervention (see Appendix 15 and Appendix 16; Egger' test: t = −0.85; df = 4; P = 0.44).

The results for statistical heterogeneity were mixed, with no important heterogeneity indicated by Chi^2 test, moderate heterogeneity indicated by the I^2 value, and the G^2 value suggesting considerable heterogeneity.

Studies with mixed samples

One study with a mixed sample (Goldstein 2019; 45 participants analysed in total sample) provided only a narrative report of improvements in self-reported depression for the resilience-training programme. We were not able to obtain the (subgroup) results for healthcare students from the study authors.

Short-term follow-up (≤ 3 months)

Five studies (including two studies with mixed samples: Goldstein 2019; Victor 2018) evaluated the effect of resilience training compared to controls on self-reported depression at short-term follow-up. A meta-analysis of four studies (including one mixed-sample study with available subgroup data: Victor 2018) that could be combined (Miu 2016; Porter 2008; Victor 2018; Wang 2012) revealed evidence of a moderate difference between groups, in favour of resilience training for this outcome (SMD −0.65, 95% CI −1.26 to −0.04; P = 0.04; 4 studies, 226 participants; I^2 = 76%; Tau^2 = 0.28; P for heterogeneity = 0.006; G^2 = 99.7%; 95% prediction interval: −2.90 to 1.62; Analysis 1.7; moderate effect size).

Based on statistical indicators, we found substantial (I^2 and Chi^2 test) to considerable heterogeneity (I^2 and G^2) for depression at short-term follow-up.

Studies with mixed samples

One study with a mixed sample (Goldstein 2019), measured the effects of a resilience intervention versus control on depression at short-term follow-up but could not be pooled with the above studies. Goldstein 2019 (45 participants analysed in total sample) provided only a narrative report of improvements in self-reported depression for the resilience-training programme, and we were not able to obtain the (subgroup) results for this time point from the study authors.

Mental health and well-being: stress or stress perception

Post-intervention

Eleven studies (three with mixed samples: Barry 2019; Goldstein 2019; Houston 2017) evaluated the effect of resilience interventions compared to control groups on self-reported stress symptoms or the subjective perception of stress at immediately post-intervention. We obtained the relevant subgroup data from the study authors for two studies involving both healthcare and non-healthcare students (Barry 2019; Houston 2017), resulting in seven studies that could be combined (Barry 2019; Erogul 2014; Houston 2017; Kötter 2016; Mathad 2017; Stephens 2012; Warnecke 2011). The pooled effect estimate suggests evidence for a small effect of resilience interventions on stress or stress perception at post-intervention (SMD −0.28, 95% CI −0.48 to −0.09; P = 0.004; 7 studies, 420 participants; I^2 = 0%; Tau^2 = 0; P for heterogeneity = 0.58; G^2 = 99.1%; 95% prediction interval: −0.74 to 0.15; Analysis 1.8; very-low certainty evidence, see Summary of findings 1).

Based on funnel plots and Egger's test, we found no statistically significant asymmetry for stress or stress perception at post-test (see Appendix 15 and Appendix 16; Egger's test: t = −1.55; df = 5; P = 0.18).

We found mixed results for heterogeneity in stress or stress perception at post-test, with three values (I^2, Tau^2, Chi^2 test) indicating no heterogeneity, while G^2 suggested considerable heterogeneity.

Single-study results

Three studies also measuring stress or stress perception at post-intervention could not be pooled with the studies above, for the following reasons. For two studies available only as conference abstracts (Chen 2018a, Kelleher 2018), we could not obtain the data from the authors. Kelleher 2018 (sample size not specified) reported lower stress scores at post-intervention in the intervention group compared to the control group, but did not indicate statistical values. Delaney 2016 reported the results for perceived stress graphically and we could not retrieve the quantitative data from the study authors; however, Delaney 2016 (probably 37 participants included) reported no evidence of a difference in perceived stress between intervention and control groups at post-test.

Studies with mixed samples

Another study with a mixed sample measuring perceived stress at post-intervention could not be pooled with the studies above, due to unavailable subgroup data (Goldstein 2019). For the total sample, including medical and nursing students (45 participants analysed), the study authors reported evidence of a between-group difference for changes in perceived stress between baseline and post-intervention (intervention arm: −24.6% average change, P = 0.017, d = −0.58; control arm: 0.8% average change, P > 0.05).

Short-term follow-up (≤ 3 months)

At short-term follow-up, five studies (including Goldstein 2019 with a mixed sample) compared the impact of resilience training compared to controls for self-reported stress or stress perception. We combined two studies reporting data suitable for quantitative analysis (Mejia-Downs 2016; Stephens 2012). Analysis of these studies (113 participants) suggests little or no evidence for a difference between groups in stress or stress perception within three months post-intervention (SMD 0.13, 95% CI −0.79 to 1.06; P = 0.78; I^2 = 83%; Tau^2 = 0.37; P for heterogeneity = 0.02; G^2 = 0%; 95% prediction interval: incalculable due to only two studies; Analysis 1.9).

The findings for statistical heterogeneity for stress or stress perception at short-term follow-up were also mixed, with some values (I^2, Chi^2) indicating substantial to considerable heterogeneity, while no heterogeneity was suggested by G^2.

Single study-results

Two additional studies measuring stress or stress perception at short-term follow-up and available as conference abstracts (Chen 2018a; Kelleher 2018), could not be pooled with the above studies, since we were unable to obtain the relevant data from the study authors. Of these, Kelleher 2018 (sample size not specified) reported lower stress scores for the resilience intervention compared to control group at one-month follow-up.

Studies with mixed samples

Comparable with immediate post-intervention, data from Goldstein 2019, who examined a mixed sample of medical and nursing students along with students from other fields (45 participants analysed in total sample), could not be combined with the other studies. The study authors identified evidence of a between-group difference in changes in perceived stress between baseline and three-month follow-up in the total sample (intervention arm: −22.3% average change, P = 0.002, d = −0.84; control arm: −10.5% average change, P > 0.05).

Medium-term follow-up (> 3 to ≤ 6 months)

Two studies reported on stress or stress perception at medium-term follow-up (Delaney 2016; Erogul 2014), with quantitative data available for only one study (Erogul 2014). Using the Perceived Stress Scale (PSS; range = 0 (best) to 40 (worst); Cohen 2012) in 57 participants, the study authors reported no evidence for a difference between resilience training (mean = 14.9; SD = 6.6) and no intervention (mean = 18.4; SD = 6.9) at six-month follow-up (P = 0.08). The calculated MD indicated evidence for a difference in favour of the resilience intervention at medium-term follow-up (MD −3.50, 95% CI −7.00 to 0.00; P = 0.05; Analysis 1.10).

Single-study results

One study measuring perceived stress at this time point could not be combined with Erogul 2014, as numerical data were not available (Delaney 2016). At four-month follow-up, Delaney 2016 (probably 37 participants included) provide a narrative report of no evidence of a difference between the resilience intervention and control for perceived stress.

Mental health and well-being: well-being or quality of life

Post-intervention

At post-intervention, five studies (including two with mixed samples: Goldstein 2019; Recabarren 2019) assessed the effect of resilience interventions compared to controls on self-reported well-being or quality of life. Including one mixed-sample study for which we obtained subgroup data for healthcare students from the study authors (Recabarren 2019), four studies (251 participants) provided data suitable for quantitative analysis (Mathad 2017; Recabarren 2019; Smeets 2014; Wang 2012). The analysis revealed little or no evidence of an effect of resilience training (SMD 0.15, 95% CI −0.14 to 0.43; P = 0.31; I^2 = 23%; Tau^2 = 0.02; P for heterogeneity = 0.27; G^2 = 99.9%; 95% prediction interval: −0.90 to 1.20; Analysis 1.11; very-low certainty evidence, see Summary of findings 1).

There was no statistical indication of asymmetry for well-being or quality of life at post-intervention (see Appendix 15 and Appendix 16; Egger's test: t = 0.12; df = 2; P = 0.91).

We found mixed results for statistical heterogeneity. While I^2 suggested unimportant heterogeneity, G^2 indicated considerable heterogeneity.

Studies with mixed samples

One mixed-sample study (Goldstein 2019), which examined healthcare and non-healthcare students, could not be included in the meta-analysis of well-being or quality of life at post-test, as relevant subgroup data were not available. Goldstein 2019 (45 participants analysed in total sample) provided a narrative report of improvements in self-reported life satisfaction for resilience training compared to control.

Short-term follow-up (≤ 3 months)

Two studies (including one with a mixed sample: Goldstein 2019), evaluated the effect of resilience training compared to controls on self-reported well-being or quality of life at short-term follow-up, with quantitative data available for only one study (Wang 2012). Using the General Well-Being Schedule (GWB; range = 0 (worst) to 110 (best)), the study authors reported higher well-being scores in the intervention group (mean = 78.00; SD = 8.90) compared to the control group (mean = 69.60; SD = 7.20) at three-month follow-up, with a significant time × group interaction (F = 5.25; P < 0.01). Similarly, the calculated MD indicated evidence for a difference in favour of resilience training at this time point (MD 8.40, 95% 4.54 to 12.26; P < 0.001; Analysis 1.12).

Studies with mixed samples

One study with a mixed sample also compared the effects of a resilience intervention to control on well-being or quality of life at short-term follow-up (Goldstein 2019), but could not be combined in analysis due to unavailable subgroup data. Except for correlations between life satisfaction and other outcomes, Goldstein 2019 (45 participants analysed in total sample) provided only a narrative report of improvements in self-reported life satisfaction for resilience training compared to control in a sample of university students (including medical and nursing students).

Adverse events

Only four studies assessed the adverse or undesired effects of resilience training in healthcare students (Galante 2018; Kötter 2016; Victor 2018; Warnecke 2011), with three of them reporting no such effects (Galante 2018; Victor 2018; Warnecke 2011).

Galante 2018 reported no participants with adverse reactions related to self-harm, suicidality or harm to others. The study authors also determined the number of adverse events by exceeding cut-off scores for Clinical Outcomes in Routine Evaluation Outcome Measure (CORE-OM; Evans 2000) risk subscales for psychological distress. In the intervention arm, 20 participants triggered this adverse event reporting protocol compared to 25 participants in the control arm. For the total sample (n = 482), the study authors found a lower score of psychological distress in the intervention arm (mean = 0.88; SD = 0.53) compared to the control group (mean = 1.04; SD = 0.54), with a significant difference in favour of the intervention arm (P = 0.001).

Victor 2018 did not systematically assess adverse events, but no negative effects were mentioned by the participants in verbal feedback. Similarly, according to Warnecke 2011, no adverse effects of the intervention were reported in the study, although the method of assessment is unclear. Kötter 2016 also measured adverse events but did not provide the relevant data in the available publication. Most studies in healthcare students provided no data on adverse effects.

Secondary outcomes

Resilience factors: social support

Post-intervention

Two studies (including one with a mixed sample: Recabarren 2019) reported on perceived social support at post-intervention. Recabarren 2019 provided subgroup data for psychology students, which we pooled with data from Stephens 2012. The analysis indicated little or no evidence of a difference in social support at post-test (SMD 0.21, 95% CI −0.15 to 0.57; P = 0.25; I^2 = 0%; Tau^2 = 0; P for heterogeneity = 0.83; 2 studies, 121 participants; G^2 = 0%; 95% prediction interval: incalculable due to only two studies; Analysis 1.13).

We found no heterogeneity for social support at short-term follow-up, based on statistical indicators.

Short-term follow-up (≤ 3 months)

We combined data from two studies (Porter 2008; Stephens 2012), to estimate the effects of a resilience intervention compared to control on social support at short-term follow-up. The pooled SMD of social support across the studies was 0.23 (95% CI −0.18 to 0.64; P = 0.28; I^2 = 0%; Tau^2 = 0; P for heterogeneity = 0.96; 2 studies, 92 participants; G^2 = 0%; 95% prediction interval: incalculable due to only two studies; Analysis 1.14), suggesting little or no evidence for an effect of a resilience intervention on social support within three months post-intervention.

There was no statistical heterogeneity for social support at short-term follow-up.

Single-study results

One additional study assessed social support at short-term follow-up (Mejia-Downs 2016). We could not pool this study with the others because we could not estimate the SDs from the interquartile ranges due to skewed distribution (see Higgins 2019b). The study authors reported the median social support using the Social Provisions Scale (Cutrona 1987) in 43 participants at two-week follow-up: 83.0 (interquartile range = 17.0) in the intervention arm and 85.0 (interquartile range = 13.0) in the control arm (study author-reported P > 0.05, no further detail available).

Resilience factors: optimism

Post-intervention

At post-intervention, two studies reported the effects of resilience interventions compared to controls on self-reported optimism (Barry 2019; Smeets 2014). We combined the data from these studies in a meta-analysis, which revealed little or no evidence for an effect of resilience training (SMD 0.29, 95% CI −0.20 to 0.78; P = 0.24; I^2 = 0%; Tau^2 = 0; P for heterogeneity = 0.54; 2 studies, 66 participants; G^2 = 0%; 95% prediction interval: incalculable due to only two studies; Analysis 1.15), compared to control.

There was no indication of heterogeneity for optimism at post-test in any statistical values.

Short-term follow-up (≤ 3 months)

Single-study results

Two studies assessed the effect of resilience-training programmes versus controls on optimism at short-term follow-up (Mejia-Downs 2016; Samouei 2015), but could not be pooled in meta-analysis. Because of skewed distribution of data for optimism, we could not compute the SDs on the basis of interquartile ranges for one study (Mejia-Downs 2016; see Higgins 2019b). The study authors reported the median optimism using the Life Orientation Test-Revised (Scheier 1994): 25.0 (interquartile range = 8.0) in the intervention arm and 25.0 (interquartile range = 5.0) in the control arm (study author-reported P > 0.05, no further details available; 43 participants). Samouei 2015 (sample size not specified) reported statistical values (e.g. means), but the number of participants randomised and analysed in each group was not specified and not available from the study authors. The investigators identified no significant difference between intervention and control groups for optimism at three-month follow-up (P = 0.23).

Resilience factors: self-efficacy

Post-intervention

Five individually-randomised studies assessed the effect of resilience interventions compared to controls on self-reported self-efficacy at immediate post-intervention (including two studies with mixed samples: Barry 2019; Recabarren 2019). We were able to retrieve the subgroup data for the two studies with mixed samples at post-test from the study authors, resulting in five studies providing data suitable for quantitative analysis (Barry 2019; Recabarren 2019; Sahranavard 2018; Smeets 2014; Waddell 2015). The analysis (219 participants) revealed evidence for a moderate difference in favour of resilience training for self-efficacy at post-test (SMD 0.51, 95% CI 0.14 to 0.88; P = 0.008; I^2 = 41%; Tau^2 = 0.07; P for heterogeneity = 0.15; 5 studies, 219 participants; G^2 = 74.5%; 95% prediction interval: −0.96 to 1.96; Analysis 1.16).

Moderate (I^2) to substantial heterogeneity (G^2) was indicated by the statistical values for self-efficacy at post-test, .

Short-term follow-up (≤ 3 months)

At short-term follow-up, only Waddell 2005 reported quantitative data on self-efficacy. After phase two in this study with 20 participants, the study authors reported higher scores for career decision-making self-efficacy, assessed using the Career Decision-Making Self-Efficacy Scale (CDMSES; Betz 1996; Taylor 1983; range not specified; higher values indicate higher self-efficacy), for the intervention arm (mean = 112.0) compared to the control arm (mean = 110.4), with no significant between-group difference (t = 0.19; P = 0.85). The calculated MD also indicated little or no evidence for an effect of training on self-efficacy (MD 1.60, 95% CI −14.65 to 17.85; P = 0.85; 1 study, 20 participants; Analysis 1.17).

Single-study results

One study reporting on self-reported self-efficacy at short-term follow-up could not be pooled with Waddell 2005. Samouei 2015, for which the number of participants randomised and analysed in each group was unclear, reported no significant difference between the intervention and control groups for self-efficacy at three-month follow-up (P = 0.36).

Resilience factors: active coping

Post-intervention

One mixed-sample study (Houston 2017) assessed the effect of a resilience intervention compared to control on the resilience factor of active coping at immediate post-intervention. We received the relevant subgroup data from the investigators. Using the newly-created 'taking action' subscale, based on original items of the Brief Coping Orientations to Problems Experience scale (Brief COPE; range 1 (worst) to 4 (best) Carver 1997) in 38 participants, the study authors found lower values of active coping (taking action) in the intervention arm (mean = 3.06; SD = 0.50) compared to the control arm (mean = 3.13; SD = 0.65) in healthcare students at post-test. The calculated MD indicated little or no evidence for an effect of resilience training (MD −0.06, 95% CI −0.45 to 0.32; P = 0.74; 1 study, 38 participants; Analysis 1.18).

Short-term follow-up (≤ 3 months)

Only one study compared the effects of resilience training to control on active coping at short-term follow-up (Porter 2008). Based on data from 22 participants and using the 'planful problem-solving' scale of the Ways of Coping Questionnaire (WOC; Folkman 1988; range not specified; higher values indicate higher planful problem-solving), Porter 2008 reported higher values of active coping in the intervention group (mean = 1.78; SD = 0.43) compared to the control group (mean = 1.32; SD = 0.54) at two-month follow-up, with a significant time × group interaction (F = 13.20; P < 0.006). The calculated MD suggested evidence for a difference between resilience training and control in favour of training (MD 0.46, 95% CI 0.05 to 0.87; P = 0.03; 1 study, 22 participants; Analysis 1.19).

Resilience factors: self-esteem

Post-intervention

Only one study in a mixed sample, for which subgroup data were not available, reported on self-reported self-esteem at immediate post-intervention (Goldstein 2019). For the total sample (45 participants analysed), the study authors only provided a narrative report of improvements in self-esteem, and we therefore could not calculate an MD.

Short-term follow-up (≤ 3 months)

At short-term follow-up, two studies with mixed samples compared the effect of resilience interventions to controls on self-esteem (Goldstein 2019; Victor 2018). The study authors of Victor 2018 provided the subgroup data for psychology students. Using the Rosenberg Self-Esteem Scale (RSES; Ferring 1996; range not specified; higher values indicate higher self-esteem) in 28 participants, the study authors found slightly higher values for self-esteem in the intervention arm (mean = 2.42; SD = 0.45) compared to attention control (mean = 2.34; SD = 0.51) at three-week follow-up. The calculated MD of 0.08 (95% CI −0.28 to 0.44; P = 0.67; 1 study, 28 participants; Analysis 1.20) indicated little or no evidence for an effect of resilience intervention on this outcome.

Studies with mixed samples

In a mixed sample of medical and nursing students, Goldstein 2019 measured self-esteem at three-month follow-up and provided a narrative report of improvements in this outcome (45 participants analysed in total sample). Subgroup data were not available.

Resilience factors: hardiness

Post-intervention

One study assessed the effects of hardiness training compared to wait-list control on hardiness at post-intervention (Sahranavard 2018). The Ahvaz Hardiness Inventory (AHI; Kiamarthi 1998) was used to measure hardiness in 30 participants (15 in each group). However, considering the possible range of scores for this outcome measure (0 (worst) to 81 (best); i.e. range of 0 to 1215 for the sum scores in each group), the reported values for hardiness at post-test did not seem plausible (intervention arm: mean = 175.80 (SD = 6.00); control arm: mean = 167.80 (SD = 13.06)). We therefore decided against calculating the MD for this study.

Resilience factors: positive emotions

Post-intervention

Five studies (including Geschwind 2015, who used a mixed sample) assessed the effect of resilience interventions compared to controls on self-reported positive emotions at immediate post-intervention. Two studies (Peng 2014; Smeets 2014) provided data suitable for quantitative analysis (112 participants). The pooled effect estimate revealed a moderate effect on positive emotions at post-test in favour of resilience training (SMD 0.51, 95% CI 0.01 to 1.01; P = 0.05; I^2 = 43%; Tau^2 = 0.06; P for heterogeneity = 0.19; 2 studies, 112 participants; G^2 = 0%; 95% prediction interval incalculable due to only two studies; Analysis 1.21).

There were mixed findings for statistical heterogeneity for positive emotions at post-test. While I^2 suggested moderate heterogeneity, there was no indication of heterogeneity using G^2.

Single-study results

Two other studies also measured the effects of resilience interventions compared to controls on positive emotions at post-intervention (Akbari 2017; Sahranavard 2018), but could not be pooled with the aforementioned studies. Although Akbari 2017 (number of participants analysed not specified) demonstrated an increasing effect of resilience training compared to no intervention on happiness (Oxford Happiness Questionnaire; Alipour 1993; Hills 2002; higher values indicate more happiness) at post-test (F = 22.412, P < 0.001), the report indicated lower values of happiness in the intervention arm (mean = 27.82; SD = 2.25) than in the control arm (mean = 42.11; SD = 2.25). We contacted the study authors but were unable to resolve this uncertainty. Sahranavard 2018 only presented the combined results for both positive and negative affect (assessed with the Positive and Negative Affect Schedule; PANAS; Watson 1988) and reported a significant effect of condition on this outcome (F = 4.96, P = 0.035) in a covariance analysis (30 participants). We could not obtain the separate data for positive affect after contacting the study authors.

Studies with mixed samples

In Geschwind 2015, the subgroup data for psychology students were not available. For the total sample of 50 participants (i.e. psychology students and healthy volunteers), the study authors reported a significant interaction for time x condition (F = 6.632, P = 0.002), with significantly higher positive affect in the intervention arm compared to the control arm after affect induction (t = 3.369, P = 0.002).

Short-term follow-up (≤ 3 months)

At short-term follow-up, one study compared the effects of a resilience intervention to wait-list control on self-reported positive emotions (Mejia-Downs 2016). Using the positive affect subscale of the Modified Differential Emotion Scale (mDES; Fredrickson 2003; range not specified; higher values indicate more positive affect) in 43 participants, the study authors reported a significant time × group interaction for positive emotions (F = 5.73; P = 0.02), with higher values in the intervention arm (mean = 3.20; SD = 0.47) compared to the control arm (mean = 3.01; SD = 0.65) at two-week follow-up. The calculated MD suggested little or no evidence for an effect of resilience training at short-term follow-up (MD 0.19, 95% CI −0.15 to 0.53; P = 0.27; 1 study, 43 participants; Analysis 1.22).

Studies with mixed samples

Geschwind 2015 also assessed the effects of a resilience intervention compared to an attention control group at short-term follow-up. We could not pool the data from this study with the above study, as we could not obtain the subgroup data for psychology students from the study authors. For the total sample (50 participants), the effect of positive affect induction compared to control on positive affect was shown to be maintained at 20-minute follow-up (t = 2.053, P = 0.047).

Sensitivity analyses

We performed five sensitivity analyses using fixed-effect pair-wise meta-analysis for the primary outcomes at post-intervention. For each outcome, the results were consistent with the findings from the random-effects meta-analyses.

Resilience

Post-intervention

We found evidence for a moderate difference in favour of resilience training (SMD 0.52, 95% CI 0.36 to 0.69; P < 0.001; 9 studies, 561 participants; Analysis 1.23).

Anxiety

Post-intervention

We found evidence for a moderate difference in favour of resilience training (SMD −0.35, 95% CI −0.57 to −0.14; P = 0.001; 7 studies, 362 participants; Analysis 1.24).

Depression

Post-intervention

We found little or no evidence for an effect of resilience training (SMD −0.18, 95% CI −0.40 to 0.04; P = 0.12; 6 studies, 332 participants; Analysis 1.25).

Stress or stress perception

Post-intervention

We found evidence for a small difference in favour of resilience training (SMD −0.28, 95% CI −0.48 to −0.09; P = 0.004; 7 studies, 420 participants; Analysis 1.26).

Well-being or quality of life

Post-intervention

We found little or no evidence for an effect of resilience training (SMD 0.14 95% CI −0.10 to 0.39; P = 0.25; 4 studies, 251 participants; Analysis 1.27).

DISCUSSION

Summary of main results

We identified 30 RCTs that fulfilled the inclusion criteria for this review, eight of which were conducted in mixed samples.

There is very-low certainty evidence (meaning that the true effect may differ markedly from the estimated effect) that resilience interventions might be more effective than control for improving resilience, self-reported symptoms of anxiety, and stress or stress perception at post-test. Effect sizes ranged from small to moderate. We found little or no evidence for an effect of training on depressive symptoms and well-being or quality of life at post-intervention. At short-term follow-up (three months or less post-intervention), the effect size for the reduction in anxiety symptoms increased from moderate to large. We also found some evidence for a moderate effect in favour of resilience training on depressive symptoms, and a single study provided evidence of an increase in well-being. The moderate or small effects for resilience and stress or stress perception found at post-test, respectively, were no longer evident at short-term follow-up. At medium-term follow-up (more than three months to six months or less), we no longer found evidence for a difference between a resilience intervention and control for resilience, while a single study still provided evidence for a decrease in stress symptoms. Anxiety, depression, and well-being or quality of life were not measured at medium-term follow-up by any study. Long-term follow-up assessments (more than six months post-intervention) were not available for any primary outcome.

For secondary outcomes at post-test and short-term follow-up, we found some evidence for moderate effects in favour of resilience training for self-efficacy and positive emotions at post-intervention, that were not maintained in the short-term follow-up, based on the evidence from single studies. While there was no evidence for an effect of training on active coping at post-test, we found evidence for an effect in favour of resilience training at short-term follow-up. Neither at post-intervention nor within three months post-intervention was there evidence for a difference between training and control for social support, optimism (only at post-intervention), or self-esteem (only at short-term follow-up). Hardiness was not measured at short-term follow-up. None of the secondary outcomes were assessed at medium-term or at long-term follow-up.

The planned subgroup analyses to test for possible effect modifiers were not possible, due to the limited number of studies. The same applied to the planned sensitivity analyses to examine the robustness of the conclusions of this review, the exception being the sensitivity analyses using a fixed-effect model for the primary outcomes at post-test. Compared with the main analyses, the calculation of fixed-effect instead of random-effects pairwise meta-analyses showed no changes in the evidence found.

Overall, we found very-low certainty evidence in this review, meaning that we can draw no clear conclusions.

Overall completeness and applicability of evidence

The review highlights some issues about the completeness and applicability of the evidence for the effects of resilience interventions in healthcare students (for details, see Appendix 17).

Participants

Since stress-related mental disorders are more prevalent in women (Kuehner 2017; Li 2017; WHO 2019) and since women report lower resilience (e.g. Kunzler 2018), the high proportion of women among the study participants may be explained by a higher interest among women to participate in resilience interventions. The applicability of the findings of this review to men may be limited, since gender differences in the prevalence of stress-related mental disorders may reflect differences in biological vulnerability, social roles, or stress reactivity (Nazroo 1998; Verma 2011; WHO 2019), thereby possibly causing a different effect of resilience training in men and women.

The included studies mainly considered young individuals, but this was to be expected, given that the population of interest in this review is healthcare students.

Students in allied health professions were less represented, restricting the applicability of our findings to these fields of study.

The clinical relevance of mental symptoms at baseline, i.e. whether symptom load justified a diagnosis of a mental disorder, is unclear for most studies. However, to get a clear picture of the participants' baseline mental health could be important, as the large effect sizes in some studies (e.g. Wang 2012) might be explained in part by the inclusion of participants with a pre-existing burden of mental symptoms or even clinical diagnoses.

The evidence was concentrated in North America, Europe and Asia (including the Near East), with only two studies from Australia. The applicability of the findings to other locations and ethnicities (e.g. South America, Africa, Oceania) therefore remains unclear. Twenty-four of the 30 included studies were conducted in high-income countries (e.g. USA) and five in an upper-middle income country (e.g. China), with only one study performed in a lower- to middle-income country. We therefore also advise some caution about the cross-cultural applicability of the evidence.

In summary, the findings may be most applicable to young adult, female healthcare students, living in high-income countries.

Interventions

Although the benefits of online- and mobile-based interventions (e.g. 24/7 availability) have been recently discussed (Cuijpers 2017; Heber 2017; Heron 2010), we identified only four studies delivered in this format. Furthermore, most of the interventions were of high or low intensity with treatment durations varying considerably. Theoretical approaches were relatively balanced between mindfulness-based training, unspecified interventions and combinations. Overall, the findings of this review are mostly applicable to group interventions of high intensity, delivered face-to-face, and using a mindfulness-based theoretical approach.

Comparators

The primary use of no intervention and wait-list controls, in particular, in the evidence found here is problematic, since these

control groups are demonstrated to yield inflated effect sizes compared to active comparators in psychotherapy research (Mohr 2014). The evidence does not allow us to answer this question, because we were not able to conduct the relevant subgroup analysis (see Table 1).

Outcomes

There were a large number of different measures for resilience in the studies (see Table 2). We were not able to investigate the potential effect of the underlying concept of resilience in these scales (see Table 1).

A large variety of assessments was also used for the primary outcomes of mental health and well-being (e.g. burnout and depression scales for depression; see Helmreich 2017). This diversity of measures has to be considered as a potential source of heterogeneity in our meta-analyses, and might have an impact on the interpretation of results.

Although resilience factors, such as social support, are discussed as well-evidenced resilience factors (see Helmreich 2017), relatively few of the included studies assessed these outcomes at the different periods of follow-up.

Adverse or undesired effects were not specified in most included studies, with three studies reporting no adverse or undesired effects. For psychotherapy, however, possible adverse outcomes have been discussed (Berk 2009; Moritz 2019). As resilience interventions often include confronting participants with individual problems, some of these training programmes might also have the potential to harm certain participants.

Lastly, very few studies had medium-term follow-up assessments and no study performed long-term follow-up, which might be explained by the students' restricted time in universities and schools, and general difficulties in establishing long-term outcomes. Our ability to examine whether any benefits of resilience interventions are sustained in the medium- and long-term was therefore also limited.

Quality of the evidence

Using the GRADE approach (Schünemann 2013; Schünemann 2019a), we rated the **overall certainty of evidence at post-intervention** for all primary outcomes as very low for several reasons. First, important **methodological limitations** reduced the certainty of the evidence offered by most included studies. There was unclear and high risk of bias for several domains across the studies; notably, there was a high risk of bias in blinding of participants and personnel and loss to follow-up, and unclear risk of bias for methods of sequence generation, allocation concealment and blinding of outcome assessment. Selective outcome reporting was also occasionally an issue. Second, three outcomes had moderate (I^2 > 30%; depression) or substantial (I^2 > 50%; resilience, anxiety) levels of **unexplained heterogeneity** and only partially overlapping CIs leading to inconsistency. Third, for all (primary) outcomes at post-intervention, the **evidence was indirect**, as studies were limited to certain participants (e.g. certain fields of health professional study), particular versions of resilience intervention (e.g. group setting, high training intensity) and certain comparators (e.g. no intervention, waiting list). Finally, due to the small number of participants included in the meta-analyses for anxiety, depression and well-being or quality of life (fewer than 400 participants), inconsistent messages about the 95% CI for the intervention effect (depression, well-being or quality of life), and the 95% CI encompassing both a very small treatment effect and crossing the threshold for appreciable benefit of the intervention (resilience, anxiety), **imprecision** was a problem for four outcomes at post-intervention. However, in the case of post-intervention resilience and anxiety, we did not downgrade for imprecision. Rather, we downgraded only for inconsistency, as the substantial heterogeneity (I^2 = 75% or 66%, respectively) for these outcomes might also have affected the CIs (i.e. precision) and we did not wish to double-downgrade for the same problem.

We did not downgrade for **publication bias** for any of the primary outcomes at post-intervention. Despite the small number of studies per meta-analysis (fewer than 10 studies; see Assessment of reporting biases), inspection of funnel plots (see Appendix 16) and Egger's test revealed no statistical or visual evidence of asymmetry (see also Effects of interventions and Appendix 15). The funnel plots were symmetrical in shape and, where available, the results from grey literature did not differ from other published studies for the (non-)evidence or the direction of effect. Due to the scarcity of larger studies across the primary outcomes at post-test, a small-study effect was difficult to assess and cannot not be ruled out completely. Nevertheless, an overestimation of effects in smaller studies seemed unlikely, since the meta-analyses mostly included small studies with significant and non-significant results. Although the evidence was largely based on small studies, there was almost no indication of potential conflicts of interest of relevance for the post-test meta-analyses, except for one study (Kötter 2016) included in the meta-analyses for anxiety, depression and stress or stress perception (see Appendix 15).

Regarding adverse events, several GRADE domains (e.g. precision, inconsistency, publication bias) could not be assessed due to the small number of studies documenting any adverse effects of study participation (e.g. by verbal feedback from participants; Galante 2018; Victor 2018; Warnecke 2011; for Kötter 2016: adverse events measured, but not reported). Based on the narrative reporting in these studies, we downgraded the certainty of the evidence for this outcome for study limitations and indirectness.

Overall, the GRADE certainty rating was very low for all primary outcomes at post-intervention, which means that there is a high degree of uncertainty about the estimates of effect observed. Future research in this area is very likely to substantially impact the effect estimates of resilience interventions.

Search methods

Appendix 18 includes further information on how potential biases in the search methods were prevented in this review.

Except for five completed, but unpublished studies (Chen 2018a; Goldstein 2019; ISRCTN64217625; Kelleher 2018; Mejia-Downs 2016), we were able to retrieve the full texts for all included studies. In accordance with the CDPLP Editorial Team, we considered alternative sources (e.g. trial register entry) for these five studies. In 22 cases, we did not receive any reply from the study authors (i.e. eligibility criteria not verifiable due to unavailable full text or alternative information), or the responses were inadequate and did not provide sufficient information to enable us to reach a decision about the eligibility of the studies (see Characteristics of studies awaiting classification). We attempted to conduct a

comprehensive search; however, the fact that 16 studies have not yet been incorporated, and will only be added in the update of this review could be considered a potential source bias.

Correspondence with the authors about data analysis was required for 25 included studies. For six studies for which we aimed to double-check the available information (e.g. amount of missing data; per-protocol analysis) by contacting the authors, we decided to rely on the reports and to include the studies in the meta-analyses despite the missing response (Anderson 2017; Miu 2016; Sahranavard 2018; Smeets 2014; Waddell 2005; Waddell 2015). For three studies (Chen 2018a; ISRCTN64217625; Kelleher 2018), we received information that no data could be provided as the studies were completed and in the process of analysis or publication. For one study (Venieris 2017) the authors responded, but relevant subgroup data could not be retrieved, since the data had been collected several years ago and were saved on another computer. The primary investigators of three studies responded to our first enquiry, but did not react to a second enquiry (Geschwind 2015; Goldstein 2019) or were not able to provide the relevant subgroup data at the time of data analysis (Galante 2018).

Post hoc changes

We made a post hoc change to the eligibility criteria for the Types of interventions (see Differences between protocol and review) by subsequently limiting the study selection to interventions that explicitly stated the aim of fostering resilience, hardiness or post-traumatic growth. Although the change raises the possibility of bias in the review process, we felt it was necessary to guarantee highly-objective eligibility criteria and transparency. We do not believe that this divergence from the protocol (Helmreich 2017) is a serious bias. Due to the focus on interventions with the mention of at least one of the three terms, general health-promoting interventions (e.g. well-being therapy, chronic disease self-management, self-management training after negative life events) not meeting this criterion were excluded from this review. However, other psychological interventions in healthcare students, that are eventually more economic than the theoretical approaches found in this review, might also foster mental health despite stressors (i.e. resilience), although not being labelled as 'resilience training'.

We also made a post hoc change to the eligibility criteria for Types of participants (see Differences between protocol and review) by limiting the included studies to healthcare students. Although the change raises the possibility of bias, we felt it was necessary because the restriction to healthcare students guarantees a systematic review with sufficiently homogeneous comparisons.

Further potential biases

Even within each type of theoretical foundation, there was partial clinical heterogeneity, in terms of intervention setting, delivery or intensity. However, as there is still no consensus or 'gold standard' about how to design resilience-training programmes leading to a variety (see previous reviews, e.g. Leppin 2014), we decided to pool the data. We took this decision as this review had a larger evidence base than previous meta-analyses, but we were not able to perform the planned subgroup analyses to investigate potential explanations for heterogeneity.

Beyond the five main results for the primary outcomes at post-test, the large number of pooled analyses in this review might have increased the probability of a type I error, potentially leading to false-positive results.

Another important limitation of this review is the unknown stressor or risk exposure in the included studies (see Implications for research). Although the health professional education might be associated with substantial stressors among participants of the included studies, a proven risk or stressor exposure was not applied as an inclusion criterion for this review (see Types of participants), only *potential* stressor exposure. Based on the definition of resilience (Windle 2011a), the effects of resilience interventions on resilience cannot be determined without ensuring a significant risk. The missing assessment of stressor exposure is a general problem in resilience intervention research (Chmitorz 2018). For healthcare students in particular, the stressor exposure might also vary at different time points of training (e.g. more stressors in year one versus year four or vice versa, due to expectations or fears about the transition to professional life). The students' limited time in institutions (e.g. university) should also be considered. As the number of potential risks or stressors (i.e. stressor load) is naturally restricted to the years of training, healthcare students might be exposed to fewer stressors than groups experiencing the same stressors over a longer period of time (e.g. healthcare professionals).

Agreements and disagreements with other studies or reviews

Studies or reviews in different clinical and non-clinical adult populations

As mentioned under Why it is important to do this review, the efficacy of resilience interventions for adult populations has been previously examined in 13 systematic reviews and six meta-analyses, including a recent Cochrane Review by our group on resilience interventions in healthcare professionals (Kunzler 2020). Overall, the reviews largely found positive effects of resilience training on different outcomes (e.g. resilience, mental health, physical health, performance); however, many review authors have pointed out the need for further research, due to elements such as the low methodological quality of the primary studies. Many of the reviews also considered study designs other than RCTs (e.g. Bauer 2018; Massey 2019), and focused on certain target groups (e.g. Milne 2016; Pallavicini 2016; Pesantes 2015; Petriwskyj 2016), or certain forms of intervention (e.g. Deady 2017). The number of RCTs on resilience training specifically was therefore rather limited, making comparisons with our review difficult.

Some of the previous reviews used broader eligibility criteria (e.g. clinical and non-clinical individuals, employees) and identified more RCTs (Joyce 2018; Macedo 2014; Leppin 2014; Robertson 2015; Vanhove 2016), compared to other reviews. Our review is focused on healthcare students, which is different from the mixed target groups in the previous reviews. Despite varying inclusion criteria, the findings of our review mostly agree with the previous research, although our review is based on evidence from a larger group of studies. For example, Macedo 2014 (seven RCTs in non-clinical adult samples), whilst not pooling any data, identified some degree of effectiveness of resilience-training programmes. Similarly, Robertson 2015 (eight RCTs in employees) found indications of benefits for personal resilience, mental health,

well-being and work performance in employees. With the exception of job performance, which was not examined here, these findings were confirmed by our review. With respect to the positive effects for resilience at post-test, our review is consistent with and even showed evidence of a larger (moderate) effect than Joyce 2018 (17 RCTs in adults), who found a small positive effect of training on resilience at immediate post-intervention. However, compared with Leppin 2014 (25 RCTs in diverse adults populations and persons with chronic diseases), who also found a moderate effect in favour of resilience training for up to three months after the end of training, our review suggested little or no evidence for a maintained positive effect for resilience at short-term follow-up. In contrast to Vanhove 2016, who identified positive effects on well-being and psychological deficits (e.g. depressive symptoms) within one month post-intervention, we found little or no evidence for an effect on these outcomes at immediately post-test. However, the maintained positive effects for anxiety and the delayed effect on depression between post-test and short-term follow-up in our review are comparable to Vanhove 2016, who, as well as the positive effects at one-month follow-up or less, also observed sustained effects of training for the prevention of psychological deficits at more than one month after training. In general, our findings on mental health differ from Leppin 2014, who found no evidence for an effect of training for mental health outcomes (depression, quality of life) aside from resilience. Due to the limited number of studies in our review (fewer than 10 studies per meta-analysis; Deeks 2019), we were not able to replicate the findings of previous reviews for effect modifiers such as training setting (Vanhove 2016), theoretical foundation (Joyce 2018), or study comparator (Leppin 2014).

Compared to our review on healthcare professionals (Kunzler 2020), this review delivers similar findings for healthcare students, although we identified a smaller number of studies for individuals in health professional education (30 RCTs) compared with studies in healthcare professionals who have completed training (44 RCTs). The moderate positive effect on resilience immediately after training, which we identified in this review, is consistent with Kunzler 2020. However, while the positive effect on resilience was maintained in the short term (three months or less after training) in healthcare professionals, we could not replicate this finding in healthcare students. The same applies to symptoms of stress or perceived stress: while we found evidence for a small, positive effect of training on post-intervention stress in healthcare students, with no evidence of an effect at short-term follow-up and only a single study measuring this outcome at medium-term follow-up, there was a moderate, positive effect on post-test stress in healthcare professionals, which was also sustained over time. Similar to our findings in healthcare professionals (i.e. increase from a small to a moderate positive effect size for depression between post-test and short-term follow-up), we observed a similar delayed effect on depression in healthcare students, with evidence for a moderate, positive effect on depressive symptoms emerging only in the short-term. In contrast with our review on healthcare professionals (no evidence of any effect), we found evidence for a positive effect of resilience interventions on healthcare students' well-being or quality of life at short-term follow-up (single study), as well as on symptoms of anxiety at post-test, which for anxiety were maintained at short-term follow-up. Comparable with our findings in Kunzler 2020, resilience factors (i.e. secondary outcomes in both reviews) were hardly assessed in healthcare students. Finally, several methodological weaknesses (e.g. paucity of medium- and long-term follow-ups), that we identified for RCTs in healthcare staff were also found in this review or were even more evident here (see Implications for research). We therefore judged the certainty of the evidence to be very uncertain for both reviews.

Studies or reviews in healthcare students

Five systematic reviews (Gilmartin 2017; McGowan 2016; Pezaro 2017; Rogers 2016; Sanderson 2017) and one meta-analysis (Lo 2018) have synthesised the efficacy of resilience-training programmes for healthcare students to date, although not all of them have focused solely on interventions (see Why it is important to do this review). Comparable with our review, two of these previous publications examined healthcare students in general (Lo 2018; Sanderson 2017), but most only targeted a subgroup of healthcare students (e.g. nursing and midwifery students; McGowan 2016) or a combination of qualified staff and (certain) students (Gilmartin 2017; Rogers 2016; Pezaro 2017). Similar to the problems for the reviews described above, most previous reviews in healthcare students (Lo 2018) also considered study designs other than RCTs. The number of RCTs on resilience training is therefore rather limited (i.e. 0 to 24 RCTs among 5 to 36 included studies in the six reviews), in contrast with our review, which identified 30 RCTs across various groups of healthcare students. Since the review questions of some of the six reviews did not focus solely on the construct of resilience or on intervention studies, the primary studies included here did not always explicitly mention the intention of fostering resilience. Instead, broader mental health interventions (e.g. Gilmartin 2017) were also considered, which renders comparisons with our review difficult.

Our review is most comparable with McGowan 2016 and Rogers 2016, who included educational interventions to promote resilience (McGowan 2016), or considered (qualitative) research covering educational interventions and resilience (Rogers 2016), with Rogers 2016 considering different groups of healthcare students in addition to healthcare professionals. McGowan 2016 identified no RCTs, and Rogers 2016 found only one RCT in healthcare students (Peng 2014), which we also included in our review. Comparable with Rogers 2016, we also identified Steinhardt 2008, but excluded it due to an 'ineligible population' based on information obtained from the study authors that they did not target healthcare students. Furthermore, we also identified several non-RCTs found in McGowan 2016 (e.g. Jameson 2014; Judkins 2005b) during the study identification process for our review.

In the only previous meta-analysis, Lo 2018, who included 24 RCTs (19 in meta-analysis) on any group intervention to enhance or maintain mental health in healthcare students, identified only two studies that explicitly stated the intention of fostering resilience (Erogul 2014; Porter 2008), both of which are included in this review. The meta-analyses on mental health (depression, anxiety), burnout and stress symptoms, which the study authors calculated for different theoretical foundations (e.g. mindfulness-based training) and which resulted in some positive effect sizes (e.g. stress reduction by mindfulness interventions compared to control), cannot readily be contrasted with the findings of this review.

AUTHORS' CONCLUSIONS

Implications for practice

There is very uncertain evidence that resilience interventions are effective in improving resilience or self-reported symptoms of anxiety, and stress or stress perception at post-test (small and moderate effect sizes).

The generalisability and applicability of the evidence is limited by the heterogeneous design and content of interventions (with a predominance of high-intensity, face-to-face interventions delivered in a group setting), the scarcity of studies with short-, medium- and long-term follow-up, the divergent efficacy measures used, for example, to measure resilience, and the limited geographical location (i.e. high-income countries). We rated the certainty of the evidence in this review as being very low across all primary outcomes at post-test. We therefore cannot draw strong conclusions about the effects of resilience interventions, as the true effect may be markedly different from the estimated effect.

We know little about the longer-term effects of resilience training on most outcomes, because few studies included follow-up assessments. Booster sessions were not conducted in any of the included studies.

The limited evidence that resilience training improves well-being or quality of life (post-test) and several resilience factors might indicate the need to adapt the current intervention techniques used and the protective factors trained.

The results of our review provide very uncertain evidence about whether resilience-training programmes may be helpful in stabilising and improving the mental health of healthcare students as a group of students with high stressor exposure.

Implications for research

The findings of this review point to the need for further research of high methodological quality in order to determine the efficacy of resilience interventions in healthcare students.

A consensus on the definition of resilience and adequate outcome measures to be used consistently across the field would be important for future research. Following the growing consensus on resilience as a dynamic outcome (Bonanno 2015; Kalisch 2017), intervention studies might be guided by this definition and examine resilience as a primary outcome (Chmitorz 2018). Because none of the studies in healthcare students measured the participants' stressor exposure, it remains unclear whether healthcare students really benefit from resilience training by being better able to cope with stressors. Future studies should therefore measure resilience as a person's mental health in relation to individual stressor load. Only if the risk or stressor exposure is assessed (which is different from the subjective perception of stress), may researchers gain knowledge about the changes in resilience by an intervention. In addition to the number of stressors, certain covariates should be assessed, such as the type of stressors (e.g. micro- versus macro stressors, psychological versus physiological stressors, acute versus chronic stressors) or the perceived severity of occurred stressors.

Study designs: there is a need for improved comparators, at least treatment as usual (TAU) or ideally active and attention control (Chmitorz 2018), to allow fair comparisons between resilience interventions and control. As already suggested (Chmitorz 2018), resilience-training programmes could be implemented during or after the presence of a stressor. However, future studies should also use designs in which resilience training is provided prior to circumscribed stress situations (e.g. examinations; rotation of a healthcare student to a demanding hospital ward, such as emergency), in order to determine the resilience effects of the intervention, and to see whether the training does indeed improve resilience to the specific stress situation (Chmitorz 2018; Kalisch 2015).

In general, pre- and post-assessments of the outcome indicators (e.g. for resilience) should be conducted, with future studies also filling the gap of longer follow-up periods and measuring the stressor exposure before, throughout and after the intervention. Also, it could be interesting to investigate whether or not booster sessions might help maintain the effects of training over time.

The use of adequate sample sizes based on a priori analyses seems to be an urgent need in this field, to ensure sufficient statistical power.

Intervention studies might also benefit from more comprehensive baseline diagnostics of mental health (e.g. clinical interview) and a better reporting of eligibility criteria for pre-existing mental symptoms. This would allow more precise conclusions about whether resilience training reduces (clinically relevant) mental symptoms. Furthermore, the implications of the resilience concept would require a baseline mental health assessment. In order to investigate the effects of interventions on resilience (i.e. mental health in relation to stressor load) and to determine a specific 'resilience pattern or trajectory' under consideration, the status of psychological functioning as an outcome of interest at baseline is important. For example, when researchers are interested in testing the effects of an intervention in stressor-exposed individuals on the resilience trajectory of *sustained mental health* (see also Description of the condition), they would have to prove a positive mental health level at baseline and at post-intervention. On the other hand, researchers considering a sample with elevated levels of mental symptoms at pre-test (Harrer 2019) would be able to investigate the resilience trajectory of recovery or even of post-traumatic growth (i.e. increased level of functioning compared to outset prior to stressors).

Beyond RCTs, dismantling designs could be helpful in clarifying the efficacy of single components of resilience training.

In general, there is a need for a better reporting of intervention studies using international guidelines, such as the CONSORT statement (Schulz 2010). To guarantee higher transparency of study conduct and reporting, primary investigators should register trials or publish study protocols according to the SPIRIT guidelines (Standard Protocol Items: Recommendations for Interventional Trials; Chan 2013a; Chan 2013b).

Finally, future studies in this field should focus more on men. Research efforts should be intensified in low- and middle-income countries in order to reach more robust conclusions about the effectiveness of training across various settings. More studies would be desirable with particular formats of intervention (e.g. online- and mobile-based). Based on the varying relevance of resilience factors in different age groups (see long-time cohort studies;

Werner 1992; Werner 2001) and given that this review was limited to young adults (students), the participants' age and the protective factors trained might also have affected the findings. Future studies should therefore focus their efforts on the development and evaluation of resilience interventions that foster specific and validated age-relevant factors in specific target groups.

In sum, there is still an urgent need for additional evidence to answer the question of which resilience interventions are really effective in healthcare students, and how they should be implemented. A larger number of RCTs in the field might then allow potential effect modifiers to be explored.

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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Akbari 2017

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified
Participants	**Country:** Iran **Setting:** university **Age:** mean = 21.58 (SD = 5.12); range = 18 - 27 years **Sample size (randomised):** 30 **Sex:** 18 women, 12 men **Comorbidity (mean (SD) of respective measures in indicated, if available):** not specified **Population description:** nursing and midwifery students **Inclusion criteria:** 1) willingness to participate in the study; 2) no history of mental illnesses; 3) low happiness score; 4) high aggression score **Exclusion criteria:** 1) unwillingness to participate in the study; 2) diagnosed psychological disorders; 3) use of psychotropic medications and sedatives **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified

Interventions	**Intervention:** resilience training (n = 15)
	• *delivery*: face-to-face; group sessions
	• *providers*: consultant
	• *duration of treatment period and timing:* 12 75-minute sessions
	• *description*:
	  ○ SESSION 1: introducing resilience and session rules to the audience; target: participants introduce themselves and know the host, they form friendly relationships; a simple definition of resilience is provided; the relationship between mental health and resilience is expressed
	  ○ SESSION 2: awareness of capabilities; target: participants provide a clear definition of self-consciousness; express the main elements of self-consciousness; recognise their strengths and weaknesses; become self-conscious about their goals, finally achieve self-confidence
	  ○ SESSION 3: improving self-esteem; target: participants gain a clear understanding of self-esteem and identify factors contributing to its strengthening; identify their weaknesses and remove one of them; strengthen the self-esteem of others
	  ○ SESSION 4: effective communication; target: participants express a clear definition of communication; are able to properly communicate with those around them; realise the importance of communication in their lives
	  ○ SESSION 5: establishing social relationships; target: participants provide a clear definition of the concept of friendship; recognise the characteristics of a good friend and apply them in making

Akbari 2017 *(Continued)*

friends; are able to discern good friends from bad friends; express disadvantages of companionship with bad friends
    - SESSION 6: setting goals and achieving them; target: participants differentiate short-term goals; gain confidence in using their own abilities; are able to plan for reaching their goal
    - SESSION 7: decision making; target: participants name the correct criteria of a good decision; explain its the importance and value; anticipate the consequences of decisions
    - SESSION 8: problem solving; target: participants explain the process of solving a problem; learn to think about a problem; are able to offer solutions for their problems; achieve self-efficacy for solving their problems
    - SESSION 9: responsibility; target: participants provide a simple definition of responsibility; take responsibility for little issues in life; easily express the characteristics of a responsible person
    - SESSION 10: anger and anxiety management; target: participants simply express the concepts of stress, anger, and anxiety and indicate their symptoms and consequences; learn stress management techniques and are able to teach them to others
    - SESSION 11: fostering a sense of spirituality; target: participants are able to use their sense of spirituality as a motivational factor; are optimistic and hopeful about future; believe in their uniqueness
    - SESSION 12: knowledge of adolescence; target: participants express adolescence features; name changes during adolescence; express adolescence diseases; name risk factors and protective factors of this period
    - each session consists of: (1) checking homework from the previous session; (2) direct instruction by lecturing; (3) group discussions; (4) intellectual challenge; and (5) wrap-up
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: adopted from a program by Henderson, Milstein, and Krovetz in 1997 to create safe schools in the USA; no theoretical foundation specified

Control: no intervention (n = 15)

Outcomes

Outcomes collected and reported:

- happiness - Oxford Happiness Questionnaire
- aggression - Buss and Perry Aggression Scale

Time points measured and reported: 1) pre-intervention; 2) post-intervention; only 2) post-intervention reported

Adverse events: not specified

Notes

Contact with authors: We contacted the study authors to get the information about potential attrition and missing data in the study, the pre-test means and SDs for both outcomes. We also inquired whether the means reported for happiness in Table 2 for the 2 groups were correct (lower score in IG compared to CG, but in the text the authors reported an increase of happiness through resilience training). We received no response to 2 inquiries.

Study start/end date: not specified; study conducted during academic years 2013 - 2014

Funding source: Islamic Azad University of Rasht Branch (see trial registration)

Declaration of interest: not specified

Ethical approval needed/obtained for study: approved by the Islamic Azad University (51172910725013)

Comments by study authors: paper obtained from a research project approved by the Islamic Azad University of Rasht Branch; registered in the Iranian Registry of Clinical Trials (IRCT2016112231016N1)

Miscellaneous outcomes by the review authors: not relevant

Akbari 2017 *(Continued)*

Correspondence: Bahman Akbari; Department of Psychology, Rasht branch, Islamic Azad University, Rasht, Iran; Bakbari44@yahoo.com

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Then they were randomly assigned to the intervention and control groups (15 per group)." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; no information about comparability of groups at baseline or respective analysis
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Judgement comment: insufficient reporting of attrition/exclusions to permit judgement of 'Low risk' or 'High risk' (e.g. unclear if there were any missing data in the 2 groups; unclear how many participants were analysed)
Selective reporting (reporting bias)	High risk	Judgement comment: trial registration (IRCT2016112231016N1) available and all of the study's prespecified outcomes have been reported but only post-intervention assessment is reported and time effect is not considered in MANCOVA

Anderson 2017

Study characteristics

Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified
Participants	**Country:** Canada **Setting:** online, self-guided intervention **Age:** mean = 25.5 years **Sample size (randomised):** 138

Anderson 2017 *(Continued)*

Sex: 50 women, 88 men

Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline: not specified

Population description: primary care paramedic (PCP) student volunteers

Inclusion criteria: not specified

Exclusion criteria: not specified

Attrition (withdrawals and exclusions): not specified

Reasons for missing data: not specified

Interventions

Intervention: self-paced online resiliency training programme (n = 81)

- *delivery*: online (blended)
- *providers*: self-guided
- *duration of treatment period and timing*: self-paced training of 6 - 8 hours over 2 weeks
- *description*:
  - LEARNING OBJECTIVES: defining resilience, identifying the emotional and physical risks of paramedicine work, recognising symptoms of stress, post-traumatic stress disorder and vicarious trauma, and building resilience skills through understanding and applying techniques to manage self-talk, feelings, and behaviour
  - OUTLINE:
    - 1) topic: The Stress Story; material covered: physiology of stress; mind/body connection
    - 2) topic: When is stress really trauma?; material covered: defining trauma; the faces of trauma; the culture of trauma
    - 3) topic: benefits and risks of being a paramedic; material covered: describe workplace benefits and risks; defining vicarious traumatisation
    - 4) topic: balancing risk and benefits with resiliency; material covered: defining resiliency
    - 5) topic: managing stress: How do I do?; material covered: self-awareness and triggers; support systems; coping strategies
    - 6) topic: building resiliency; material covered: putting the pieces together; maintaining life balance; help-seeking behaviours
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: not specified

Control: not specified (n = 57)

Outcomes

Outcomes collected and reported:

- resilience - Resilience Scale (RS)
- resilience, self-reliance - RS
- resilience, meaningfulness - RS
- resilience, equanimity - RS
- resilience, perseverance - RS
- resilience, existential aloneness - RS

Time points measured and reported: 1) pre-intervention (prior to practicum experience and resiliency training); 2) post-intervention (after resiliency training and following completion of practice experience)

Adverse events: not specified

Anderson 2017 *(Continued)*

Notes	**Contact with authors:** We contacted the authors to get the information about any missing data (withdrawals/exclusions) in the study, the number of participants analysed in each group and the SDs for the outcomes reported in Table II. We received no response to 2 inquiries. **Study start/end date:** not specified **Funding source:** partially funded by the Canadian Mental Health Association, Campus Capacity Development Grant, and partially by the Justice Institute of British Columbia **Declaration of interest:** The authors state that there are no conflicts of interest **Ethical approval needed/obtained for study:** not specified **Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** not relevant **Correspondence:** Gregory S. Anderson; Office of Applied Research and Graduate Studies, Justice Institute of British Columbia (JIBC), 715 McBride Blvd., New Westminster, BC V3L 5T4, Canada; ganderson@jibc.ca

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Using a randomized control trial, cohorts of students were randomly assigned to either the experimental (with the online course as an intervention) or control group. Two cohorts were randomly assigned to receive the online course intervention designed to build capacity for resilient behaviour, while two cohorts acted as the control group." Quote: "Baseline demographic results were examined using bivariate comparisons between the control and experimental, and all were found to be statistically insignificant at $p < 0.05$ which suggests that there were no differences between the two groups on the pre-test demographic variables." Quote: "Prior to the intervention there were no significant differences in total resilience or any of the sub-scales (self- reliance, meaningfulness, equanimity, perseverance, and existential aloneness)." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; verified baseline comparability of groups for sociodemographic characteristics and outcome variables on the basis of analysis
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	Unclear risk	Judgement comment: insufficient information about blinding of participants and personnel to permit judgement of 'Low risk' or 'High risk' (online self-guided intervention)
Blinding of outcome assessment (detection bias) Subjective outcomes	Unclear risk	Judgement comment: insufficient information about blinding of outcome assessment to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Judgement comment: insufficient reporting of attrition/exclusions to permit judgement of 'Low risk' or 'High risk' (e.g. unclear if there were any missing data and if missing data were imputed, for example; number of participants analysed in each group not stated)

Anderson 2017 *(Continued)*

Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Barry 2019

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** Individuals **Power (power & sample size calculation, level of power achieved):** To ensure sufficient statistical power to enable comparison of treatments, the trialists sought to recruit at least 84 participants, based on the related trial previously (Warnecke 2011); that trial was powered to detect a 4-point difference (SD 0.6) in the Perceived Stress Scale (PSS) score, using a 2-tailed test, α = 0.05 and power = 0.80, and allowing for a 10% dropout; this calculation was based on data from a study of university students which found a mean pretest PSS score of 18.11 (SD = 6.19); while only 66 participants were recruited in that study, statistical differences were still detected between the groups **Imputation of missing data:** no imputation of missing data specified; intervention designed as "intention to treat" study (i.e. adherence to daily practice for whole period not essential); intention-to-treat analysis (i.e. including participants who withdrew during study period)
Participants	**Country:** Australia **Setting:** CD-guided intervention; sealed trial packs are posted to participants, i.e. training setting at home **Age:** mean = 38.14 (SD = 11.33) years **Sample size (randomised):** 82, including 17 doctoral students in health professions **Sex:** 61 women, 21 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** • depression (Depression, Anxiety and Stress Scale (DASS); 0 - 9 normal range): IG: 5.32 (3.7), CG: 7.52 (6.8); anxiety (DASS; 0 - 7 normal range): IG: 5.79 (6.2), CG: 5.37 (7.1); stress (DASS; 0 - 14 normal range): IG: 11.91 (8.1), CG: 13.76 (8.5); all participants within normal clinical range for depression, anxiety and stress • perceived stress (PSS): IG: 21.17 (3.4), CG: 20.74 (2.6) • all included participants with psychological distress in Kessler Psychological Distress Scale (K10) below 30 (i.e. below severe level of distress) **Population description:** doctoral candidates **Inclusion criteria:** 1) 18 years of age or older; 2) studying on campus; 3) having completed > 3 months of candidature **Exclusion criteria:** 1) participants with score of 30+ in K10 questionnaire for psychological distress (indicates severe levels of distress; participants immediately referred to appropriate health service provider; n = 3) **Attrition (withdrawals and exclusions):** pre-intervention: 1 did not return survey (IG); during study period: 9 withdrawals (IG: 8, CG: 1); post-intervention: same 9 participants did not return survey (IG: 8, CG: 1) **Reasons for missing data:** not specified
Interventions	**Intervention:** guided mindfulness practice (n = 43)

Barry 2019 *(Continued)*

- *delivery*: CD; individual setting
- *providers*: spoken mindfulness practice on CD recorded by Emma Warnecke
- *duration of treatment period and timing*: 8 weeks; participants asked to use CD on daily basis (i.e. in total 56 daily practices requested: 7 a week over 8-week period)
- *description*:
  - participants provided with recorded mindfulness practice on CD (i.e. spoken mindfulness practice of breath awareness recorded by Emma Warnecke (available at www.utas.edu.au/health/students/medicine/stress-management)
  - participants provided with guide to safe use and asked to use CD on daily basis; participants provided with record sheet to report daily practice
  - see website for detailed information:
    - introduction (5 minutes)
    - relaxation – guided relaxation with no background sounds (30 minutes)
    - relaxation – guided relaxation with background ocean sounds (30 minutes)
    - mindfulness – breath awareness (25 minutes)
    - mindfulness – advanced practice of breath awareness (30 minutes)
    - beach sounds for relaxation (30 minutes)
    - relaxation – brief guided relaxation (5 minutes)
- *compliance*: adherence to protocol for daily mindfulness practice varied widely amongst 34 members in IG: 2 did not complete any mindfulness practice at all, another 2 only completed the mindfulness practice during the first week of the study; among remaining 30 active participants: 21 completed the practice at least once in each of the 8 weeks, between 1 and 3 participants completed at least once across 7, 6, 5, 4, or 3 weeks of the study; none of the participants in IG completed the requested maximum of 56 daily practices (7 a week over the 8-week period); total number of mindfulness practices completed by each of the 30 actively participating members of IG varied from 10 to 53, with an average of 35 practices (5 a week) over the 8-week study period; Intervention designed as "intention to treat" study, i.e. adherence to daily practice for whole period is not essential; 8/43 withdrew during study period
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis:* mindfulness-based

Control: no intervention (n = 39)

- *description*:
  - receive no intervention activities for the same period and while not discouraged from their usual form of self-care, they are requested not to undertake any regular mindfulness practice
  - participants advised that they would receive the mindfulness CD at the end of the study period for their own use
- *compliance*: 1/39 withdrew during study period

Outcomes

Outcomes collected and reported:

- perceived stress - PSS
- depression - DASS
- anxiety - DASS
- stress - DASS
- PsyCap – efficacy - brief version of Psychological Capital Questionnaire (PCQ)
- PsyCap – hope - brief version of PCQ
- PsyCap – resilience - brief version of PCQ
- PsyCap – optimism - brief version of PCQ
- PsyCap – total score - brief version of PCQ

Time points measured and reported: 1) pre-intervention; 2) post-intervention

Adverse events: not specified

Barry 2019 *(Continued)*

Notes	**Contact with authors:** We contacted the authors to ask for the subgroup outcome data of doctoral candidates in health professions (Barry 2019 [pers comm]). **Study start/end date:** not specified; recruitment in July 2015 **Funding source:** This research was conducted with funding from the authors' university **Declaration of interest:** The authors have no conflicts of interest to report **Ethical approval needed/obtained for study:** received approval from the Human Research Ethics Committee (H14833) of the University of Tasmania **Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** response from Dr Barry concerning health professions: "Yes, several of the doctoral candidates in our study were in health related areas of study. In fact, they represented about 25% of the participants."; subgroup data for doctoral candidates in health professions sent from authors **Correspondence:** Karen May Barry, PhD; Tasmanian Institute of Agriculture, University of Tasmania, Private Bag 98, Hobart, Tasmania 7001, Australi; aKaren.Barry@utas.edu.au

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Quote: "Participants were block randomized, with block sizes of two, to either the intervention or usual care control." Quote: "As reported elsewhere, for all recruited participants the mean age was 38 years, 81.5% were female and 22.2% were international candidates. When randomly allocated to the control or intervention group, there were no statistically significant differences in baseline characteristics, with the exception of significantly lower total PsyCap for the intervention participants (Table 1)." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk' (method of random-sequence generation is not described); verified baseline comparability of groups for sociodemographic characteristics and most outcome variables except for total PsyCap score (significantly lower in IG compared to CG, P = 0.049)
Allocation concealment (selection bias)	Unclear risk	Quote: "The survey questionnaire and a sealed trial pack (including mindfulness CD, instructions, and record sheet for the intervention group, while an empty CD case and information sheet was included for the control group) were posted to the participants. Participants were instructed to complete the baseline questionnaire prior to opening the sealed trial pack. This ensured allocation to the control or intervention group was concealed until after baseline data were collected." Judgement comment: participants could probably not foresee assignment (sealed trial pack that participants are instructed to open only after completing the baseline questionnaire); insufficient information about allocation concealment from investigators enrolling participants to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Quote: "A single-blinded randomized control trial of a 30-min mindfulness intervention 17 was conducted" Quote: "Due to the nature of the intervention, it was not possible to conduct a double-blinded trial."

Barry 2019 *(Continued)*

		Judgement comment: single-blind study (unclear if study personnel or participants were blinded) and the outcome could be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	Unclear risk	Judgement comment: insufficient information about blinding of outcome assessment to permit judgement of 'Low risk' or 'High risk'; unclear if participants' responses to questionnaires were affected by lack of blinding, since it is unclear if study personnel or participants were blinded in the single-blind study (see performance bias)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "One participant withdrew from the control group of the study during the trial period and nine withdrew from the intervention group, including one prior to the trial and eight during the trial. Therefore, 72 participants progressed through the whole trial (Figure 1)." Quote: "The intervention was designed as an "intention to treat" trial, therefore adherence to the daily practice for the whole period was not essential." Judgement comment: reasons for missing data likely to be related to true outcome with imbalance in amount of missing data between groups (pre-intervention: IG: 1 did not return survey vs CG: n = 0; IG: 8 withdrew during study period and did not return post-intervention survey vs CG: 1); intervention designed as intention-to-treat (i.e. participants included irrespective of adherence to daily practice); but available-case analysis (only participants for whom outcomes were obtained at pre- and post-intervention surveys)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Chen 2018a

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified in conference abstract **Imputation of missing data:** probably no imputation of missing data; only 9 did not withdraw and completed all surveys, i.e. yielding an analytic sample of 9 (due to small sample size, no analysis of hypotheses)
Participants	**Country:** USA**Setting:** not specified**Age:** not specified **Sample size (randomised):** 22**Sex:** not specified**Comorbidity (mean(SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** fall and spring first-semester baccalaureate students in nursing (BSNs) **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** n = 9/22 withdrawals (not specified which group); 9 of 13 remaining participants completed all surveys (not specified which group), i.e. 4 with incomplete surveys

Chen 2018a *(Continued)*

	Withdrawals and exclusions: 9/22 withdrawals (not specified which group); 9 of 13 remaining participants completed all surveys (not specified which group), i.e. 4 with incomplete surveys
Interventions	**Intervention:** Brief Mindfulness-based Compassion (MSC) (n randomised not specified) • *delivery*: face-to-face (setting not specified) and individual home practice • *providers*: not specified • *duration of treatment period and timing*: 4 weekly 1-hour sessions + 10 minutes daily home practice • *description*: emphasises self-kindness • *compliance*: total withdrawal: 9 (unclear which group) • *integrity of delivery*: not specified in conference abstract • *economic information*: not specified in conference abstract • *theoretical basis:* mindfulness-based **Control:** wait-list control (n randomised not specified) • *description*: receive consolidated half-day programme at the beginning of the following semester • *compliance*: total withdrawal: 9 (unclear which group)
Outcomes	**Outcomes collected and reported:** • stress - scale not specified • resilience - scale not specified • mindfulness - scale not specified • self-compassion - scale not specified • academic performance - scale not specified; not reported **Time points measured and reported:** 1) pre-intervention; 2) post-intervention; 3) 1-month follow-up (at 8 weeks after baseline, i.e. 4 weeks after 4-week intervention); time points reported not specified **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors to see if the study was already published (Kelleher 2019 [pers comm]). **Study start/end date:** not specified **Funding source:** not specified **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** not specified**Comments by study authors:** not relevant**Miscellaneous outcomes by the review authors:** not relevant**Correspondence:** Catherine Kelleher; University of Maryland, School of Nursing; kelleher@umaryland.edu

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote (see conference abstract): "During year 1, participants were randomized to MBSR and MSC programs as originally planned but enrollment was low. During year 2, the randomized design was modified to drop the MBSR arm, focus only on the MSC program, and use a control group in which participants would get the MSC program in a consolidated half-day program at the beginning of the following semester. The simplified design permitted testing student interest in signing up for an MSC study and the impact on enrollment if there was no uncertainty about being randomized to 1 of 2 programs which met at different times." Judgement comment: based on conference abstract, insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; no judgement on baseline comparability possible

Chen 2018a *(Continued)*

Allocation concealment (selection bias)	Unclear risk	Judgement comment: based on conference abstract, insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'.
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: based on conference abstract, blinding of participants probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: based on conference abstract, insufficient information about blinding of outcome assessment; but due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about the intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote (see conference abstract): "In year 2, total recruitment=22, total withdrawal=9, and 9 of the 13 participants completed all surveys, yielding an analytic sample=9. Due to small sample size, analysis for both pilot years was limited to descriptive statistics, and hypotheses could not be tested" Judgement comment: unclear if reasons for missing data likely to be related to true outcome (number of participants randomised to each group and number of dropouts in each group not stated); probably per-protocol analysis and available-case analysis (analyses restricted to descriptive statistics and no testing of hypotheses due to withdrawals and incomplete surveys; i.e. only 9 participants who did not withdrew and completed the surveys were considered)
Selective reporting (reporting bias)	Unclear risk	Judgement comment: no judgement possible based on conference abstract

Delaney 2016

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** For this pilot study, a sample size goal for initial testing of the stress management intervention was 30 to 40 participants. POST-HOC POWER ANALYSES: performed on nonsignificant outcomes of perceived stress, resilience, GPA, and attrition to determine if there was sufficient power to accept nonsignificant results; power analysis based on the primary dependent variable in this study, perceived stress. When applied to a large national sample, the mean and SD of the PSS were 19.92 and 7.49, respectively. If the PSS has a comparable SD when used in this study, a sample size of 72 participants would be needed to achieve 80% power; further power analyses revealed that to obtain sufficient power for the other study variables, BRS, GPA, and attrition a sample size of 72 to 100 participants would be required; analyses confirmed that the study was UNDERPOWERED to detect meaningful differences in the study outcomes **Imputation of missing data:** not specified
Participants	**Country:** USA **Setting:** 2 large universities in Connecticut (simulation laboratories) **Age:** mean age not reported; 33 participants aged 18 - 21 and 7 participants aged ≥ 22 years

Delaney 2016 *(Continued)*

Sample size (randomised): 40

Sex: 4 women, 36 men

Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline: not specified

Population description: junior nursing students from 2 universities in Connecticut

Inclusion criteria: 1) English-speaking junior nursing students age 18+; 2) currently enrolled in a baccalaureate nursing programme at one of the participating schools; 3) willing to participate

Exclusion criteria: not specified

Attrition (withdrawals and exclusions): 3 withdrawals (IG: 2; CG: 1)

Reasons for missing data: for 3 withdrawals: 2 in IG unable to attend 2. NURSE session; 1 in CG had other academic commitments

Interventions

Intervention: NURSE (Nurture nurse, Use resources, foster Resilience, Stress and Environment management) (n = 20)

- *delivery*: FACE-TO-FACE (delivered in simulation laboratories of 2 universities); combines prebriefing including didactic practice, experiential learning and discussion followed by a simulation; uses both in-person simulations with faculty role-play and high-fidelity human patient simulator; GROUP SETTING: simulation session conducted in small groups; 1 university: both NURSE sessions conducted with entire group; other university: several small-group sessions
- *providers*: 2 researchers (1 at each university); use written intervention manual with standardised guidelines, PowerPoint presentation and simulation scenarios; patient simulation with faculty actor; practice sessions and mock reviews to ensure consistent delivery of educational components and scoring of group simulation forms until the instructors reached 100% agreement
- *duration of treatment period and timing*: 2 x 2½-hour NURSE sessions; 5 hours in total: prebriefing including didactic practice, experiential learning and discussion (1½ hours) followed by a simulation; simulated 60-minute role-play (hands-on simulation: 20 minutes, debriefing discussion: 40 minutes)
- *description (content, components)*:
  - stress management intervention that supports academic success, professional evolution, and development of the personal characteristics of high resilience and low stress levels
  - COMPONENTS: nurturing self (N), using resources such as social support (U), building resilience (R), engaging in stress management (S), and participating in creating healthy environments (E); combines prebriefing including didactic practice, experiential learning and discussion hours followed by a simulation
  - SESSION 1: NURTURE NURSE (N), USE RESOURCES (U), RESILIENCE (R):
    - content outline: a) didactic: understand the benefits of nurturance and stress management; recognise how different personality types approach stress; develop self-awareness of, responses to and coping styles for stress; recognise stages and symptoms of stress, the difference between negative and positive aspects of stress, characteristics of resilience and means to increase and develop it and other healthy means of managing stress; learn positive affirmations to reverse negative thinking; use time management strategies to reduce stress; recognise the need for environmental and personal resources as support to manage stress; b) experiential: List personal causes of stress and characteristic means of coping and maintaining health; c) discussion: various methods to reduce stress and promote health and resilience
    - following didactic portion, simulation component uses standardised patient simulation with a faculty actor (= role-play involving a common cause of academic stress, student stress related to grades and course load; similar to procedure used at both schools for simulation sessions, students' names were placed in a hat and one student was selected to be an active participant while the other members of the group were observers, observers were in the same room as participants and had access to all information and discussions)
    - followed by debriefing session for students to discuss academic stressors and plan their own individualised wellness plan for stress management and academic success

Delaney 2016 *(Continued)*

- SESSION 2: STRESS (S) AND ENVIRONMENT MANAGEMENT (E):
  - content outline: a) didactic: distinguish between effective and ineffective communication responses during stressful situations, reduce stress using psychological techniques (affirmations, imagery), reduce stress using physical techniques (relaxation breathing, simple yoga postures, exercise), identify methods to improve relationships with classmates/co-workers, to create and contribute to healthy clinical/work environments; b) experiential: practise breathing with imagery of positive school and work outcomes, demonstrate a simple yoga position; c) discussion: What is a healthy work environment?
  - simulation component uses a combination of high-fidelity simulation with use of a mannequin controlled by a faculty member in a control room and 2 faculty actors; simulation scenario presents common real-world clinical stressor (patient unhappy with having a student nurse and challenging his/her competence to perform a procedure; scene included demonstration of engaging in conversation with a patient in that difficult situation, demonstrating listening skills, and showing compassion and care for the frightened patient with a complicated wound); followed by demonstration of communication skills with a nurse manager and colleague (role-play by two faculty actors) regarding the patient situation; in debriefing component, students invited to discuss and reflect on the issues that arose from the scenario, e.g. personal anxiety, their coping mechanisms, and skills they learned from the session; further discussion of creating healthy work environments
- *compliance*: 2/20 did not attend 2. NURSE session
- *integrity of delivery*:
  - 5 treatment fidelity procedures applied to this study: (1) development and use of a researcher-developed intervention manual and simulated scenarios with standardised guidelines, (2) practice sessions and mock reviews to ensure consistent delivery of educational components and scoring of group simulation forms were performed until the instructors reached 100% agreement, (3) completion of a checklist by the instructor at each session to record intervention components delivered, (4) weekly conferences between the NURSE instructors and monthly meetings with the research team to discuss progress of the intervention, and (5) use of post-intervention knowledge measure to assess student comprehension of NURSE education and receipt of treatment
  - Both researchers completed fidelity form following NURSE programme; overall workshop presented as intended (e.g. researchers used written intervention manual with standardised guidelines); group sessions varied between the universities (1x: both NURSE sessions conducted with the entire group; 1x: other several small group sessions as all of the participants had different class schedules making it challenging for all of the students to meet together)

- *economic information*: not specified
- *theoretical basis:*
  - based on Watson's (2008) theory of human caring (Watson 2008): asserts that caring is a science and caring relationships are foundational for nursing; caring is necessary for the preservation of humanity and benefits the caregiver as well as the person being cared for; nurses must cultivate sensitivity to themselves and others through self-care and stress management; development of NURSE driven by the theory of human caring and firmly grounded in a philosophical worldview of holism
  - core concepts of Watson's (2008) theory: caring for self and others; nursing students/nurses can practice this model during stressful situations by pausing and using simple rituals such as centring, breathing, and mindfulness (strategies in NURSE) to create caring occasions for self; these self-caring occasions change the presence of the nurse, affecting the whole energy field and providing nurses with a feeling of renewal; components of the NURSE intervention are all congruent with the values and major concepts and beliefs in the model
  - SIMULATION PROCESS in NURSE includes debriefing and discussion using guided reflection technique (Paige 2015); simulation process consistent with the National League for Nursing (NLN) guidelines for simulation (Jeffries 2007) and procedures used by participating schools of nursing

Control: active control (n = 20)

- *delivery*: booklet and worksheet
- *providers*: probably self-guided
- *duration of treatment period and timing*: 2 months

Delaney 2016 *(Continued)*

- *description*: booklet and worksheet on therapeutic communication; 2-part simulated case study on therapeutic communication and review of general stress information
- *compliance*: 1/20 withdrawal (due to other academic commitments)
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis:* not specified

Outcomes	**Outcomes collected and reported:** • perceived stress - PSS • resilience - BRS • GPA - student's university transcript at each university • attrition rates - rates of non-returning students in each group, by study site, who left nursing programme **Time points measured and reported:** 1) pre-intervention; 2) post-intervention (= end of fall semester); 3) 4-month follow-up (4 months post-intervention, = end of spring semester); attrition rates only assessed at post-intervention and 4-month follow-up **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors for whether the 2 dropouts occurred in the IG or CG, and to get the means and SDs for resilience and perceived stress in both groups with the number of participants analysed, respectively. We also asked if the treatment duration in the NURSE group was also 2 months. We received no response to 2 inquiries. **Study start/end date:** not specified **Funding source:** The authors thank Sigma Theta Tau, International Mu Chapter, for providing funding for this study. **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** Study protocols were approved by the IRBs at the 2 universities participating in this study before participants were recruited. **Comments by study authors:** Authors thank Jean Watson, PhD, Director of the Watson Caring Science Institute, for consulting on this project **Miscellaneous outcomes by the review authors:** not relevant **Correspondence:** Colleen Delaney, PhD; University of Connecticut, 231 Glenbrook Road, Storrs, CT 06269, USA; colleen.delaney@uconn.edu

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Students were randomly assigned to the NURSE intervention (n = 20) or Attention Control Condition (n = 20)." Quote: "No statistically significant differences between the control and intervention groups across baseline demographic characteristics were found." Quote: "In addition, no significant differences between groups were found in the baseline scores for perceived stress, resilience, and GPA." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; verified baseline comparability of groups for sociodemographic characteristics (see Table 2; all Ps >

Delaney 2016 *(Continued)*

		0.338) and outcomes of interest (resilience, perceived stress, GPA) on the basis of analysis (self-reported knowledge only in IG)
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Objective outcomes	Low risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention), but the review authors judge that the outcome is not likely to be influenced by lack of blinding
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to face-intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Objective outcomes	Low risk	Judgement comment: insufficient information about blinding of outcome assessment, but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment to permit judgement of 'Low risk' or 'High risk' (unclear if study personnel who conducted the in-person interview, assessments immediately post-intervention and follow-up telephone interview was blinded); but due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Thirty-seven (37) students completed the study, 19 in the intervention group and 18 in the control group." Quote: "Three students dropped out of the study (two intervention students were unable to attend the second NURSE session and one control group student had other academic commitments)." Judgement comment: reasons for missing data unlikely to be related to true outcome with relative balance in missing data between groups (IG: 2 unable to attend 2. NURSE session; CG: 1 due to other academic commitments); number of participants analysed in each group not specified
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Erogul 2014

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** A sample size calculation determined that 26 participants per group would be required to detect a difference with an effect size of 0.8,

Erogul 2014 *(Continued)*

	with a power of 80% at significance level of 0.05; in part no significant results, according to publication may be due to study being underpowered **Imputation of missing data:** no imputation of missing data; per-protocol analysis (only participants who took part in allocated intervention)
Participants	**Country:** USA **Setting:** SUNY Downstate School of Medicine in Brooklyn **Age:** mean = 23.5 (SD = 1.7) years **Sample size (randomised):** 59 (not specified; according to authors at baseline) **Sex:** 26 women, 33 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** both control and treatment groups statistically comparable to the norm for resilience, perceived stress and self-compassion **Population description:** first-year class of medical students **Method of recruitment:** recruited from 2010 - 2011 first-year class of medical students at SUNY Downstate School of Medicine in Brooklyn, New York **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** after replacement of 22 participants (IG: 10, CG: 10) who refused to participate in allocated intervention: 2 dropouts (IG: 1/29 (3.4%); CG: 1/30 (3.3%); information about 1 dropout in CG received from authors) **Reasons for missing data:** 1 dropout from IG: scholastic reasons; for other withdrawals unclear; reasons for refusal of 22 randomised participants not specified

Interventions	**Intervention:** abridged MBSR (initially randomised: 39; after refusal of 10 randomised participants to take part in allocated group: n = 29)
	
	• *delivery*: face-to-face; group sessions; weekly handouts, homework reflections
	• *providers*: licensed psychotherapist with 35 years of regular practice in mindfulness meditation who has undergone the MBSR foundational programme at the University of Massachusetts Center for Mindfulness
	• *duration of treatment period and timing*: 8 weekly 75-minute sessions and programme of suggested meditation at home (20 minutes daily practice); full-day retreat offsite between 7th and 8th weekly meeting
	• *description (content, components)*:
	  ◦ IN-CLASS SESSIONS: 1) teach the experiential practices of mindfulness-based meditation, body scan, and breathing-based yoga and 2) to provide a cognitive curriculum about understanding stress and how best to manage reactivity
	  ◦ HOMEWORK: individual sessions of daily meditation for 20 minutes; meditations started with narrated guidance (body scan, breath meditation, gentle yoga); each 20-minute track = abbreviated version of weekly 60-minute experience in mindfulness meditation and corresponds to theme of the weekly meeting; after week 4: shift from guided to self-meditation
	  ◦ RETREAT: to immerse the participants in a full day of mindfulness, thus leveraging the experience they had gained so far in the programme to deepen their mindfulness practice
	• *compliance*: 100% attendance of participants at full-day retreat
	• *integrity of delivery*: not specified
	• *economic information*: not specified
	• *theoretical basis:* MBSR

Erogul 2014 *(Continued)*

	Control: no intervention (initially randomised: 42; after refusal of 12 randomised participants to take part in allocated group: n = 30)
Outcomes	**Outcomes collected and reported:** • perceived stress - PSS-10 • self-compassion - SCS • resilience - RS **Time points measured and reported:** 1) pre-intervention; 2) post-intervention (at conclusion of intervention); 3) 6-month follow-up (6 months post-intervention) **Adverse events:** not specified
Notes	**Contact with authors:** We contacted authors for the number of participants randomised in total and to each group (refusals from participants after randomisation) as well as the number of participants analysed at each time point (Erogul 2018 [pers comm]) **Study start/end date:** study carried out in March of the first year of medical school; exact study dates not specified **Funding source:** grant from the Arnold P Gold Foundation **Declaration of interest:** The authors report no conflict of interest **Ethical approval needed/obtained for study:** approved by the SUNYDownstate IRB **Comments by authors:** checklist of Items for Reporting Trials of Nonpharmacologic Treatments in appendix **Miscellaneous outcomes by the review authors:** information received from authors: "We had: 30 controls 29 treatment at the start of the study. By the end, because of attrition of one individual from each arm we had 29 controls, 28 study subjects = 57 participants total analyzed" **Correspondence:** Mert Erogul; Department of Emergency Medicine, SUNY Downstate School of Medicine, 155 Lafayette Ave #1a, Brooklyn, NY 11238; erogul1@gmail.com

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "The selection process involved using a random number generator to select students who had been numbered according to their alphabetical order in the class." Quote: "After this random allocation, students were asked by email to consent to participate in the group to which they had been assigned. A proportion of students declined to participate (as indicated below), and were replaced by other students selected at random in a similar fashion from the remaining members of the class on a rolling basis until a complement of 30 control and 29 study participants was achieved." Quote: "There were no significant differences with respect to age, sex, PSS, SCS and RS scores at baseline." Judgement comment: The investigators describe a random component in the sequence-generation process (random-number generator). However, after 22 participants refused to participate in allocated intervention after randomisation, they were replaced by other students selected at random from class "in a similar fashion". It is not clear how the second random selection was performed; verified baseline comparability of groups for sociodemographic characteristics (age, gender) and outcomes of interest on the basis of analysis

Erogul 2014 *(Continued)*

Allocation concealment (selection bias)	Unclear risk	Quote: "This process blindly allocated thirty students to control and thirty to intervention." Quote: "After this random allocation, students were asked by email to consent to participate in the group to which they had been assigned. A proportion of students declined to participate (as indicated below), and were replaced by other students selected at random in a similar fashion from the remaining members of the class on a rolling basis until a complement of 30 control and 29 study participants was achieved." Judgement comment: participants and investigators enrolling participants could probably not foresee assignment during computer-based allocation (exact method not described); but insufficient information about allocation concealment for allocation of participants who replaced the ones who refused to participate in allocated group
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Quote: "un-blinded randomized controlled study" Judgement comment: blinding of participants and personnel not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; but due to performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "After this random allocation, students were asked by email to consent to participate in the group to which they had been assigned. A proportion of students declined to participate (as indicated below), and were replaced by other students selected at random in a similar fashion from the remaining members of the class on a rolling basis until a complement of 30 control and 29 study participants was achieved." Quote: "One study participant dropped out during the first week for scholastic reasons and his data were not used." Judgement comment: information received from authors: “We had: 30 controls, 29 treatment at the start of the study. By the end, because of attrition of one individual from each arm we had 29 controls and 28 study subjects = 57 participants total analyzed”; reasons for missing data unlikely to be related to true outcome with relative balance in missing data between groups (12 in CG refused to participate in allocated group after randomisation vs 10 in IG); participants who dropped out were replaced by other students in the class; 2 dropouts during intervention phase (IG: 1, CG: 1); per-protocol analysis analysis (only participants who took part in allocated intervention)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Galante 2018

Study characteristics	
Methods	**Study design:** RCT

Galante 2018 *(Continued)*

	Study grouping: parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** To detect a change in Clinical Outcomes in Routine Evaluation Outcome Measure (CORE-OM) score of SD 0.3 at a P value < 0.05 with 90% power, 550 students were estimated to be needed, allowing for 20% loss to follow-up.; 59% attendance rate at half or more course sessions could have represented a constraint on statistical power, but the study was designed to accommodate this **Imputation of missing data:** multiple imputation for primary outcome; for primary outcome psychological distress (and outcome grades): per-protocol analysis (with participants in IG who completed at least 4 mindfulness course sessions and excluding individuals in CG who engaged in meditation elsewhere during the follow-up period preceding outcome measurement) AND intention-to-treat analysis (see also appendix)
Participants	**Country:** UK **Setting:** University of Cambridge (courses run during university terms) **Age:** range = 17 - ≥ 31 years; see information from authors: only 1 participant aged 17 years **Sample size (randomised):** 616 **Sex:** 388 women, 228 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** psychological distress (CORE-OM): IG: 1.01 (0.54); CG: 0.97 (0.51) **Population description:** students (undergraduate and postgraduate) at University of Cambridge **Method of recruitment:** recruitment from students at University of Cambridge; method of recruitment not specified **Inclusion criteria:** 1) current undergraduate or postgraduate students (aged ≥ 18 years) at the University of Cambridge; 2) students who believed they could attend at least 7 of the 8 sessions of the mindfulness course **Exclusion criteria:** 1) currently experiencing severe periods of anxiety or depression; 2) a severe mental illness, such as hypomania or psychotic episodes; 3) recent bereavement or major loss; 4) any other serious mental or physical health problem that would affect their ability to engage with the course **Attrition (withdrawals and exclusions):** lost to follow-up: post-intervention: 135 (IG: 52, CG: 83); examination period: 175 (IG: 76, CG: 99); 5 (2%) (all in CG) withdrew from study **Reasons for missing data:** reasons for missing data (lost to follow-up) at post-intervention and examination period not specified; withdrawals from study in CG: in final year, could not undertake Mindfulness Skills for Students (MSS) course in following year

Interventions	**Intervention:** TAU (mental health support as usual) + MSS intervention (mindfulness-based intervention to increase resilience) (n = 309)
	
	• *delivery*: face-to-face; group sessions (7 courses in parallel with up to 30 students in each course); mindfulness meditation exercises, periods of reflection and inquiry, interactive exercises; home practice recommended
	• *providers*:
	  ◦ TAU: University of Cambridge Counselling Service, health services external to the University, including the NHS
	  ◦ MSS: experienced and certified mindfulness teacher (Intervention providers comprised 1 mindfulness teacher, 1 administrative team, and 1 centre in which the intervention was done)
	• *duration of treatment period and timing*: 8 weekly 75- to 90-minute sessions (students required to choose usual session time and day to attend each week, but when this was not possible they could attend an alternative session within the same week --> so-called session hopping); home practice increased from 8 minutes/day to 15 to 25 minutes/day

Galante 2018 *(Continued)*

- *description*:
  - TAU: access to comprehensive centralised support at the University of Cambridge Counselling Service in addition to support available from the university and its colleges, and from health services external to the University, including the NHS
  - MSS: each session permeated with elements of flexibility, self-discovery, self-compassion, and empowerment, aimed at generating a natural transfer of skills developed in meditation to study, decision making, and relationships
    - summarises the different types of meditation taught in the course book, as 3 choices which can be made at any moment in a meditation (or beyond), depending on what we feel is needed at that moment for a kinder, wiser response to our experience
    - within the 3 choices, MSS places greater emphasis on certain areas of mindfulness practice and approach than the 'Frantic World' course: 1) noticing moments of meta-awareness when they arise, pausing there, and exploring/appreciating that very moment; 2) from the outset, encouraging students to choose their next point of attention 'in the flow', organically (whether the breath, body, sounds, thoughts, feelings, or a broader whole-body sense of being – as it feels natural or possible at the time), rather than necessarily coming back to the breath or body; and 3) encouraging students to choose freely whether to continue attending in the present moment at all, and consciously allowing into their meditation other states of mind and body (such as plans, daydreams, sleepiness), to develop inner listening and presence (and avoid any implied value judgement of clear or focused states as preferable or 'better')
    - primary component of MSS: compassionate self-knowledge and self-discovery over time; describes mindful attention as "being with" whatever enters our experience or awareness – with a growing ability to decentre by acknowledging and "giving space" to whatever comes into the experience
    - emphasis on choice also fosters a growing confidence in making trustworthy choices both in meditation and beyond, alongside a more fluid and kindly understanding of what or who constitutes "I", the person making those choices; this mitigates students' perfectionist tendencies to judge experience negatively, or blame themselves for "getting it wrong" when less attentive or uncomfortable states enter into meditation, study or life, and increases their ability to tolerate all experience with an increasing comfort zone around difficult experience (so it becomes, "more and more acceptable not to be okay")
    - nonviolent communication and focusing: help students to explore feelings safely (e.g. in weeks 4 and 5), to foster a kind, empathic inner relationship, to understand how this positively affects outer relationships (e.g. week 6), and to explore needs both met and not met by actions such as autopilot (week 1) and procrastination (week 7)
    - HOMEWORK: meditations from audio files and other mindfulness practices (e.g. mindful walk, mindful eating, habit breakers)
- *compliance*:
  - 182/309 participants (59%) attended 4 or more sessions
  - 65/309 (21%) attended all course sessions
  - participants attended median of 5 sessions including 44 participants who attended no sessions at all
  - for single sessions: sessions 1: n = 246; session 2: n = 220; session 3: n = 182; session 4: n = 173; session 5: n = 145; session 6: n = 147; session 7: n = 133; session 8: n = 123 (number of sessions attended suggests that participants dropped out from the courses, rather than just skipping sessions)
  - reasons for abandoning mindfulness course provided by 39 participants: schedule conflicts (n = 16); too busy (n = 12); n = 15 cancelled without attending any sessions (n = 3 due to misunderstanding eligibility or dates; n = 2 due to personal reasons); course not what they had expected (n = 3); emotional life events (n = 2); found mindfulness momentarily unhelpful (n = 1)
- *integrity of delivery*: not specified
- *economic information*: MSS courses were free to students; £11 available to each participant as token of appreciation for questionnaire completion

Galante 2018 *(Continued)*

- *theoretical basis*:
  - based on course book *Mindfulness: a practical guide to finding peace in a frantic world* (Williams & Penman, 2011) that was adapted for university students to facilitate application of mindful awareness to study, positive decision-making and relationships
  - while course book is rooted in Mindfulness-based Cognitive Therapy, MSS adopts flexibility often associated with MBSR; MSS also draws on 2 other mindful modalities (Nonviolent Communication, Focusing)

Control: TAU (mental health support as usual) (n = 307)

- *delivery*: probably face-to-face
- *providers*: University of Cambridge Counselling Service in addition to support available from the university and its colleges and from health services external to the University, including the NHS
- *duration of treatment period and timing*: not specified
- *description*: access to comprehensive centralised support (guaranteed possibility to participate in MSS courses in following year)
- *compliance*: 5 (2%) (all in CG) withdrew from study (for 3 of 4 in their final year because they could not undertake MSS course in the following year)
- *integrity of delivery*: not specified
- *economic information*: £ 11 available to each participant as token of appreciation for questionnaire completion
- *theoretical basis*: not specified

Outcomes

Outcomes collected and reported: most outcomes only assessed in examination period

- psychological distress - CORE-OM (post-intervention and examination)
- well-being - WEMWS (post-intervention and examination)
- examination results - grades
- numbers of requests for special examination arrangements
- inability to sit examination (i.e. intermissions of study)
- perceived effect of problems on academic performance - single item
- daily coping (problem/emotion focused) - single items
- physical activity patterns - smartphone accelerometer
- altruism - offer of high-street shopping vouchers with a choice to donate them to charity (post-intervention and examination

Time points measured and reported: 1) pre-intervention; 2) post-intervention; 3) examination period (post-intervention; stressor exposure)

Adverse events: no participants with adverse reactions related to self-harm, suicidality, or harm to others; number of adverse events triggered by surpassing CORE-OM risk subscales cut-off scores: 1) pre-intervention: IG: 15, CG: 11; 2) post-intervention: IG: 13, CG: 13; 3) examination term: IG: 7, CG: 12; for all outcome time points: IG: 20; CG: n25

Notes

Contact with authors: We contacted the authors for the subgroup outcome data (means and SDs for all outcomes) of students in the fields of 'Clinical medicine' and 'Humanities and social sciences'; response received from authors (Galante 2019 [pers comm]); but subgroup data could not be sent while the review was written up

Study start/end date: 28 September 2015 – 1 January 2015
Funding source: University of Cambridge and National Institute for Health Research Collaboration for Leadership in Applied Health Research and Care East of England; study funded by the University of Cambridge Vice-Chancellor's Endowment Fund, the University Counselling Service, and the National Institute for Health Research (NIHR) Collaboration for Leadership in Applied Health Research and Care East of England hosted by the Cambridgeshire and Peterborough National Health Service Foundation Trust
Declaration of interest: no competing interests declared
Ethical approval needed/obtained for study: approved by Cambridge Psychology Research Ethics Committee on 25 August 25, 2015 (number PRE.2015.060); independent data monitoring and ethics

Galante 2018 *(Continued)*

committee is set up and study is co-produced with students and university officers to increase validity of results
Comments by study authors: registered with the Australia and New Zealand Clinical Trials Registry, number ACTRN12615001160527
Miscellaneous outcomes by the review authors: information received from authors: only 1 participant aged 17 years

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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "participants were randomly assigned (1:1), via remote survey software (Qualtrics) using computer-generated random numbers (simple random isation), to receive either mindfulness training with the Mindfulness Skills for Students (MSS) course plus mental health support as usual, or mental health support as usual alone." Quote: "Baseline characteristics were similar between groups (table 1)." Judgement comment: The investigators describe a random component in the sequence-generation process (computer random-number generator).; insufficient information about comparability of groups at baseline for sociodemographic variables (statistical (non)significance not reported); baseline comparability for outcome variables unclear
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'; study management team informed of participants' allocation AFTER baseline assessment and allocation process concealed; but method of allocation is not described and unclear if researchers in study management team were also responsible for participant enrolment
Blinding of participants and personnel (performance bias) Objective outcomes	Low risk	Quote: "Each participant was informed of their allocation automatically after completion of the baseline questionnaire." Quote: "Concurrently, members of the study management team were also informed automatically of participants' allocation" Quote: "Due to the nature of the intervention, participants were aware of group allocation for the duration of the study." Judgement comment: no blinding of participants and personnel (face-to-face intervention), but the review authors judge that the outcome is not likely to be influenced by lack of blinding
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Quote: "Each participant was informed of their allocation automatically after completion of the baseline questionnaire." Quote: "Concurrently, members of the study management team were also informed automatically of participants' allocation" Quote: "Due to the nature of the intervention, participants were aware of group allocation for the duration of the study." Judgement comment: no blinding of participants and personnel (face-to-face intervention), and the outcome is likely to be influenced by lack of blinding

Galante 2018 *(Continued)*

Blinding of outcome assessment (detection bias) Objective outcomes	Low risk	Judgement comment: assessment of objective outcome via smartphone app; blinding of outcome assessment unclear, but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	Low risk	Quote: "Data collection was remote and automatic using the web-based Qualtrics software to ensure masking of outcome assessors." Judgement comment: blinding of outcome assessment ensured, and unlikely that the blinding could have been broken
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "we randomly assigned 616 students to the MSS group (n=309) or the support as usual group (n=307; figure 2)." Quote: "Five (2%) people, all in the support as usual group, withdrew from the study; three of four in their final year said this was because they could not undertake the MSS course the following year." Quote: "Multiple imputation addressed missing data (appendix pp 3, 4)." Quote: "The primary analysis was by intention to treat." Judgement comment: reasons for missing data likely to be related to true outcome with imbalance in missing data between groups (see Figure 2; lost to follow-up: post-intervention: IG: 52; CG: 83; examination period questionnaire: IG: 76; CG: 99); for primary outcome and grades: per-protocol analysis (with participants in IG who completed at least 4 mindfulness course sessions and excluding individuals in CG who engaged in meditation elsewhere during the follow-up period preceding outcome measurement) AND multiple imputation and intention-to-treat analysis (see also appendix)
Selective reporting (reporting bias)	High risk	Quote: "This trial is registered with the Australia and New Zealand Clinical Trials Registry, number ACTRN12615001160527." Judgement comment: trial registration (ACTRN12615001160527) and study protocol (Galante 2016) available; some prespecified (secondary) outcomes were not reported (e.g. mental health services use); some reported (secondary) outcomes were not prespecified (e.g. inability to sit examinations/intermissions of study); prespecified 1-year follow-up not reported here

Geschwind 2015

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified
Participants	**Country:** Belgium **Setting:** laboratory (sound-attenuated and dimmed experimental room) **Age:** mean = 19.35 (SD = 1.98) years **Sample size (randomised):** 50, including 37 psychology students

Geschwind 2015 *(Continued)*

Sex: 50 women

Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline: not specified

Population description: healthy women

Method of recruitment: recruited from psychology students at University of Leuven (n = 37) + healthy volunteers (n = 13)

Inclusion criteria: not specified

Exclusion criteria: 1) being pregnant; 2) having respiratory or cardiovascular diseases, neurologic diseases (e.g. epilepsy), or any other minor or major illness, including chronic pain; 3) uncorrected hearing problems; 4) pain at the dominant hand or wrist

Attrition (withdrawals and exclusions): for positive and negative affect: 8 missing at follow-up; unclear for other outcomes

Reasons for missing data: not specified

Interventions

Intervention: positive affect induction (BPS) (n = 25)

- *delivery*: individual setting; writing and visualisation
- *providers*: experimenter in laboratory setting
- *duration of treatment period and timing*: approximately 20 minutes
- *description*: participants asked to first think about (1 minute) and subsequently write about a future in which everything goes well and in which they realise their dreams (15 minutes) and then to visualise this scenario for 5 minutes
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: 37 psychology students of the University of Leuven received course credits, and 13 volunteers were paid EUR 15
- *theoretical basis*: BPS previously shown to selectively increase optimism, positive affect, and positive future expectancies, but not to decrease negative affect in pain-related experiments; Peters 2010

Control: attention control (Typical Day) (n = 25)

- *delivery*: individual setting; writing and visualisation
- *providers*: experimenter in laboratory setting
- *duration of treatment period and timing*: approximately 20 minutes
- *description*: participants asked to first think about (1 minute) and subsequently write about a typical day (15 minutes) and then to visualise this scenario for 5 minutes (equivalent instructions)
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: 37 psychology students of the University of Leuven received course credits, and 13 volunteers were paid EUR 15
- *theoretical basis*: not specified; previously used in similar studies (e.g. Peters 2010)

Outcomes

Outcomes collected and reported:

- pain-US expectancy - single item
- self-reported fear of movement-related pain - single item

Positive and negative affect (modified Differential Emotions Scale; mDES) also assessed before/after affect induction, but not stated as dependent variables

Time points measured and reported: 1) pre-intervention, during acquisition phase (pain-US expectancy, fear of movement-related pain; rated after every 4th block in acquisition phase); 2) pre-intervention (before affect induction phase; mDES); 3) post-intervention (after affect induction phase;

Geschwind 2015 *(Continued)*

	mDES); 4) post-intervention, during test of generalisation (pain-US expectancy, fear of movement-related pain; rated before each movement); 5) post-intervention, during transfer-of-acquisition phase (pain-US expectancy, fear of movement-related pain every other block); 6) 20-minute follow-up (mDES; after test of generalisation, approximately 20 minutes after affect induction) **Adverse events:** not specified
Notes	**Contact with authors:** We contacted authors to ask for the subgroup (summary outcome) data for psychology students, but they had not responded at the time of writing **Study start/end date:** not specified **Funding source:** Ann Meulders (AM) is a postdoctoral researcher of the Research Foundation Flanders (FWO-Vlaanderen), Belgium (12E33714 N). The participation of Nicole Geschwind was made possible by the Center for Excellence on Generalization research, Katholieke Universiteit (KU) Leuven, Belgium (GRIP*TT; KU Leuven grant PF/10/005). The study was also supported by the Odysseus Grant ''The Psychology of Pain and Disability Research Program'' funded by the Research Foundation Flanders (FWO-Vlaanderen), Belgium to Johan WS Vlaeyen (G090208N) and by an EFIC-Grunenthal Research Grant (E-G-G ID: 169518451) to AM. **Declaration of interest:** The authors report no conflict of interest **Ethical approval needed/obtained for study:** approved by the Ethical Committee of the Faculty of Psychology and Educational Sciences of the University of Leuven (registration number: S-54568) and the Medical Ethical Committee of the University Hospital of the University of Leuven (registration number: ML8513) **Comments by authors:** supplementary data related to this article can be found at dx.doi.org/10.1016/j.jpain.2014.12.003 **Miscellaneous outcomes by the review authors:** not relevant **Correspondence:** Nicole Geschwind, Department of Clinical Psychological Science, Maastricht University, Maastricht, The Netherlands; Corresponding author: Ann Meulders PhD, Department of Psychology, University of Leuven, Tiensestraat 102, Box 3726, 3000 Leuven, Belgium; ann.meulders@ppw.kuleuven.be

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Quote: "Participants were randomly allocated to either the PA induction group (n = 25) or the control group (n = 25), stratified by hand preference (left/right)." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; verified baseline comparability (see Supplementary Table S1) between groups in sociodemographic characteristic (age), variables related to pain-US (physical stimulus intensity, duration of pain-US) and positive affect before affect induction phase; significant difference in self-reported stimulus intensity at calibration; baseline comparability for outcome variables (self-reported fear of movement-related pain, pain-US expectancy) that were also assessed in acquisition phase before affect induction unclear
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants unclear; blinding of study personnel probably not done (experimenter who provides the intervention next to laboratory of participants, verbal communication and observation possible) and the outcome is likely to be influenced by lack of blinding

Geschwind 2015 *(Continued)*

Blinding of outcome assessment (detection bias) Subjective outcomes	Unclear risk	Judgement comment: insufficient information about blinding of outcome assessment to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Quote: "Participants were randomly allocated to either the PA induction group (n = 25) or the control group (n = 25)" Quote: "FU measures were available only in a subset of 42 participants." Judgement comment: see supplementary material 1 (Increase PA after affect induction phase (post-test)) for results for positive affect, 50 analysed; insufficient reporting of attrition/exclusions to permit judgement of 'Low risk' or 'High risk' (e.g. unclear how many participants were analysed for single outcomes)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Goldstein 2019

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified in conference abstract/poster or abstract of manuscript under review **Imputation of missing data:** no imputation of missing data; per-protocol analysis (i.e. only participants who completed workshops) and available-case analysis (i.e. only participants for whom outcomes were obtained)
Participants	**Country:** USA **Setting:** undergraduate students; training setting not specified **Age:** mean = 20.77 (SD = 3.36) years **Sample size (randomised):** 92 **Sex:** 36 women, 9 men (in analysed sample) **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** undergraduate students (including health profession students) **Method of recruitment:** not specified **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** pre-intervention (assessment not completed): 3 (IG: 1, CG: 2); further withdrawals during workshops: 20 (IG: 9, CG: 11); post-intervention (further lost to follow-up): 9 (IG: 4, CG: 5); 3-month follow-up (further lost to follow-up): 15 (IG: 7, CG: 8)

Goldstein 2019 *(Continued)*

	Reasons for missing data: not specified
Interventions	**Intervention:** 'Your Enlightened Side' (YESplus) (n = 47) • *delivery*: face-to-face; probably group setting (involving some level of social interaction) • *providers*: not specified • *duration of treatment period and timing*: 4 consecutive days; 18 hours in total • *description)*: primary emphasis on yogic breathing, meditation, acceptance, and social connectedness; teaches a yogic breathing and acceptance-based approach to stress-management • *compliance*: 37/47 completed workshop (79%); similar high ratings of the workshop in IG and CG (8.0 ± 3.1 vs 7.7 ± 3.1, respectively, on 0 - 9 scale, P = 0.42) • *integrity of delivery*: not specified • *economic information*: not specified • *theoretical basis:* yogic breathing and acceptance-based approach to stress-management **Control:** attention control: 'Wisdom On Wellness' (WOW) (n = 45) • *delivery*: face-to-face; probably group setting (involving some level of social interaction) • *providers:* not specified • *duration of treatment period and timing)*: 4 consecutive days; 18 hours in total • *description*: targets cognitive stress-management techniques; science of stress, cognitive restructuring, stress reappraisal, control strategies • *compliance*: 32/45 completed workshop (71%); similar high ratings of the workshop in IG and CG (8.0 ± 3.1 vs 7.7 ± 3.1, respectively, on 0 -9 scale, P = 0.42) • *integrity of delivery*: not specified • *economic information*: not specified • *theoretical basis*: cognitive approaches to stress-management
Outcomes	**Outcomes collected and reported:** • sleep - PSQI • perceived stress - PSS • depression - MASQ, no exact findings (only significance/non-significance) reported • anxiety - MASQ, not reported • self-esteem - RSES, no exact findings (only significance/non-significance) reported • social connectedness - scale for Social Connectedness, no exact findings (only significance/non-significance) reported • satisfaction with life - Satisfaction with Life Scale, no exact findings (only significance/non-significance) reported • breathing rate - Maastricht Acute Stress Test (MAST) • heart rate - MAST **Time points measured and reported:** 1) pre-intervention; 2) post-intervention; 3) 3-month follow-up (3 months post-intervention) **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors for information on whether fostering resilience was a primary aim of the study (see miscellaneous outcomes). Since the authors gave feedback that health profession students were also included (Goldstein 2019 [pers comm]), we asked for the outcome data for this subgroup. We received no response to this inquiry. **Study start/end date:** not specified in conference abstract/poster or abstract of manuscript under review **Funding source:** research funded by a Mind and Life Institute Varela Award and National Science Foundation Graduate Research Fellowship

Goldstein 2019 *(Continued)*

Declaration of interest: not specified in conference abstract/poster or abstract of manuscript under review

Ethical approval needed/obtained for study: not specified in conference abstract/poster or abstract of manuscript under review

Comments by study authors: not relevant

Miscellaneous outcomes by the review authors: conference abstract; presented at 2019 33rd Annual Meeting of the Associated Professional Sleep Societies, San Antonio, TX; manuscript under review according to authors; Information received from authors concerning study aims: "It aimed to improve well-being, as measured by various domains including depression, anxiety, perceived stress, self-esteem, sleep, life satisfaction, and cardiac stress metrics which could be considered correlates or potential mechanisms of resilience. Given that it was a longitudinal design focusing on students, with a 3-month follow-up period, we anticipated the participants to experience natural stress associated with being a student and interpret the results as reflecting increased resilience." corresponding poster and paper of manuscript under review sent by authors

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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "89 students (age 20.9±3.1 years, 73% female, 86% undergraduate) with general distress complaints were randomly assigned to undergo one of two stress-management workshops." Quote (paper abstract; paper under review): "In this study, students were randomized to one of two psychosocial stress-management interventions." Judgement comment: based on conference abstract, poster and paper abstract of manuscript under review, insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; verified baseline comparability of groups for sociodemographic characteristics (gender, age, ethnicity, race, student status, GPA; all Ps > 0.377); baseline comparability for outcome variables not specified
Allocation concealment (selection bias)	Unclear risk	Judgement comment: based on conference abstract, poster and paper abstract of manuscript under review, insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Objective outcomes	Low risk	Judgement comment: based on conference abstract, poster and paper abstract of manuscript under review, blinding of participants and personnel probably not done (face-to-face group intervention), but the review authors judge that the outcome is not likely to be influenced by lack of blinding
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: based on conference abstract, poster and paper abstract of manuscript under review, blinding of participants and personnel probably not done (face-to-face group intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Objective outcomes	Low risk	Judgement comment: based on conference abstract, poster and paper abstract of manuscript under review, insufficient information about blinding of outcome assessment, but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement: based on conference abstract, poster and paper abstract of manuscript under review, insufficient information about blinding of outcome assessment; but due to potential performance bias (no blinding of participants),

Goldstein 2019 *(Continued)*

		the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "89 students (age 20.9±3.1 years, 73% female, 86% undergraduate) with general distress complaints were randomly assigned to undergo one of two stress-management workshops." Quote (Paper abstract of manuscript under review): "Forty-five students completed all time-points and were used for analysis" Judgement comment: based on conference abstract, poster and paper abstract of manuscript under review, reasons for missing data likely to be related to true outcome with imbalance in missing data between groups: (Pre-intervention: IG: 1, CG: 2; further withdrawals during workshop: IG: 9, CG: 11; Post-intervention (further lost to follow-up): IG: 4, CG: 5; 3-month follow-up (further lost to follow-up): IG: 7, CG: 8); per-protocol analysis (i.e. only participants who completed workshops) and available-case analysis (i.e. only participants for whom outcomes were obtained)
Selective reporting (reporting bias)	Unclear risk	Judgement comment: no study protocol or trial registration available; based on conference abstract, poster and paper abstract of manuscript under review, insufficient information to permit judgement of 'Low risk' or 'High risk'

Houston 2017

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified **Imputation of missing data:** no imputation of missing data; available-case analysis (only participants for whom outcomes were obtained independent of compliance with intervention)
Participants	**Country:** USA**Setting:** university**Age:** range = 18 - 23 years**Sample size (randomised):** 129 including 38 college students in healthcare professions**Sex:** 93 women, 36 men**Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** anxiety (GAD-7): IG: 2.18 (0.81), CG: 2.08 (0.73); depression (CES-D): IG: 1.85 (0.52), CG: 1.82 (0.52); stress (items on stressful experiences): IG: 2.94 (0.49), CG: 2.91 (0.57) **Population description:** college undergraduate students **Inclusion criteria:** no inclusion criteria (universal application of RCI) **Exclusion criteria:** no exclusion criteria **Attrition (withdrawals and exclusions):** post-intervention: 10 did not complete assessment (IG: 6, CG: 4); 9 of 64 participants in IG not present at session 3 of RCI, but did complete the assessment **Reasons for missing data:** not specified
Interventions	**Intervention:** RCI (n = 64) • *delivery:* face-to-face; group sessions (3 - 8 participants per group)

Houston 2017 *(Continued)*

- *providers:* RCI sessions led by 1+ group facilitators; led by licensed social workers trained in facilitating RCI; graduate students from non– mental health disciplines assisted with facilitation (e.g. wrote group responses on a board as part of the session)
- *duration of treatment period and timing*: 3 x 45-minute weekly sessions
- *description*:
  - manualised group intervention for children and youth designed to help participants identify thoughts, feelings, and coping strategies related to issues following a traumatic event or a problematic experience or related to everyday stressors
  - RCI sessions focus on a specific problem that is shared by the group
  - problem to be discussed in an RCI session can be identified by facilitators before a session (e.g. a recent community disaster) or by participants as part of the session; once a shared problem has been identified, a facilitator leads the group through several steps to describe the problem (i.e. what happened or what is happening?) and what has changed as a result of the problem, to explore thoughts and feelings related to the problem, to identify new problems that are occurring now, to brainstorm options for change, to consider consequences related to the brainstormed options for change, and to develop an individual and group action plan
  - when working through the RCI process in a group setting with peers, participants have opportunities to share and validate their own experiences, recognise that others have similar thoughts and feelings related to a shared problem, express and process their thoughts and feelings related to a problem, correct cognitive distortions, recognise their own existing coping strategies, learn new coping strategies from peers, connect to supports, learn problem solving, and gain satisfaction from helping others
  - WEEK 1 + 2: identification of own shared problems to discuss during the RCI sessions (in this study: stress (general and academic), future (career) concerns, time management challenges, and roommate and relationship problems)
  - WEEK 3: participants provided with list of possible problems (fitting in on campus, problems with instructors and professors, drinking and substance use, relationship problems, depression and anxiety, and grief and loss) and instructed group participants to select from that list. Most groups (7/10) selected depression and anxiety as the Week 3 topic
- *compliance*: 64 of 64 allocated participants at session 1; 11 students not present at session 2; 9 students not present at session 3
- *integrity of delivery*: to assess fidelity, facilitators completed session report after each RCI session (forms track whether intervention exercise components were completed, not completed, or completed with modification); inspection of session report forms indicated excellent fidelity across all sessions
- *economic information*: participants compensated for their time with USD 10 gift card at week 1, USD 15 gift card at week 2, USD 20 gift card at week 3
- *theoretical basis: p*roblem-solving; based on the "Listen to the Children" interview process that was developed and implemented with 6400 students following the 1995 Oklahoma City bombing

Control: no intervention (n = 65)

Outcomes

Outcomes collected and reported:

- resilience - CD-RISC
- coping, support - Brief COPE
- coping, giving up/self-blame - Brief COPE
- coping, taking action - Brief COPE
- coping, alcohol - Brief COPE
- coping-religion - Brief COPE
- hope - Trait Hope Scale
- stress - items on 14 stressful experiences
- anxiety - GAD-7
- depression - CES-D

Time points measured and reported: 1) pre-intervention; 2) post-intervention

Houston 2017 *(Continued)*

	Adverse events: not specified
Notes	**Contact with authors:** We contacted the authors to ask for the subgroup outcome data for college students in health professions (Houston 2019 [pers comm]). **Study start/end date:** implemented during the spring 2015 semester; exact study dates not specified **Funding source:** supported by the US Substance Abuse and Mental Health Services Administration (SAMHSA) through the Disaster and Community Crisis Center (DCC; http://dcc. missouri.edu) at the University of Missouri, a partner in the National Child Traumatic Stress Network (NCTSN) **Declaration of interest:** The authors have no conflicts of interest to report **Ethical approval needed/obtained for study:** approved by the University of Missouri IRB **Miscellaneous outcomes by the review authors:** subgroup data for college students in health professions sent from authors **Correspondence:** J Brian Houston, PhD; Disaster and Community Crisis Center, Department of Communication, University of Missouri, 204 Switzler Hall, Columbia, MO 65211, USA; houstonjb@missouri.edu

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "65 were randomly assigned to the control group and 64 were randomly assigned to the intervention group using blocked randomization." Quote: "Group randomization was conducted immediately prior to the Week 1 sessions using blocked randomization with 4 units in each block." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; no information about comparability of groups at baseline or respective analysis
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; but due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Judgement comment: reasons for missing data unlikely to be related to true outcome with relative balance in missing data between groups (IG: 6 at post-intervention; CG: 4); no reasons for missing data stated for each group; available-case analysis (only participants for whom outcomes were obtained independent of compliance with intervention)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available but it is clear that the published reports include all expected outcomes, including those that were prespecified

ISRCTN64217625

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified in trial registration **Imputation of missing data:** not specified
Participants	**Country:** UK **Setting:** University of Brighton and Oxford-Brookes University **Age:** not specified **Sample size (randomised):** 50 targeted **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** student paramedics who do not have post-traumatic stress disorder or depression **Inclusion criteria:** student paramedics who do not have post-traumatic stress disorder or depression (adults) **Exclusion criteria:** student paramedics who are suffering from PTSD or major depression **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified

Interventions	**Intervention:** Mind's resilience intervention plus a new internet-based top-up session (n = not specified)
	
	• *delivery*: face-to-face, standard group-based + internet-based
	• *providers*: not specified
	• *duration of treatment period and timing*: 6 sessions standard group-based (see Wild 2016: 2½-hour sessions) + top-up 1-hour training
	• *description*:
	  ◦ for description of Mind' resilience intervention, see Wild 2016: improve participants' well-being by building social capital, encouraging positive activities, and teaching psychological coping skills drawn from CBT and mindfulness
	  ◦ well-being (BE ACTIVE: improve well-being through positive activities); psychological coping strategies (TAKE NOTICE: develop evidence-based psychological coping strategies drawn from CBT and mindfulness; KEEP LEARNING: learn psychological coping skills drawn from CBT and mindfulness, try new activities); social capital (GIVE: Build social capital through joining social networks to foster a sense of belonging in neighbourhoods and communities, give your time as part of a group; CONNECT: build social networks and social capital, access social support to foster belonging)
	  ◦ TOP-UP TRAINING: not specified
	• *compliance*: not specified
	• *integrity of delivery*: not specified
	• *economic information*: not specified

ISRCTN64217625 *(Continued)*

- *theoretical basis*:
  - see Wild 2016: Mind's model of resilience
  - builds on the 5 ways to well-being, a set of evidence-based public mental health messages, identified by the New Economics Foundation, aimed at improving the mental health and well-being of the whole population: 1) Be active; 2) Take notice; 3) Keep learning; 4) Give; and 5) Connect; teaching psychological coping skills drawn from CBT and mindfulness; TOP-UP TRAINING: not specified

Control: active control (Mind's resilience intervention) (n = not specified)

- *delivery*: face-to-face, standard group-based
- *providers*: not specified
- *duration of treatment period and timing*: 6 sessions standard group-based; see Wild 2016: 2½-hour sessions
- *description*:
  - for description of Mind' resilience intervention, see Wild 2016: improve participants' well-being by building social capital, encouraging positive activities, and teaching psychological coping skills drawn from CBT and mindfulness
  - well-being (BE ACTIVE: improve well-being through positive activities); psychological coping strategies (TAKE NOTICE: develop evidence-based psychological coping strategies drawn from CBT and mindfulness; KEEP LEARNING: learn psychological coping skills drawn from CBT and mindfulness, try new activities); social capital (GIVE: Build social capital through joining social networks to foster a sense of belonging in neighbourhoods and communities, give your time as part of a group; CONNECT: build social networks and social capital, access social support to foster belonging
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information:* not specified
- *theoretical basis*:
  - see Wild 2016: Mind's model of resilience builds on the 5 ways to well-being, a set of evidence-based public mental health messages, identified by the New Economics Foundation, aimed at improving the mental health and well-being of the whole population: 1) Be active; 2) Take notice; 3) Keep learning; 4) Give; and 5) Connect; teaching psychological coping skills drawn from CBT and mindfulness

Outcomes

Outcomes collected and reported:

Primary outcome

- resilience - CD-RISC
- rumination - Perseverative Thinking Questionnaire and Rumination Response Scale

Secondary outcome

- days off work
- psychological coping strategies - Responses to Intrusions Questionnaire

Outcomes reported not specified

Time points measured and reported: 1) pre-intervention; 2) post-intervention; 3) 6-month follow-up (6 months post-intervention); time points reported not specified

Adverse events: not specified

Notes

Correspondence required: We contacted the authors to see whether the trial was completed and published and if the authors could provide the summary outcome data for the 2 groups (Wild 2018 [pers comm]).

Study start/end date: January 2016 – October 2016

Funding source: University of Oxford; Mind, the mental health charity (UK)

Declaration of interest: not specified in trial registration

ISRCTN64217625 *(Continued)*

Ethical approval needed/obtained for study: approved by University of Oxford Central University Research Ethics Committee, 07 December 2015, ref: MS-IDREC-C1-2015-059

Comments by authors: not relevant

Miscellaneous outcomes by the review authors: information received from authors: trial completed but unpublished

Correspondence: primary contact: Dr Jennifer Wild; Department of Experimental Psychology, University of Oxford, South Parks Road, Oxford, OX1 3UD, United Kingdom; Jennifer.wild@psy.ox.ac.uk

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote (see trial registration): "Participants will be randomly allocated to one of the following: 1. Six sessions of standard group-based resilience training, 2. Six sessions of standard group-based resilience training plus a one hour internet-based top-up training" Judgement comment: based on trial registration, insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; for baseline comparability, no judgement possible based on trial registration
Allocation concealment (selection bias)	Unclear risk	Judgement comment: based on trial registration, insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Objective outcomes	Low risk	Judgement comment: based on trial registration, blinding of participants and personnel probably not done (face-to-face intervention), but the review authors judge that the outcome is not likely to be influenced by lack of blinding
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement: based on trial registration, blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Objective outcomes	Low risk	Judgement comment: based on trial registration, insufficient information about blinding of outcome assessment, but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: based on trial registration, insufficient information about blinding of outcome assessment; but due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Judgement comment: no judgement possible based on trial registration
Selective reporting (reporting bias)	Unclear risk	Judgement comment: no judgement possible based on trial registration

Kelleher 2018

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified in conference abstract **Imputation of missing data:** not specified
Participants	**Country:** USA**Setting:** not specified**Age:** not specified**Sample size (randomised):** not specified**Sex:** not specified**Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** first semester baccalaureate nursing students (BSNs) **Method of recruitment:** recruited from first semester BSNs in Fall 2012; RCT repeated for Spring 2013 first semester BSNs **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** Brief MBSR programme (n randomised not specified) • *delivery*: face-to-face group setting (classes) • *providers*: not specified in conference abstract • *duration of treatment period and timing*: 4 weekly 1-hour sessions + 10 minutes daily practice • *description*: not specified • *compliance*: not specified • *integrity of delivery*: not specified • *economic information:* not specified • *theoretical basis*: MBSR **Control:** wait-list control (n randomised not specified) • *description*: receive 4h-MBSR workshop at beginning of their 2nd semester
Outcomes	**Outcomes collected and reported:** • stress - scale not specified • resilience - scale not specified • mindfulness - scale not specified • grade point average - scale not specified **Time points measured and reported:** 1) pre-intervention; 2) post-intervention (at 4 weeks); 3) 1-month follow-up (at 8 weeks; i.e. 4 weeks post-intervention); all time points reported except for 1) pre-intervention **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors to see if the study was already published (Kelleher 2019 [pers comm]).**Study start/end date:** not specified **Funding source:** not specified **Declaration of interest:** not specified**Ethical approval needed/obtained for study:** not specified**Comments by**

Kelleher 2018 *(Continued)*

study authors: not relevant**Miscellaneous outcomes by the review authors:** information received from authors: results have not been published yet; quantitative data was not available from the study authors **Correspondence:** Catherine Kelleher; University of Maryland, School of Nursing; kelleher@umaryland.edu

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote (see conference abstract): "A randomized intervention pilot evaluated impact of a brief MBSR program for Fall 2012 first semester baccalaureate students in nursing (BSNs) and was repeated for Spring 2013 first semester BSNs." Judgement comment: based on conference abstract, insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; for baseline comparability, no judgement possible based on conference abstract
Allocation concealment (selection bias)	Unclear risk	Judgement comment: based on conference abstract, insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Objective outcomes	Low risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention), but the review authors judge that the outcome is not likely to be influenced by lack of blinding
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Objective outcomes	Low risk	Judgement comment: based on conference abstract, insufficient information about blinding of outcome assessment (electronic surveys), but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: based on conference abstract, insufficient information about blinding of outcome assessment; but due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Judgement comment: no judgement possible based on conference abstract
Selective reporting (reporting bias)	Unclear risk	Judgement comment: no judgement possible based on conference abstract

Kötter 2016

Study characteristics

Methods	**Study design:** RCT **Study grouping:** parallel group

Kötter 2016 *(Continued)*

	Unit of randomisation: individuals **Power (power & sample size calculation, level of power achieved):** With 39 students per group, the trial would have been powered to detect medium-to-large effect sizes (d = 0.65) for the difference in Perceived Medical School Stress German version (PMSS-D) (SD 7.8), using a 2-tailed test, α = 0.05 and an 80% power level. This number was determined using G*Power. In order to allow for a 10% dropout, the target sample size for the trial was 43 students per group (intervention groups 1 and 2 and control group 3) **Imputation of missing data:** missing values substituted following rules provided in handbooks for instruments; incomplete data sets were excluded; missing data from responses (IG: n = 5, CG: n = 7) imputed through last-observation-carried forward method of imputation (conservative method chosen due to equal dropout in IG and CG); per-protocol analysis and intention-to-treat analysis (with 105 participants); as per-protocol analysis yielded very similar results, only intention-to-treat analysis reported
Participants	**Country:** Germany **Setting:** medical students registered for first medical examination at the University of Lübeck; training setting not specified **Age:** mean = 24.2 (SD = 2.6) years **Sample size (randomised):** 1) randomisation (treatment (group 1 or 2) vs control group): 129; 2) randomisation to group 1 or 2 (only participants assigned to treatment group): 67 **Sex:** 70 women, 35 men (of 105 participants) **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** depression (HADS-D; range = 0 - 21) after randomisation 1 as well as after psychoeducative seminar: IG (coaching group): 3.88 (2.87), CG: 4.05 (3.72); anxiety (HADS-D; range = 0 - 21): IG (coaching group): 7.87 (3.39), 7.55 (4.30); perceived stress (PMSS-D): IG (coaching group): 29.60 (6.57), CG: 28.74 (6.90) **Population description:** medical students **Inclusion criteria:** 1) registration for the first medical examination (“Physikum”) by mid-July 2014 at University of Lübeck **Exclusion criteria:** after randomisation 1 (to treatments vs control group): 1) participants who did not do a test necessary to fulfil the exam admission requirements **Attrition (withdrawals and exclusions):** • withdrawals: 1 (IG1; seminar + coaching) discontinued intervention • lost to follow-up at t2: IG1: 2; IG2: 1; CG: 1; missing data from responses: IG: 5, CG: 7 **Reasons for missing data:** for losses to follow-up: no reasons specified; for 1 withdrawal in IG1: refused to participate in 2. coaching session; for missing data from responses: not specified

Interventions	**Intervention 1:** psycho-educative seminar + individual coaching (after 1) 24 exclusions due to not passing test necessary to fulfil exam admission requirements and 2) randomisation: 34)
	
	• *delivery*: a) psycho-educative seminar: face-to-face group setting; b) coaching: face-to-face; individual setting + USB stick with music
	• *providers*: a) psycho-educative seminar: psychologist; b) coaching: trained psychologists and physicians (manual-based)
	• *duration of treatment period and timing*: a) psycho-educative seminar: 1 hour; coaching: b) coaching: 2 x 1-hour sessions within interval of 2 weeks; 20 minutes daily listening to music during examination preparation phase
	• *description (content, components)*:
	  ◦ PSYCHO-EDUCATIVE SEMINAR: psychologist addresses issues, such as emotional reactions toward stressors, unconscious persistence of unprocessed negative emotions, and the relationship of the processing of stressful events and sleep
	  ◦ RESOURCE-ORIENTED INDIVIDUAL COACHING: based on wingwave® (Besser Siegmund Institut, Hamburg, Germany) method; wingwave uses a finger-strength test derived from the Bi-Digital-O-Ring-Test for the determination of unconscious stressors following a standardised protocol; in order to process identified stressors, elements of eye movement desensitisation and reprocession, and neurolinguistic programming techniques are applied; coaching not primarily designed to identify and treat deficits but to foster individual stress-management resources (“resilience”)

Kötter 2016 *(Continued)*

- Coaching session 1: participants receive USB stick containing hemisphere-stimulating music and are instructed to use it; instructed to listen to 20-minute piece of electronic music twice daily, before and during learning

- *compliance*: all 34 participants received allocated intervention; 1 discontinued intervention (refused to participate in 2. coaching session)
- *integrity of delivery*: coaching is manual-based
- *economic information*: to reduce potential dropout rates, participants received a book voucher worth EUR 5 per completed questionnaire
- *theoretical basis*: coaching based on wingwave® (Besser Siegmund Institut, Hamburg, Germany) method

Intervention 2: psycho-educative seminar (after 24 exclusions due to not passing test necessary to fulfil exam admission requirements and 2. randomisation: n = 33)

- *delivery*: psycho-educative seminar: face-to-face group setting + USB stick with music
- *providers*: psycho-educative seminar: psychologist
- *duration of treatment period and timing*: psychoeducative seminar: 1 hour; 20 minutes daily listening to music during examination preparation phase
- *description*:
  - PSYCHO-EDUCATIVE SEMINAR: psychologist addresses issues, such as emotional reactions toward stressors, unconscious persistence of unprocessed negative emotions, and the relationship of the processing of stressful events and sleep
  - following psycho-educative seminar, participants in this group also receive USB stick containing hemisphere-stimulating music and instruction sheet explaining how to use it; instructed to listen to 20-minute piece of electronic music twice daily, before and during learning
- *compliance*: all 33 participants received allocated intervention; 0 discontinued intervention
- *integrity of delivery*: not specified
- *economic information*: to reduce potential dropout rates, participants received a book voucher worth EUR 5 per completed questionnaire
- *theoretical basis*: not specified

IG1 and IG2 were combined in analysis, thus: IG (coaching group): n = 67, CG: n = 38

Control: no intervention (after 24 exclusions due to not passing test necessary to fulfil exam admission requirements: n = 38)

- *compliance*: all 38 participants received allocated intervention; 0 participants discontinued intervention
- *economic information*: to reduce potential dropout rates, participants received a book voucher worth EUR 5 per completed questionnaire

Outcomes

Outcomes collected and reported:

- stress - PMSS-D
- depression - HADS-D
- anxiety - HADS-D
- self-rated general health - single item

Time points measured and reported: 1) during intervention, after psycho-educative seminar in groups 1 and 2, but before examination preparation phase and coaching (t1); 2) post-intervention (after seminar and coaching, but directly before examination; t2)

Adverse events: not specified in this report; qualitative analyses to ask about adverse events (results will be published separately)

Notes

Contact with authors: no correspondence required**Study start/end date:** recruitment in 2014; see trial registration: July – September 2014**Funding source:** support and funding by Lübeck Medical School, especially Jürgen Westermann**Declaration of interest:** 1 author is certified wingwave® coach and acted as 1 of the coaches in the study; authors declare no additional conflicts of interest**Ethical ap-**

Kötter 2016 *(Continued)*

proval needed/obtained for study: approved by the Ethics Committee of the University of Lübeck (File reference 14-098)**Comments by study authors:** registered with the German Clinical Trials Register (DRKS00006349); study acronym: LUST_wingwave; due to unexpected shortfall in the sample size (24 students did not pass a test necessary to fulfil the examination admission requirements, Figure 1), decision to combine both intervention groups for the quantitative analyses**Miscellaneous outcomes by the review authors:** not relevant**Correspondence:** Thomas Kötter; Institute of Social Medicine and Epidemiology, University of Lübeck, Ratzeburger Allee 160, 23562 Lübeck, Germany; Tel +49 451 500 5874; Fax +49 451 500 5455; thomas.koetter@uksh.de

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "After preliminary enrolment, we randomly allocated participants to the treatment (groups 1 and 2) or control group (group 3) using a computer-generated random numbers table (randomization 1)." Quote: "In a second step, the participants in the treatment group were randomly allocated to treatment groups 1 and 2 (randomization 2)." Quote: "Table 1 displays baseline characteristics for all participants included. Overall, 35 male and 70 female students (M =24.2 years, SD =2.6) with an age range between 19 and 32 years participated in this study (66% of the whole class). The study participants were 0.5 years younger and the percentage of females was higher when compared to the whole class. We had a lower percentage of male participants in the coaching group and participants in this group were 0.5 years older (Table 1)." Judgement comment: The investigators describe a random component in the sequence-generation process (computer-generated random numbers table) for randomisation 1 (treatment in group 1 or 2 vs control group); insufficient information about random-sequence generation for randomisation 2 (to group 1 or 2); verified comparability between groups at assessment t1 (i.e. after randomisation 1 and psychoeducative seminar, but before coaching in group 1) for outcome variables (see Table 2; all Ps > 0.42); insufficient information about comparability of groups in sociodemographic characteristics (e.g. smaller percentage of male participants in CG, but statistical (non)significance not specified); insufficient information about baseline comparability BEFORE psycho-educative seminar
Allocation concealment (selection bias)	Unclear risk	Quote: "By inviting those participants in the treatment group to participate in the psychoeducative seminar (described earlier), the students were immediately informed of their allocation to either control or treatment group. In a second step, the participants in the treatment group were randomly allocated to treatment groups 1 and 2 (randomization 2). This allocation was concealed by means of sealed, opaque envelopes until the end of the psychoeducative seminar and the t1 survey." Judgement comment: insufficient information about allocation concealment for randomisation 1 (treatment (group 1 or 2) vs control group); for randomisation 2, participants and investigators enrolling participants could probably not foresee assignment (sealed, opaque envelopes)
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Quote: "By inviting those participants in the treatment group to participate in the psychoeducative seminar (described earlier), the students were immediately informed of their allocation to either control or treatment group. In a second step, the participants in the treatment group were randomly allocated to treatment groups 1 and 2 (randomization 2). This allocation was concealed by means of sealed, opaque envelopes until the end of the psychoeducative seminar and the t1 survey. The participants, coaches, and the involved researcher were not blinded hereafter."

Kötter 2016 *(Continued)*

		Judgement comment: 1) no blinding of participants and personnel (for allocation to treatment (group 1 or 2) or control group after randomisation 1 nor for allocation to treatment group 1 or 2 after randomisation; and 2) the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Quote: "Also, as group allocation was not concealed; t1 measures were completed after randomization; and the students, coaches, and investigators were not blinded, the differences between the groups at both t1 and t2 might have been influenced by a certain amount of frustration in the control group in not having received coaching." Judgement comment: probably no blinding of outcome assessment (e.g. group allocation after randomisation 1 not concealed and study personnel/participants were not blinded) and the outcome measurement is likely to be influenced by lack of blinding; unclear blinding for t2 assessment (web surveys); but due to performance bias (no blinding of participants), the review authors judge that the participants' responses at t2 assessment to questionnaires may also be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "We substituted missing values following the rules provided in the handbooks for the instruments, that is, through interpolation where tolerable. We then excluded incomplete data sets." Quote: "Data were missing from the responses of five students in the intervention group and seven in the control group, respectively. The last-observation-carried-forward method of imputation was chosen because this is a conservative method used in instances in which there is an equal dropout rate in the intervention and the control group." Quote: "Intention-to-treat and per-protocol analyses yielded very similar results and we therefore present only the former." Judgement comment: reasons for missing data unlikely to be related to true outcome with relative balance in missing data between groups (lost to follow-up: IG1: 2; IG2: 1, CG: 1; missing data from responses: IG: 5, CG: 7); no reasons for missing data specified for each group; per-protocol analysis and intention-to-treat analysis after last-observation-carried-forward method of imputation (see Table 2)
Selective reporting (reporting bias)	High risk	Quote: "The trial was approved by the Ethics Committee of the University of Lübeck (File reference 14-098) and registered with the German Clinical Trials Register (DRKS00006349)" Judgement comment: trial registration available (DRKS00006349) and all of the study's prespecified (primary and secondary) outcomes have been reported in the prespecified way; but according to trial registration 3 assessments (t1 before coaching/examination preparation phase; t2 after individual coaching and directly before the examination; t3 after the examination "Physikum"), but only t1 and t2 reported

Mathad 2017

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals

Mathad 2017 *(Continued)*

	Power (power & sample size calculation, level of power achieved): A priori computation of sample size using G* Power version 3.1.9.2, revealed 64 participants were required with an effect size 0.347 at an α value of 0.05 and with an actual power of 0.80 **Imputation of missing data:** no imputation of missing data; per-protocol analysis (only participants who did not drop out from IG or CG; i.e. 80 participants analysed according to authors)
Participants	**Country:** India **Setting:** nursing students; training setting not specified **Age:** mean = 19.5 (SD = 1.28) years **Sample size (randomised):** 100 **Sex:** all women **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** nursing students (1st and 2nd year General Nursing and Midwifery (GNM) and 1st to 3rd year Bachelor of Scence Nusing (BSc Nursing)) **Inclusion criteria:** 1) female students aged between 17 and 30 years; 2) willing to learn yoga **Exclusion criteria:** 1) students diagnosed with severe neurological or psychiatric illness; 2) students receiving treatment for hormonal imbalance; 3) who recently underwent surgical intervention; 4) students regularly practising yoga **Attrition (withdrawals and exclusions):** 20 dropouts (IG: 10, CG: 10) **Reasons for missing data:** for 20 dropouts: 5: sick (IG: 3, CG: 2); 2: could not attend due to personal reasons (IG); 7: were not willing (to attend) (IG: 3, CG: 4); 3: excluded during data analysis (IG: 2, CG: 1); 1 started treatment for hypothyroidism (CG); 2: discontinued the course (CG)

Interventions	**Intervention:** yoga intervention (n = 50)
	
	• *delivery*: face-to-face; probably group setting
	• *providers* not specified
	• *duration of treatment period and timing*: 8 weeks: 5 days/week, 1 hour a day
	• *description*:
	  ◦ 1) BASIC INSTRUCTIONS (approximately 15 minutes) – first day
	  ◦ 2) BREATHING PRACTICES (approximately 10 minutes): hands in and out breathing, hand-stretch breathing, ankle-stretch breathing, leg-raising (alternative and both legs) breathing, tiger breathing, rabbit (Shashanka) breathing – daily (1st - 8th week)
	  ◦ 3) LOOSENING PRACTICES (approximately 10 minutes): twisting, side bending, forward and backward bending Jogging – daily (1st - 8th week)
	  ◦ 4) SUN SALUTATION (Suryanamaskara) (approximately 10 - 12 minutes) – daily (1st - 8th week)
	  ◦ 5) POSTURES (approximately 10 - 15 minutes): asanas (postures), standing posture, half-wheel posture (Ardhacakrasana), foot-palm posture (Padahastasana), half waist rotation posture (Ardhakaticakrasana), tree posture (Vrkshasana), triangle posture (Trikonasana) sitting posture, diamond posture (Vajrasana), rabbit posture (Shashankasana), spinal-twist posture (Vakrasana/ Ardhamatsendrasana), camel posture (Ustrasana), Posterior stretch (Paschimottanasana), supine asana, fish posture (Matsyasana), shoulder-stand posture (Sarvangasana), prone asana, cobra posture (Bhujangasana), grasshopper posture (Shalabhasana), bow posture (Dhanurasana) – daily (1st - 8th week)
	  ◦ 6) QUICK RELAXATION TECHNIQUE (QRT) (approximately 3 minutes) – daily (1st - 8th week)
	  ◦ 7) PRANAYAMA (approximately 8 - 10 minutes): Kapalabhati, Nadishodana pranayama, Bhramari chanting – daily (from 2nd week)
	  ◦ 8) YOGIC GAMES (Krida yoga (approximately 8 - 10 minutes) – alternative days; 9) MEDITATION (approximately 5 minutes) – once in a month
	  ◦ 9) LECTURE SESSION (approximately 10 minutes) – once in a month
	• *Compliance*: 10 dropouts during intervention period
	• *Integrity of delivery*: not specified
	• *Economic information*: not specified

Mathad 2017 *(Continued)*

- *Theoretical basis*: based on integrated approach to yoga therapy as designed by S-VYASA (Nagarathna 2008)

Control: wait-list control (n = 50)

- *description*: participants continue routine work during first 8 weeks; yoga intervention given to CG after completion of study
- *compliance*: 10 dropouts during waiting period/routine work

Outcomes	**Outcomes collected and reported:** • mindfulness - Freiburg Mindfulness Inventory • resilience - CD-RISC • self-compassion - SCS - Short Form • satisfaction with life - SWLS • empathy (cognitive) - JSEHPS **Time points measured and reported:** 1) pre-intervention; 2) post-intervention **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors for the number of participants aged ≥ 18 years in the final sample and if they could provide the subgroup data for these participants (Mathad 2019 [pers comm]) **Study start/end date:** May 2015 – July 2015 **Funding source:** not specified **Declaration of interest:** no financial or other competing interests **Ethical approval needed/obtained for study:** approval of Institutional Ethics Committee was obtained for this study {RES/IEC-SVYASA/59/2015} **Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** information received from authors: "Data was analysed for 80 participants who were 18 years and above", i.e. no participants < 18 years in final (analysed) sample **Correspondence:** Ms Monali Devaraj Mathad; Research Scholar, Department of Division of Yoga and Humanities, S-VYASA University, #19, Eknath Bhavan, Gavipuram Circle, Kempe Gowda Nagar, Bengaluru-560019, Karnataka, India; mathad.kwr@gmail.com

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "After screening, students were randomly allocated into two groups." Quote: "Meanwhile, normality test (Shapiro-Wilk) ensured that there is no significant difference between yoga and WLC groups at baseline for all the variables." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; verified baseline comparability for several sociodemographic characteristics (age, gender, marital status, residence); baseline comparability for other sociodemographic variables (class/batch; religion, mother tongue) (i.e. statistical (non-)significance) not specified; no significant baseline differences in outcome variables (see Table 4; all Ps > 0.18)
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'

Mathad 2017 *(Continued)*

Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; but due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "100 students were recruited, 50 participants in each group and there were 10 dropouts in each group. Finally, for analysis there were 80 students left." Judgement comment: reasons for missing data unlikely to be related to true outcome with relative balance in number and reasons for missing data between groups (IG: 10 dropouts; CG: 10 dropouts; e.g. IG: 3 not willing to attend vs 4 in CG; IG: 2 excluded during data analysis vs 1 in CG; IG: 2 could not attend intervention due to personal reasons vs 2 in CG who discontinued the course); per-protocol analysis (i.e. only participants who did not drop out from IG or CG)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Mejia-Downs 2016

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** imputation of missing data not specified; all randomised participants were analysed (n = 43)
Participants	**Country:** USA **Setting:** university **Age:** adults (see Population description; age not specified) **Sample size (randomised):** 43 **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** perceived stress (PSS-10): IG: 13.59 (5.01), CG: 13.90 (4.56) **Population description:** health professional students/doctor of physical therapy students **Inclusion criteria:** current enrolment in Doctor of Physical Therapy programme at either Indiana University or the University of Indianapolis

Mejia-Downs 2016 *(Continued)*

	Exclusion criteria: no exclusion criteria specified **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** resilience curriculum (n = 22) • *delivery*: face-to-face; didactic component, skills-building training • *providers*: not specified • *duration of treatment period and timing*: 4 weekly 2-hour modules (8 hours in total) + homework exercises to encourage application of the skills • *description*: ◦ 4 modules; provides education for participants about methods to increase protective factors against stress, the use of effective coping strategies, and the importance of accessing social support, with the goal of better managing stress and enhancing resilience • *compliance*: not specified • *integrity of delivery*: not specified • *economic information (intervention cost, changes in other costs as result of intervention)*: not specified • *theoretical basis*: no theoretical foundation specified **Control:** wait-list control (n = 21)
Outcomes	**Outcomes collected and reported:** ***Primary outcome*** • psychological resilience - CD-RISC ***Secondary outcome*** • perceived stress - PSS-10 • coping flexibility - CFS • coping flexibility, evaluation - CFS • coping flexibility, adaptive - CFS • optimism - Revised Life Orientation Test • positive affect - mDES • negative affect - mDES • perceived social support - SPS • perceived social support, guidance support - SPS • perceived social support, reassurance of worth - SPS • perceived social support, social integration - SPS • perceived social support, attachment - SPS • perceived social support, nurturance - SPS • perceived social support, reliable alliance - SPS ***Other outcome*** • physical symptoms - Symptoms of Illness Checklist **Time points measured and reported:** 1) pre-intervention (in first 2 weeks of semester); 2) 2-week follow-up (4-week intervention after 2-week pre-intervention assessment; follow-up at week 8 after baseline, i.e. 2 weeks post-intervention) **Adverse events:** not specified
Notes	**Contact with authors:** We contacted authors for the summary outcome data for the outcomes (Mejia-Downs 2018 [pers comm]).

Mejia-Downs 2016 *(Continued)*

Study start/end date: see trial registration: September 2015 – January 2016

Funding source: University of Indianapolis

Declaration of interest: not specified

Ethical approval needed/obtained for study: not specified

Comments by authors: register number: NCT02541240

Miscellaneous outcomes by the review authors: dissertation; information received from authors: study completed but not yet published; result tables for RCT provided from published dissertation

Correspondence: principal investigator: Anne M Mejia-Downs, PT, MPH; University of Indianapolis; adowns@uindy.edu

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote (see trial registration): "The study involves curriculum development and evaluation by randomized controlled trial. Participants will be randomized to the intervention group to receive a Resilience Curriculum or to a wait-list control group" Judgement comment: insufficient information about random-sequence generation (in trial registration and results sent from authors) to permit judgement of 'Low risk' or 'high risk'; no significant baseline differences between groups in resilience and positive affect, not described for other variables
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information (in trial registration and results sent from authors) about allocation concealment to permit judgement of 'Low risk' or 'high risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention), and the outcome is likely to be related to true outcome
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment (in trial registration and results sent from authors); but due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Judgement comment: results sent from authors; all 43 randomised participants were analysed; but unclear if there were any missing data that were imputed
Selective reporting (reporting bias)	Low risk	Judgement comment: trial registration (NCT02541240) available and all of the study's prespecified (primary and secondary) outcomes that are of interest in the review have been reported in the prespecified way

Miu 2016

Study characteristics

Methods	**Study design:** RCT

Miu 2016 *(Continued)*

	Study grouping: parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified **Imputation of missing data:** no imputation of missing data; available-case analysis (only participants for whom outcomes were obtained at baseline and follow-up assessment)
Participants	**Country:** USA**Setting:** laboratory at Emory University**Age:** age not specified (university students)**Sample size (randomised):** 123**Sex:** 81 women, 26 men**Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** depressive symptoms (BDI-II): IG: 8.41, CG: 8.29; many participants with minimal number of depressive symptoms (8.35 (6.89)); considerable number of participants who reported mild depression (20%) and moderate depression (9%) with range of 0 - 31; i.e. no clinical sample, but adequate range of depression symptoms; severe mental disorders (e.g. bipolar disorder, schizophrenia) as exclusion criterion: none of participants met this criterion **Population description:** university students from psychology department **Inclusion criteria:** not specified **Exclusion criteria:** severe mental disorders, such as bipolar disorder and schizophrenia **Attrition (withdrawals and exclusions):** in total: 16 excluded from analysis: 11 lost to follow-up (i.e. did not complete follow-up assessment); 5 excluded **Reasons for missing data:** for 11 losses to follow-up: not specified; 1 outlier excluded; 4 excluded due to being non-freshmen **Adverse events:** not specified

Interventions	**Intervention:** mindset intervention (n = 61)
	
	• *delivery*: laboratory; not specified if group or individual setting
	• *providers*: not specified; probably researchers at laboratory (psychology department) at Emory University
	• *duration of treatment period and timing*: 1 approximately 25-minute visit/session
	• *description*:
	  ◦ implicit theory about personality (1. read article; 2. read testimonials from others; 3. write to others about what they learned)
	  ◦ 1) ARTICLE:
	  ■ participants are taught the changeability mindset about one's own personality by first presenting a personal anecdote and then scientific article about the potential to change personality
	  ■ article presents studies about how behaviours are controlled by the brain and how brain pathways can be changed (Yeager 2013a; Yeager 2013b), as a way to provide a scientific basis for believing in the potential for change; article emphasises that if participants experience a rejection or failure, the failure is not due to a fixed, personal deficiency on their part; participants are asked to summarise the article to ensure they were actively reading it
	  ◦ 2) TESTIMONIALS: afterwards, participants read testimonials from others (i.e. upperclassmen) who used the changeability mindset when they encountered a setback
	  ◦ 3) NARRATIVE: participants also asked to write a similar narrative to future student because this narrative exercise has been shown to help participants internalise the intervention material (see Aronson 1999; Walton 2011)
	• *compliance*: not specified
	• *integrity of delivery*: not specified
	• *economic information*: not specified
	• *theoretical basis:*
	  ◦ adapted from the intervention on changeability mindset about bullies' personality used and described in several previous studies (e.g. Miu 2015; Yeager 2013b)
	  ◦ rather than emphasising bullies' personalities and overt aggression among high school students as in past interventions, the present intervention made the article and situation more relevant to

Miu 2016 *(Continued)*

college freshmen by discussing the potential for change in one's own personality and change in rejection or exclusion in college

Control: attention control (n = 62)

- *delivery*: laboratory; not specified if group or individual setting
- *providers:* not specified; probably researchers at laboratory (psychology department) at Emory University
- *duration of treatment period and timing*: 1 approximately 25-minute visit/session
- *description*:
  - the role of brain (1. read article; 2. read testimonials from others; 3. write to others about what they learned)
  - 1) ARTICLE: participants learn about how different brain parts are specialised in different skills and how the brain processes information (see Yeager 2011)
  - 2) TESTIMONIALS: participants read testimonials about how college upperclassmen integrated the article into understanding the new physical environment at Emory (e.g. the occipital lobe controls your vision and eventually it adjusts to the new school environment)
  - 3) NARRATIVES: participants then asked to write a similar narrative to future students about how the brain adjusts to the new physical environment
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis:* not specified

Outcomes	**Outcomes collected and reported:** • depressive symptoms - BDI-II • attributions - ASQ • mindsets about personality - IPTQ self-form **Time points measured and reported:** 1) pre-intervention (initial visit); 2) 1-month follow-up (2. visit; i.e. 1 month after initial visit; 1 month post-intervention); 3) participants with complete data at both time points, invited to participate in voluntary 3-month follow-up (3. visit; i.e. 3 months after initial visit, 3 months post-intervention) **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors for the SDs for the outcomes reported in Table 3, but received no response to 2 inquiries **Study start/end date:** not specified**Funding source:** not specified**Declaration of interest:** not specified**Ethical approval needed/obtained for study:** not specified**Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** dissertation**Correspondence:** Adriana S Miu; Advisor: Marshall Duke, PhD; Duke: Department of Psychology; Emory University; psymd@emory.edu; 36 Eagle Row, Emory University, Atlanta, GA 30322; Phone: 404-727-7453

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Quote: "After participants completed baseline questionnaires of mindsets, depression, and attributions, within the same session, they were randomly assigned on Qualtrics (Qualtrics, Provo, UT) to either the changeability mindset intervention or the control condition, as detailed below." Quote: "Randomization Check. Randomization of the mindset intervention was effective except for baseline differences in mindsets (see Table 1)."

Miu 2016 *(Continued)*

		Quote: "There were no significant baseline differences on covariates between participants in intervention and control groups, such as sex (X 2 = 1.96, p =.162), race/ ethnicity (X 2 = 2.53, p =.639), socioeconomic class (X 2 = 5.94, p =.204), grades (t = -1.75, p = .084), and locus of control (t = .84, p = .400)." Quote: "Regarding variables of interest, there were no significant baseline differences in depressive symptoms (t = -.09, p = .932), and stable attributions (t = .40, p = .687), between treatment and control groups, except for baseline mindset beliefs, t = -2.33, p = .022." Quote: "At baseline prior to the intervention, participants who received the intervention had a more changeability mindset (M = 2.95, SD = 1.07) compared to participants who were randomized to the control condition (M = 2.50, SD = .90)." Judgement comment: investigators describe a random component in the sequence-generation process (Qualtrics software); verified baseline comparability of groups for sociodemographic characteristics (sex, race/ethnicity, socioeconomic class, grades, locus of control; all Ps > 0.16) and most outcome variables (depressive symptoms, stable attributions) except for mindset belief (P = 0.022) with IG having a more changeability mindset compared to CG
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk' (method of concealment is not described in sufficient detail)
Blinding of participants and personnel (performance bias) Subjective outcomes	Low risk	Quote: "Research assistants and researchers were blind to condition, as treatment randomization was conducted through Qualtrics." Quote: "a double-blind randomized mindset intervention was conducted to reduce depressive symptoms one month post-intervention." Judgement comment: intervention provided in the laboratory (participants in both groups read articles and are asked to write narratives); blinding of participants and intervention providers probably ensured (double-blind study), and unlikely that the blinding could have been broken
Blinding of outcome assessment (detection bias) Subjective outcomes	Low risk	Judgement comment: blinding of outcome assessment probably ensured, and unlikely that the blinding could have been broken (online surveys; e-mail/link to online survey provided by researcher; see performance bias: research assistants and researchers were blind to condition)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Eleven participants did not complete the one-month follow-up study and four participants were not freshmen and therefore excluded (see Table 2 for baseline differences between dropouts and full sample)." Judgement comment: reasons for missing data likely to be related to true outcome with imbalance in missing data between groups (61 randomised to IG vs 62 to CG; in total: 16 exclusions (11 lost to follow-up, 1 outlier, 4 non-freshmen): IG: 12 exclusions, CG: 4); available-case analysis (only participants for whom outcomes were obtained at baseline and follow-up assessment)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified (T3 assessment optional)

Mueller 2018

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** power not specified; study limitation: sample size was restricted to a group of 36 physical therapy students in 1 programme **Imputation of missing data:** information received from authors: per-protocol analysis with Time 2 and Time 3 following the completion of the intervention by both groups
Participants	**Country:** USA **Setting:** online, self-guided intervention **Age:** mean = 26.83 (SD = 3.31) years **Sample size (randomised):** 37 **Sex:** 25% women, 75% men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** entry-level doctor of physical therapy (DPT) students **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** 1 withdrawal in IG (immediate group) **Reasons for missing data:** for 1 withdrawal in IG: pregnancy-related delay in internships

Interventions	**Intervention:** "Called to Care" curriculum (immediate group) (n = 19)
	
	• *delivery*: online interactive; each module includes: video lecture, readings, asynchronous discussion board containing 4 - 5 questions pertaining to application of module content; curriculum employs film clips, guided questions, research articles, other readings to promote the clinical application of educational concepts
	• *providers*: self-guided intervention; 1 of the authors (KM) monitors discussion board posts
	• *duration of treatment period and timing*: 10 weeks (intervention completed during first 10-week internship); access provided to online platform on first day of 1. internship; 11 x 1-hour modules; participants are able to proceed through modules at their own pace
	• *description*:
	  ◦ 11 evidence-based, positive psychology-informed modules; purpose of "Called to Care": to improve patient outcomes through the development of optimal physical therapist behaviours
	  ◦ 11 modules include active constructive responding (Gable 2006), peaked theory (Do 2008) and placebo/nocebo (Colloca 2008; Enck 2008; Kahneman 1993)
	  ◦ participants required to post and respond at least once for each of the modules on the discussion board (discussion boards are part of the course, but not systematically analysed)
	  ◦ INFORMATION RECEIVED FROM AUTHORS: course developed to improve physical therapist communication, patient outcomes, and work enjoyment; course included sessions on empathy, compassion, making high-quality interpersonal connections, appreciative inquiry and the use of film as a metaphor for the humanistic side of healthcare
	• *compliance*: 1/19 withdrew due to pregnancy-related delay in internships
	• *integrity of delivery*: not specified
	• *economic information:* Upon request by author, the developers agreed to provide access to the curriculum at no charge for use with student clinicians for this study

Mueller 2018 *(Continued)*

- *theoretical basis*:
  - grounded in the science of positive psychology, the study of factors and interventions that support human happiness and well-being (Adams 2012)
  - developed by Dr Larry Benz (physical therapist with master's degree in positive psychology)
  - Evidence in Motion. Called to Care course teaches healthcare providers about compassion and empathy. EIM News 14 November 2013. Available at: http://www.evidenceinmotion.com/ about/ news/called-to-care-course-teaches-healthcare-providersabout-compassion-and-empathy/

Control: wait-list control (n = 18)

- *description*: delayed intervention group; received the intervention during their second internship
- *compliance*: no withdrawals during waiting period in 1. internship

Outcomes

Outcomes collected and reported:

- empathy - JSEHPS
- work engagement - UWES-17
- resilience - Grit scale (see Footnotes)

Time points measured and reported: 1) pre-intervention; 2) post-intervention (after completion of intervention and 1. internship); 3) 10-week follow-up in IG (i.e. 10 weeks post-intervention and after 2. internship) and post-intervention in CG; for review only 1) and 2) relevant as the wait-list control had also received the intervention at 3)

Adverse events: not specified

Notes

Contact with authors: We contacted the authors for information about the number of participants analysed for the outcomes reported in Table 2 and 3 (i.e. per-protocol analysis with 36 participants at T2 and T3 and without 1 withdrawal). We also asked for more details about the intervention content (Mueller 2019 [pers comm]).

Study start/end date: not specified; Called to Care curriculum provided to all participants at the end of spring 2015 semester
Funding source: The authors report no funding or conflicts of interest related to this study
Declaration of interest: no funding or conflicts of interest related to this study reported
Ethical approval needed/obtained for study: approved by the Northern Arizona University IRB (case 729441-1)
Comments by study authors: not relevant
Miscellaneous outcomes by the review authors: additional information about intervention content and number of participants analysed received from authors
Correspondence: Dr Karen Mueller; Department of Physical Therapy and Athletic Training, Northern Arizona University, 208 E Pine Knoll Dr, PO Box 15105, Flagstaff, AZ 86011, USA; Karen.mueller@nau.edu

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "participants were randomly assigned (via a blinded shuffle of cards) to an immediate intervention group or a delayed intervention group. The deck included only the numbered cards (to ensure an even 50/50 split) and group assignment based on evens or odds." Quote: "There were no significant differences in age or gender distribution, and no significant differences between the baseline outcome measures of the immediate and delayed intervention groups, suggesting that the randomization worked appropriately." Judgement comment: investigators describe a random component in the sequence-generation process (shuffling cards); verified baseline comparability of

Mueller 2018 *(Continued)*

		groups for sociodemographic characteristics (all Ps > 0.055) and outcomes of interest on the basis of analysis (see Table 1; Ps > 0.213)
Allocation concealment (selection bias)	Unclear risk	Quote: "randomly assigned (via a blinded shuffle of cards) to an immediate intervention group or a delayed intervention group." Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk' ("blinded shuffle of cards"; method of allocation concealment is not described in sufficient detail)
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Quote: "The participants were informed of their designation into the immediate or delayed intervention group." Judgement comment: online, self-guided intervention; no blinding of participants and probably no blinding of personnel (monitored discussion board postings); the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment to permit judgment of 'Low risk' or 'High risk' (in part electronic assessments); but due to performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "37 students volunteered to participate in the Called to Care study. Of the 37 students, 1 withdrew from the project due to a pregnancy- related delay in her internships. Thirty-six students completed the project." Quote: "FIGURE 1. Study design flowchart." Judgement comment: reasons for missing data unlikely to be related to true outcome (only 1 withdrawal in IG due to pregnancy); information received from authors: "We did perform a per-protocol analysis with T2 and T3 following the completion of the intervention by both groups."
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Peng 2014

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals**Power (power & sample size calculation, level of power achieved):** not specified**Imputation of missing data:** not specified
Participants	**Country:** China**Setting:** medical students of Third Military Medical University; training setting not specified**Age:** mean = 19.78 (SD = 0.77); range = 18 - 22 years**Sample size (randomised):** 60; 30 divided into high-resilience group (SD above average score of CD-RISC (CD-RISC)); n = 30, divided into low-resilience group (SD below average score of CD-RISC)**Sex:** 18 women, 42 men**Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified**Population description:** medical students **Inclusion criteria:** not specified

Peng 2014 *(Continued)*

Exclusion criteria: not specified

Attrition (withdrawals and exclusions): not specified

Reasons for missing data: not specified

Interventions

Intervention: Penn Resilience Program (PRP) (in total: n = 30; n = 15 of high-resilience group, n = 15 of low-resilience group)

- *delivery*: face-to-face group setting; emphasised discussion and experiences sharing among the participants; includes theme games, role-playing, case analysis, brainstorming, and other activities to enable students to increase their participation in the training
- *providers*: group leaders (not further specified)
- *duration of treatment period and timing*: 10 weekly 90- to 120-minute sessions
- *description*:
  - based on the PRP course contents and the characteristics of the medical students
  - consists of following steps: connecting thoughts and emotions, challenging irrational thinking and beliefs, cognitive training, a review of lessons 1 – 3, self-confidence and interpersonal contact, coping strategies, behaviour modification exercises, a review of lessons 5 – 7, problem-solving exercises, and a review of the entire PRP curriculum
  - LESSON 1: thoughts and emotion connection; content: group leaders and members get to know each other; course contents all around Ellis's ABC (Activating event, Belief, Consequence) theory are also introduced; students need to recount recent difficult experiences in a sequential manner, and to recall their thoughts and their feelings
  - LESSON 2: challenging irrational thoughts and beliefs; content: identify involuntary negative thoughts, and recognise these ideas often appear correct; learn to analyse cases from a positive view
  - LESSON 3: cognitive training; content: learn how to deal with negative events and think flexibly to prevent catastrophising; the members ascertain the worst-case scenario, the best-case scenario, the probable scenarios, respectively by analysing the events; the members describe accidents and frustrations that occur in their daily life, and discuss feasible solutions to these events
  - LESSON 4: review lessons 1 – 3; content: review the knowledge and cognition skills in lessons 1 – 3; the trainer provided additional cases to the members to complete the exercises
  - LESSON 5: interpersonal communication; content: the members present 3 common types of social communication patterns (impulsive, passive and confident) through role-play; the members develop interpersonal communication skills by improving confidence
  - LESSON 6: coping strategy; content: learn stress-coping methods (e.g. deep breathing and muscle relaxation), practise positive meditation through organising positive and optimistic images
  - LESSON 7: behaviour modification exercises; content: adjust their maladaptive behaviour and recognise all-or-nothing thinking; learn to divide complex tasks into several more controllable sections and finish the entire mission step by step
  - LESSON 8: review lessons 5 – 7; content: review the relaxation and social skills to solve problems in daily life
  - LESSON 9: problem-solving exercises; content: discuss and analyse events in their daily lives; problem-solving exercises are repeatedly made to consolidate skills and knowledge
  - LESSON 10: review entire course; content: summarise PRP training course; end the course with a party
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*:
  - based on the PRP course contents and the characteristics of the medical students
  - PRP designed by Seligman and colleagues in Pennsylvania University in 1999
  - based on cognitive behavioural theory, which focuses on improving students' cognitive behaviour and skills (Kumpfer 1999)

Control: wait-list control (in total: n = 30; 15 of high-resilience group, 15 of low-resilience group)

Peng 2014 *(Continued)*

Outcomes	**Outcomes collected and reported:** • resilience - CD-RISC • positive emotion - PANAS • negative emotion - PANAS • emotion regulation, cognitive appraisal - ERS • emotion regulation, expression inhibition - ERS **Time points measured and reported:** 1) pre-intervention; 2) post-intervention **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors for the second full text, but received no response to 2 inquiries. **Study start/end date:** not specified**Funding source:** This study was financially supported by National Natural Science Foundation of China Granted to Min Li (No. 31170994) and Project of Military Research Foundation of PLA of China to Min Li (Grants 12XLZ212 and CWS11J049).**Declaration of interest:** not specified**Ethical approval needed/obtained for study:** approved by the Ethics Committee of the Third Military Medical University**Comments by study authors:** not relevant**Miscellaneous outcomes by the review authors:** 2 reports; full text for 2. report not available**Correspondence:** Li Peng; corresponding author: Min Li; Department of Military Psychology, School of Psychology, The Third Military Medical University, No. 30, Gaotanyan Road, Shapingba District, Chongqing 400038, China, Tel.: +86 23 68752267; fax: +86 23 68752360; limin52267@tmmu.edu.cn (M. Li)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "the students were divided into high-resilience and low-resilience groups, with each group consisting of 30 students. Half of the students from each group were then divided into the experimental group and received PRP training. The remaining students were divided into the control group and were told to wait for resilience training." Quote: "From them, 30 students with high resilience and 30 with low resilience were obtained. These students were further randomly assigned into experimental group to receive resilience training (n = 15), and control group without training (n = 15)." Quote: "No significant differences in resilience, positive emotion, negative emotion, cognitive appraisal, and expression inhibition scores were found between the control and experimental groups (P > .05) (see Table 2)." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; verified baseline comparability of groups for outcome variables on the basis of analysis (see Table 2; all Ps > 0.28 in high-resilience participants or all Ps > 0.30 in low-resilience individuals), baseline comparability for sociodemographic characteristics (e.g. age, gender) not specified
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit a judgement of low risk or high risk
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding

Peng 2014 *(Continued)*

Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; but due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Judgement: insufficient reporting of attrition/exclusions to permit judgement of 'Low risk' or 'High risk' (probably 30 randomised in each group were also analysed; but unclear if there were any missing data and if missing data were imputed)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Porter 2008

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified; according to publication maybe lack of statistical power **Imputation of missing data:** no imputation of missing data; available-case analysis (only participants for whom outcomes were obtained at both time points)
Participants	**Country:** Canada **Setting:** college programme for paramedic students **Age:** mean = 21.69 (SD = 1.92); range = 19 - 28 years **Sample size (randomised):** 29 **Sex:** 11 women, 18 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** depression (SCL-90-R): IG: 1.08 (0.42); CG: 1.57 (0.65); Anxiety (SCSL-90-R): IG: 0.73 (0.49); CG: 0.93 (0.51); Global Severity Index (SCL-90-R): IG: 0.85 (0.33); CG: 1.09 (0.52); Burnout-emotional exhaustion (MBI): IG:17.09 (6.72); CG: 20.64 (10.20); Burnout-depersonalisation (MBI): IG: 8.82 (4.88); CG: 9.45 (3.86); Burnout-personal accomplishment (MBI): IG: 34.64 (8.32); CG: 32.73 (8.36) **Population description:** paramedic students in the final year of a 2-year college paramedic programme **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** 6 participants dropped out of the study before post-intervention assessment (IG: 3/15 (20%); CG: 3/14 (21.4%)); n = 1 participant did not complete WAYS measure **Reasons for missing data:** not specified
Interventions	**Intervention:** psycho-educational group (n = 15)

Porter 2008 *(Continued)*

- *delivery*: face-to-face; group sessions
- *providers*: counsellor, not specified
- *duration of treatment period and timing*: 13 sessions over 4 months (prior to beginning a semester of full-time clinical placement); almost weekly sessions (12 sessions) over course of 15-week semester + 2 additional sessions prior to beginning of full-time clinical placements
- *description*:
  - GROUP FOCUS: 1) fostering positive peer support; 2) building positive attitudes towards emotional expression; and 3) increasing participants' knowledge and application of adaptive coping strategies for dealing with stressful events
  - TYPICAL FORMAT OF GROUP SESSIONS: breathing/focusing/relaxation exercise, participant check-in; introduction to session topic; individual/small group reflective exercise; large group debriefing; breathing/focusing/relaxation exercise, and check-out focusing on how participants might consciously use cognitive/behavioural strategies during the next week to enhance their capacity to deal with stress
  - CONTENT OF SESSIONS:
    - SESSION 1: welcome, introductions, ground rules, overview of topics, dyad interviews
    - SESSION 2: individual nature of stressors and stress responses
    - SESSION 3: personal resources for dealing with stress
    - SESSION 4: relaxation strategies
    - SESSION 5: identifying and evaluating automatic thoughts
    - SESSION 6: personal rules, standards, and expectations
    - SESSION 7: personal/professional responsibilities
    - SESSION 8: personal power/sphere of influence
    - SESSION 9: exploring coping styles
    - SESSION 10: developing confidence realistic expectations on placement
    - SESSION 11: registered massage therapy trials
    - SESSION 12: dealing with difficult people
    - SESSION 13: personal/professional boundaries additional relaxation strategies
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: based on a cognitive-behavioural counselling theory of change

Control: no intervention (n = 14)

Outcomes

Outcomes collected and reported:

- coping strategies, confrontative coping - WOC
- coping strategies, distancing - WOC
- coping strategies, self-controlling - WOC
- coping strategies, seeking social support - WOC
- coping strategies, accepting responsibility - WOC
- coping strategies, escape-avoidance - WOC
- coping strategies, planful problem-solving - WOC
- coping strategies, positive reappraisal - WOC
- psychological distress, somatization - SCL-90-R
- psychological distress, depression - SCL-90-R
- psychological distress, anxiety - SCL-90-R
- psychological distress, interpersonal sensitivity - SCL-90-R
- psychological distress, hostility - SCL-90-R
- psychological distress, Global Severity Index - SCL-90-R
- psychological distress, Positive Symptoms Distress Index - SCL-90-R
- burnout, emotional exhaustion - MBI
- burnout, depersonalization - MBI

Porter 2008 *(Continued)*

- burnout, personal accomplishment - MBI
- attitudes towards emotion expression - Attitude Towards Emotional Expression Scale
- perceived peer support in general - Peer Support Crisis Support Questionnaire

Time points measured and reported: 1) pre-intervention; 2) 2-month follow-up (2-months post-intervention; 6-month interval between 2 assessments)

Adverse events: not specified

Notes

Contact with authors: We contacted authors for the number of dropouts and the number of participants analysed for each group at pre- and post-intervention assessment (Porter 2018 [pers comm]).

Study start/end date: recruitment start in fall 2007; exact study dates not specified

Funding source: funding for this research provided by Fanshawe College Research Initiatives Fund

Declaration of interest: not specified

Ethical approval needed/obtained for study: not specified

Comments by authors: not relevant

Miscellaneous outcomes by the review authors: not relevant

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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Fourteen participants (8 women) were randomly assigned to be part of the control group, and fifteen participants (5 women) were randomly assigned to be part of the treatment group." Quote: "Ages ranged from 20 to 25 in the control group (M = 21.82, SD = 1.72), and from 19 to 28 in the treatment group (M = 21.58, SD = 2.31). This age difference was not statistically significant." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; verified baseline comparability for sociodemographic variable age; baseline comparability for other sociodemographic characteristics and outcomes of interest unclear
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; but due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Six participants dropped out of the study before post-test measures were collected. Three of these individuals (all men) were in the control group, and three of these individuals were in the treatment group (2 women)."

Porter 2008 *(Continued)*

		Quote: "The final sample was, therefore, comprised of 23 individuals, 11 in the control group (8 women), and 12 in the treatment group (3 women)." Judgement comment: reasons for missing data unlikely to be related to true outcome with balance in missing data between groups (IG: n = 3; CG: n = 3); for burnout, attitudes toward emotional expression, peer support and ways of coping subscales: 1 additional missing participant; reasons for missing data not reported; available-case analysis (only participants for whom outcomes were obtained at both time points)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Recabarren 2019

Study characteristics

Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** To determine the optimal sample size, the trialists performed an a priori power analysis using `G*Power` and computed an expected medium effect size based on the meta-analysis of Regehr 2013 for an ANOVA (analysis of variance) with 2 measurement points, 2 groups and between and within factors interaction; sample size of 54 obtained; in addition, drop-out rate of 15% estimated based on the results of similar intervention programme, leading to an adequate sample size of 64 participants **Imputation of missing data:** per-protocol analysis and available-case analysis (i.e. including only data from participants who participated in at least 5/8 intervention sessions and who answered the post-treatment measures) + intention-to-treat analysis (i.e. including all 64 randomised participants who completed pre-treatment assessment; including also non-completing participants and those with missing outcomes); missing data at post-intervention dealt by using LOCF method
Participants	**Country:** Switzerland **Setting:** university students; training setting not specified **Age:** mean = 21.35 (SD = 2.53); only psychology students (n = 51): mean = 21.02 (SD = 2. 47); range: 18 -34 years **Sample size (randomised):** 64, including 51 psychology students **Sex:** 56 women, 8 men (total sample); only psychology students (n = 51): 46 women, 5 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** • structure diagnostic interview (Mini-International Neuropsychiatric Interview) and participants with psychopathological disorders are excluded; MINI lifetime diagnostic: past depression: total sample: 5 (7.8%), IG: 1 (3.1%), CG: 4 (12%); panic disorder: total sample: 2 (3.1%), IG: 1 (3.1%), CG: 1 (3.1%); PTSD: total sample: 1 (1.6%), IG: /, CG: 1 (3.1%) • depression (BDI-II): IG: 5.96 (4.19), CG: 6.22 (5.50); both groups without depression (below cut-off for mild depression (< 12)) • state anxiety (State-Trait Anxiety Inventory, STAI-S): IG: 31.19 (7.42), CG: 32.06 (9.12); both groups below cut-off for mild anxiety (< 36) • social anxiety (LSAS-SR): IG: 38.27 (19.72), CG: 41.44 (25.15); both groups below cut-off for low social anxiety (< 56)

Recabarren 2019 *(Continued)*

- mental health screening (Symptom Checklist, SCL-27-plus):
  - social phobia: IG: 1.30 (0.75), CG: 1.68 (0.93); both groups below cut-off (1.86)
  - vegetative: IG: 1.07 (0.55), CG: 1.23 (0.56); both groups below cut-off (1.54)
  - pain: IG: 1.43 (0.71), CG: 1.61 (0.66); both groups below cut-off (1.77)
  - agoraphobic: IG: 0.45 (0.53), CG: 0.61 (0.51); both groups below cut-off (0.93)
  - current depression: IG. 0.52 (0.47), CG: 0.62 (0.61); both groups below cut-off (1.28)

Population description: university students (majority psychology students)

Inclusion criteria: see also trial registration: 1) being older than 18 years old; 2) having a good understanding of French or German; 3) being a student at the University Fribourg; 4) for the other parts of the study: being right-handed

Exclusion criteria: 1) presence of an endocrinological condition, history or presence of a neurological disorder or brain injury; 2) use of psychotropic drugs; 3) presence of a mental disorder; 4) participating in another psychological intervention or any type of therapy or coaching and participating in the longitudinal part of this study; 5) for the other parts of the study: general MRI exclusion criteria, i.e. presence of claustrophobia, being pregnant (tested with a pregnancy test), metal in the body (pacemakers, aneurysm's clips, metallic prosthesis, cochlear implant…)

Attrition (withdrawals and exclusions): 1 withdrawal in IG (did not begin intervention)

Reasons for missing data: not specified

Interventions

Intervention: multidimensional stress intervention/prevention programme (n = 32)

- *delivery*: face-to-face; group setting (maximum of 8 students); activities provided printed or on CD; intervention intended to be as experiential as possible: participants sometimes work alone, in pairs, in subgroups or in plenum; written exercises, discussions, role playing in personal or fictive situations; different types of material and triggers used: e.g. videos, audio, visual supports; at end of each exercise: plenary discussion and short theoretical link
- *providers*: led by 2 trained clinical psychologists; programme is manualised; throughout entire programme, external psychotherapists available for supervision when needed
- *duration of treatment period and timing*: 8 weekly 2-hour sessions; homework between sessions proposed
- *description*:
  - OBJECTIVE: not only to experiment with several techniques to prevent and to cope with stress, but also to increase resources of being more resilient against stress that the participants could use as psychological tools in their everyday life; programme integrates mindfulness-based activities, cognitive and behavioural strategies, social skills exercises, and emotional regulation
  - CONTENT OF PROGRAMME/SESSIONS: 1) organisational matters and programme overview; stress, triggers, and coping strategies; 2) cognitive and body techniques, mindfulness-based exercises; 3) cognitive and body techniques; 4) cognitive techniques; 5) emotion and emotion regulation; 6) emotion regulation; 7) social skills and assertiveness; 8) social skills and assertiveness; evaluation of the programme and personal goals
  - FIRST SESSION: participants present themselves, rules of group functioning are discussed, confidentiality document signed; personal experience of stressful situations, triggered emotions, coping strategies, and their efficacy are discussed; participants' experience with stress = basis to introduce theoretical information about the topic
  - EACH SESSION FOLLOWS THE SAME STRUCTURE: a) 2 - 8. session: start with brief breathing exercise; b) summary of former meeting and objectives of new session are presented; c) review of homework; d) starting with new content; e) end of each session: proposal of homework and participants answer questionnaires about group cohesion and therapeutic alliance
  - SESSIONS 2 - 4: behavioural and cognitive techniques (e.g. breathing exercises; planning and cognitive restructuring) and mindfulness-based exercises (e.g. awareness of breath meditation; exercises for living in the present moment)
  - SESSIONS 5 - 6: topic of emotions and emotion regulation
  - SESSIONS 7 - 8: integrate assertiveness training and social skills components (e.g. validating communication; interpersonal conflict resolution)

Recabarren 2019 *(Continued)*

- *compliance*: 1/32 did not attend any sessions; i.e. only 31 began the intervention; participants present in sessions varied from 5 (1 person) to all session (11 students); most students (70%) attended 7 or 8 sessions, 25% of students were present at 6 and all of them finished the treatment
- *integrity of delivery*: programme is manualised; each session protocoled by masters-level student to ensure compliance with programme; throughout entire programme, external psychotherapists available for supervision when needed
- *economic information*: for their participation, the students received money (CHF 100) or experimental hour compensation (for psychology students)
- *theoretical basis*:
  - combined intervention: mindfulness-based activities, cognitive and behavioural strategies, social skills exercises, and emotional regulation; integrates validated techniques from different approaches (Freiburger Training gegen Leistungsstress, including cognitive behavioural techniques; RFSM-e-MOTION (RFSM, Réseau Fribourgeois de Santé Mental, i.e. Fribourg Mental Health Network))
  - RFSM-e-MOTION intervention = validated online programme for relatives of individuals with mental disorders that focuses on the emotional aspects of the family members' experiences and their relationship with the suffering person (see rfsm-e-motion.ch), this programme is based on Dialectical behavioural therapy

Control: wait-list control (n = 32)

- *compliance*: no withdrawals from control group; possibility to participate in IG if they wished so, but finally none of them participated (lack of time)
- *economic information:* for their participation, the students received money (CHF 100) or experimental hour compensation (for psychology students)

Outcomes

Outcomes collected and reported:

- mental health problems, social phobia - SCL-27-plus
- mental health problems, vegetative - SCL-27-plus
- mental health problems, pain - SCL-27-plus
- mental health problems, agoraphobic - SCL-27-plus
- mental health problems, current depression - SCL-27-plus
- depression - BDI-II
- trait anxiety - STAI-S
- state anxiety -STAI-S
- social anxiety - LSAS-SR
- progress of course of therapy, symptom distress - Outcome Questionnaire (OQ -45.2)
- progress of course of therapy, interpersonal relationships - OQ -45.2
- progress of course of therapy, social role - OQ -45.2
- progress of course of therapy, total score (functional problems) - OQ -45.2
- quality of life total - WHOQOL-BREF
- quality of life, psychological - WHOQOL-BREF
- quality of life, physical - WHOQOL-BREF
- quality of life, social - WHOQOL-BREF
- quality of life, environmental - WHOQOL-BREF
- self-efficacy - GSEQ
- sense of coherence - Sense of Coherence Scale
- self-compassion - Self-compassion scale Short Form
- perceived social support - Multidimensional Scale of Perceived Social Support

Time points measured and reported: 1) pre-intervention (maximum of 2 weeks before start of intervention); 2) post-intervention (maximum of 2 weeks after end of the intervention); according to trial registration also assessments at 3-month and 6-month follow-up (i.e. 3 and 6 months post-intervention) in certain cohorts

Recabarren 2019 *(Continued)*

	Adverse events: not specified
Notes	**Contact with authors:** We contacted the authors for the subgroup outcome data (i.e. means, SDs and number of participants analysed) for all outcomes for psychology students (Recabarren 2019 [pers comm]). **Study start/end date:** data collection between March 2015 – March 2017 (see also trial registration) **Funding source:** supported by the research pool of the University of Fribourg (grant number 578) **Declaration of interest:** research conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest **Ethical approval needed/obtained for study:** accepted by the Ethics Committee of the Cantons of Vaud and Fribourg (Protocol 261/14) **Comments by study authors:** registered in the research register of the University of Fribourg FUTURA (Project number 6239; http://admin.unifr.ch/futura/content/ projects/6239) as well as in the Clinicaltrial Register (clinicaltrials.gov.NCT03861013) **Miscellaneous outcomes by the review authors:** subgroup data for psychology students were sent by the authors **Correspondence:** Romina Evelyn Recabarren; Division of Clinical and Health Psychology, IReach Lab, Department of Psychology, University of Fribourg, Fribourg, Switzerland; rominaevelyn.recabarren@unifr.ch

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "After that, participants were randomly distributed in the intervention or the wait-list control group. The randomization was done using a free available software, i.e., www. randomization.com" Quote: "No significant differences were found in the sociodemographic variables between the participants of the wait-list control group and of the intervention groups (all p >0.05) [age: t (62) = −0.393, p = 0.696; sex: X 2 (1) = 0.571, p = 0.450; socioeconomic position: Cramer's V = 0.135, p = 0.769; studies (psychology and other): X 2 (1) = 0.097, p = 0.756]." Judgement comment: The investigators describe a random component in the sequence-generation process (randomisation software); verified baseline comparability of groups for some sociodemographic characteristics (age, sex, socioeconomic position, studies); baseline comparability for other sociodemographic variables (e.g. marital status) and outcomes of interest not specified on the basis of analysis
Allocation concealment (selection bias)	Unclear risk	Quote: "After that, participants were randomly distributed in the intervention or the wait-list control group. The randomization was done using a free available software, i.e., www. randomization.com and was archived in an electronic document saved separately." Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk' (method of concealment is not described in sufficient detail: "archived in electronic document saved separately"; unclear if random-sequence allocation was concealed from personnel and/or participants)
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Quote: "After randomization had been done and due to the design of the study, investigators and participants were not blinded about group allocation." Judgement comment: no blinding of participants and personnel (face-to-face intervention), and the outcome is likely to be influenced by lack of blinding

Recabarren 2019 *(Continued)*

Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: blinding of interviewers for structure diagnostic interview on psychopathological disorders at baseline ensured; insufficient information about blinding of outcome assessment (online questionnaires); but due to performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "We analyzed our data using the per-protocol (PP) approach (108). In that respect, we calculated the ANOVA analyses but only with data from participants who participated in at least five of the eight intervention sessions and who answered the post-treatment measures. Considering the completion of post- treatment measures and according to the dependent variable considered, the sample of post-treatment participants for the PP-analyses varies from 56 to 60." Quote: "To increase the confidence of our results, we performed the same analyses considering an intention-to-treat approach (ITT). In the ITT analyses, all randomized participants who completed the pre-treatment assessment (T1) were taken into account, including non-completing participants and those with missing outcomes. Missing data at post-treatment assessment (T2) were dealt by using the last observation carried forward method (LOCF), which in this case correspond to the pre- treatment measure (T1) (108). A total of 64 participants were taken account for these analyses." Judgement comment: unclear if reasons for missing data are related to true outcome (e.g. number of missing data not reported for each group); per-protocol analysis with participants who participated in at least 5/8 intervention sessions and available-case analysis (i.e. participants who provided post-treatment measures) with varying number of participants analysed for each outcome (n = 56 to 60); but also intention-to-treat analysis with all randomised participants (n = 64) using LOCF method
Selective reporting (reporting bias)	High risk	Quote: "This study was registered in the research register of the University of Fribourg FUTURA (Project number 6239; http://admin.unifr.ch/futura/content/ projects/6239) as well as in the Clinicaltrial Register (clinicaltrials.gov.NCT03861013)." Judgement comment: trial registration available (NCT03861013); not all of the study's prespecified primary and secondary outcomes have been reported; PRESPECIFIED: Primary outcomes: depression, anxiety (trait/state), sense of coherence, burnout, social anxiety, quality of life, difficulties in emotion regulation, perceived stress, self-efficacy, mindfulness skills, mental health problems, self-compassion, perceived social support, reward responsiveness, self-esteem, reactions after traumatic events, childhood trauma, post-traumatic stress, cannabis abuse, coping, life orientation/optimism, smartphone addiction, internet addiction, changes in participant's progress through the course of the therapy; Secondary outcomes: ambulatory assessment, answer to reward task, cortisol levels in daily life and laboratory task; Other outcomes: socio-economic position index, information about relatives, handedness, nicotine dependence, psychotherapy alliance, quality of the group relationship, academic success, change in psychopathological disorders; REPORTED: mental health problems, depression, anxiety (trait/state), social anxiety, changes in participant's progress through the course of the therapy, quality of life, self-efficacy, sense of coherence, self-compassion, perceived social support

Sahranavard 2018

Study characteristics	
Methods	**Study design:** RCT**Study grouping:** parallel group**Unit of randomisation:** individuals**Power (power & sample size calculation, level of power achieved):** power achieved in 1-way covariate analysis in MANCOVA (multivariate analysis of covariance) indicates adequacy of sample size (anxiety sensitivity: 0.97; hope: 0.82; positive and negative affect: 0.57; anxiety: 1.00; hardiness: 0.82; self-efficacy: 0.92)**Imputation of missing data:** not specified
Participants	**Country:** Iran **Setting:** female students from Birjand University of Medical Science; training setting not specified **Age:** mean = 22.00 (SD = 1.11); range = 20 - 24 years **Sample size (randomised):** 30 **Sex:** 30 women **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** anxiety symptoms (BAI): IG: 13.40 (6.16); CG: 13.46 (5.16) **Population description:** female medical students of Birjand University of Medical Sciences **Method of recruitment:** recruited at Birjand University of Medical Sciences in Iran; method of recruitment not specified (selected by available sampling) **Inclusion criteria:** 1) having the BDI score higher than 16; 2) living in the dormitory; and 3) being informed and satisfied; according to Sahranavard 2018, also participants with higher than average score on the BAI **Exclusion criteria:** 1) unsatisfied students; 2) being graduates; 3) those who did not live in the dormitory; and 4) having BDI < 16; according to Sahranavard 2018, also students with lower than average score on the BAI **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** stress-management-based cognitive-behavioural group treatment (n = 15) • *delivery*: face-to-face; group setting • *providers*: clinical psychologist; therapists in this study have master's degree-level education in psychology and have all specialised expertise in CBT • *duration of treatment period and timing:* 6 x 90-minute sessions twice a week (i.e. 3 weeks treatment duration)

Sahranavard 2018 *(Continued)*

- *description*:
  - SESSION 1: awareness of stress and its coping ways: self-awareness; administering the `pre-test`, explaining stress-causing factors and the importance of stress management, how to respond to stress-causing factors, creating a list of such factors, and relaxation practice
  - SESSION 2: do not be indifferent to stress: mental methods; becoming aware of spontaneous thoughts, understanding the relationship between thoughts and feelings, understanding the physical symptoms, relaxation practice along with diaphragmatic breathing
  - SESSION 3: adapt to life: physical methods of coping with stress; explaining the relationship between thoughts and excitement, identifying negative thoughts and understanding their effects on behaviour, imagination and relaxation practice
  - SESSION 4: study skills, exam preparation and time management; awareness of reasonable and unreasonable self-talks, relaxation practice in the form of imagination along with diaphragmatic breathing
  - SESSION 5: group power: interpersonal relations skills; replacing reasonable thoughts, autogenetic training of heaviness and warmth feeling (sunlight meditation practice), relaxation practices in the form of mental imagination along with positive self-induction
  - SESSION 6: treat yourself to merit: cultivate self-esteem and honour, prevent depression and anxiety and deal effectively with them; training efficient dealing, autogenic training of heartbeat, breath, stomach, and forehead
  - SESSION 7 (see Sahranavard 2019): administering responses of efficient dealing, autogenic training along with imagination and `self-induction`
  - SESSION 8 (see Sahranavard 2019): training anger management and mantra meditation
  - SESSION 9 (see Sahranavard 2019): training assertiveness, breath count meditation
  - SESSION 10 (see Sahranavard 2019): social support, a total review of the programme, and creating a personal stress management plan
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: cognitive-behaviour therapy (CBT); CBT is a type of psychotherapy that helps the student to dissect the relationships among their emotions, cognitions, and behaviours to identify and reframe irrational and self-defeating thoughts, which in turn improves their mood and alters their behaviours. Research and clinical practice have shown CBT to be effective in reducing symptoms and relapse rates in a wide variety of psychiatric disorders

Control: wait-list control (n = 15)

Outcomes

Outcomes collected and reported:

- anxiety sensitivity - Anxiety sensitivity questionnaire
- positive affect - PANAS
- negative affect - PANAS
- hope - Hope scale
- self-efficacy - Schwarzer's General Self-Efficacy Scale
- anxiety - BAI
- hardiness - Ahvaz Hardiness Inventory

Depression (BDI) no outcome measure, but only assessed at baseline

Time points measured and reported: 1) pre-intervention; 2) post-intervention (1 week after training)

Adverse events: not specified

Notes

Contact with authors: We contacted the authors for any withdrawals/exclusions from the study and the number of participants analysed. We also asked for the post-intervention means and SDs for positive and negative affect separately and whether the CBT group included 6 or 10 sessions. We received no response to 2 inquiries

Sahranavard 2018 *(Continued)*

Study start/end date: not specified**Funding source:** no specific funding for this work; nil financial support and sponsorship**Declaration of interest:** no conflicts of interest disclosed**Ethical approval needed/obtained for study:** approved by the Research Ethics Committee of the Birjand University of Medical Sciences (Birjand, Iran)**Comments by study authors:** not relevant

Miscellaneous outcomes by the review authors: Sahranavard 2018 and Sahranavard 2019 are 2 reports of the same study (n = 30 randomised) with different outcomes reported**Correspondence:** Dr Sara Sahranavard; Department of Psychology, Faculty of Medicine, Birjand University of Medical Science; Social Determinants of Health Research Center, Faculty of Health, Birjand University of Medical Sciences, Tehran, Iran; sahranavard_sara@yahoo.com; alesaleh70@yahoo.com

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "A sample of 30 participants were selected through the available sampling method and randomly assigned into experimental (CBT) and control groups (each group, 15 female student)." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; verified baseline comparability of groups for sociodemographic characteristic age (unclear for other sociodemographic variables); baseline comparability for outcome variables unclear (i.e. statistical significance not specified)
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; but due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Judgement comment: insufficient reporting of attrition/exclusions to permit judgement of 'Low risk' or 'High risk' (n = 15 randomised to each group; but unclear if there were any missing data or if potential missing data were imputed; number of participants analysed in each group not stated)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Samouei 2015

Study characteristics

Methods	**Study design:** RCT **Study grouping:** parallel group

Samouei 2015 *(Continued)*

	Unit of randomisation: not exactly specified (based on full text unclear if individual or cluster-randomisation)**Power (power & sample size calculation, level of power achieved):** not specified**Imputation of missing data:** not specified
Participants	**Country:** Iran**Setting:** students of Isfahan University of Medical Sciences; training setting probably university (since training sessions held at same day as other university classes)**Age:** not specified**Sample size (randomised):** not specified**Sex:** not specified**Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** students of Isfahan University of Medical Sciences **Method of recruitment:** recruited from students of Isfahan University of Medical Sciences (Department of Management and Medical Informatics and Department of Rehabilitation Sciences); 5 study groups selected from majors of audiology, speech therapy, orthopaedics, physiotherapy, healthcare management, and medical librarianship; method of recruitment not specified **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified

Interventions	**Intervention:** mindfulness training (n = not specified)
	
	• *delivery*: face-to-face group setting; teachings include: discussions, group activities, role playing, individual tasks, group tasks, homework
	• *providers*: teaching sessions carried out by psychology lecturer
	• *duration of treatment period and timing*: 8 x 2-hour sessions once or twice a week; homework assignments; training sessions held on same day as other university classes
	• *description*:
	  ◦ guidelines for teaching sessions arranged using pamphlet titled: *Guide for teaching basic mindfulness skills*
	  ◦ During teaching sessions, participants learn different methods for connecting with their bodies, thoughts and emotions and how to concentrate on tasks and accept their bodies and emotions without judgement.
	  ◦ SESSION CONTENT: each session starts with brief description about mindfulness and the importance of living in the present; techniques thought in sessions include muscle relaxation during sessions, concentrating on present, experiencing inside and outside, thought faulting, recording 3 minutes of thoughts, mindful breathing, mindful diet, and mindfulness during mindful activities; at end of the each session: homework assignment related to the covered techniques
	• *compliance*: not specified
	• *integrity of delivery*: not specified
	• *economic information*: not specified
	• *theoretical basis:* mindfulness-based
	
	Control: active control (n = not specified)
	
	• *delivery*: brochures
	• *providers*: self-guided
	• *duration of treatment period and timing*: not specified
	• *description*: brochures about scientific information unrelated to psychology distributed
	• *compliance*: not specified
	• *integrity of delivery*: not specified
	• *economic information*: not specified
	• *theoretical basis*: not specified

Outcomes	**Outcomes collected and reported:**

Samouei 2015 *(Continued)*

- mindfulness - FFMQ, not reported
- psychological capital, total score - PCQ
- psychological capital, self-efficiency - PCQ
- psychological capital, hopefulness - PCQ
- psychological capital, resilience - PCQ
- psychological capital, optimism - PCQ

Time points measured and reported: 1) pre-intervention; 2) 3-month follow-up (i.e. 3 months after last session); only 2) reported

Adverse events: not specified

Notes	**Contact with authors:** We contacted the authors for the number of participants randomised to each group. We also asked if there were any missing data (e.g. withdrawals or exclusions) in the 2 groups, the number of participants analysed, respectively, and if the study used cluster randomisation, but received no response to 2 inquiries. **Study start/end date:** study conducted in 2013**Funding source:** financial support and sponsorship: nil**Declaration of interest:** There are no conflicts of interest.**Ethical approval needed/obtained for study:** not specified**Comments by study authors:** not relevant**Miscellaneous outcomes by the review authors:** not relevant**Correspondence:** Miss Rahele Samouei, PhD Student of Health Management in Disasters; Social Determinants of Health Research Center, Isfahan University of Medical Sciences, Isfahan, Iran; Samouei@mail.mui.ac.ir

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Therefore, cluster sampling method was employed by simultaneous selection of five groups of students from two departments to four majors whom were then randomly divided to study and control groups." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; no information about comparability of groups in sociodemographic characteristics or outcome variables at baseline or respective analysis
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; but due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Judgement comment: insufficient reporting of attrition/exclusions to permit judgement of 'Low risk' or 'High risk' (e.g. number randomised to each group not stated; unclear if there were any missing data and if missing data were imputed, for example; number of participants analysed in each group not specified)
Selective reporting (reporting bias)	High risk	Judgement comment: no study protocol or trial registration available, but not all of the study's prespecified outcomes have been reported (FFMQ values at post-intervention not reported)

Smeets 2014

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** unclear if available-case analysis (with n = 49 as indicated in text) or if missing data were imputed to perform intention-to-treat analysis
Participants	**Country:** Netherlands **Setting:** mid-sized European University **Age:** mean = 19.96 (SD = 1.33) years **Sample size (randomised):** 52 **Sex:** 52 women **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** female psychology students entering first or second year of college **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** only CG: 3/25 (12%) did not complete post-test assessment and were excluded from analysis (according to text; but see also Table 2 in the report) **Reasons for missing data:** not specified

Interventions	**Intervention:** self-compassion (SC) intervention (n = 27)
	
	• *delivery*: face-to-face; group sessions; each intervention session: short presentation followed by experiential exercises and discussion periods; intervention booklet
	• *providers*: all sessions co-led by 2 trainers (including first author)
	• *duration of treatment period and timing*: 3 weeks; 2 x active 1½-hour intervention sessions; 1 x 45-minute closing/evaluation session
	• *description*:
	  ◦ goal: to equip participants with the ability to treat themselves compassionately in times of personal suffering
	  ◦ WEEK 1/SESSION 1: focused on teaching participants to notice own suffering and introduction of informal self-compassion techniques; background information on self-compassion and its differences from concepts (e.g. self-indulgence, self-pity, self-esteem); participants share experiences on how they usually treat themselves when having a difficult time and explore their self-critical voice by writing down their most common self-critical thoughts on cards; participants are asked to think about what they would need to feel comforted and understood in times of distress
	  ◦ HOMEWORK ASSIGNMENTS: a) "intervention bracelet": switch from one arm to the other every time they addressed themselves in a harsh way or felt upset about something; b) keep week-long "self-compassion journal" that contains instructions on how to reprocess difficult experiences with a sense of kindness, common humanity, and mindfulness; and c) loving-kindness meditation: silently repeat 3 loving-kindness phrases directed to others, themselves, every night before going to bed (e.g. "may you be at peace," "may you be kind to yourself," "may you be free from suffering")

Smeets 2014 *(Continued)*

- WEEK 2/SESSION 2: focused on teaching participants to be more self-compassionate when confronting difficulties in daily life; presentation on the role of self-criticism in fear of failure and procrastination; think about what motivates themselves in a self-compassionate rather than a self-critical way; exercise: design of 3 personalised self-compassion phrases to use when encountering difficulties in daily life that correspond to key elements of self-compassion definition (e.g. "This is a moment of suffering" (mindfulness), "suffering is something we all share" (common humanity), and "may I be kind to myself" (self-kindness); write down 5 things they appreciate about themselves and discussion of experience of relating to oneself in a positive way
- HOMEWORK ASSIGNMENT: a) use self-compassion phrases as often as possible when encountering difficulties in daily life; b) write a self-compassionate letter about an issue they tend to feel bad about (written from perspective of imaginary friend who is unconditionally kind, accepting and compassionate) that is read twice in upcoming week; c) continue with loving-kindness practice every night
- WEEK 3/SESSION 3: sharing of experiences and evaluation of intervention

- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: self-compassion literature (e.g. Neff 2003b)

Control: attention control (time management control intervention) (n = 25)

- *delivery*: face-to-face; group sessions; each intervention session: short presentation followed by experiential exercises and discussion periods; intervention booklet
- *providers*: all sessions co-led by 2 trainers (including first author)
- *duration of treatment period and timing*: 3 weeks; 2 x active 1½-hour intervention sessions; 1 x 45-minute closing/evaluation session
- *description*:
  - goal: to teach participants general time management skills
  - WEEK 1/SESSION 1: focus on teaching participants to become aware of the way they manage their time; background information on time management; participants share experiences on how efficiently they use their time; exercise: write down detailed overview of daily activities of the past work week, along with estimation of time they had spent on each activity; give time efficiency percentages, reflecting how efficiently they had used their time for each activity; brainstorming about explanations for lowest and highest efficiency percentages; participants introduced to use of visualisation for optimising their time management skills and asked to visualise their activities of the last 24 hours by means of short visualisation audio fragment
  - HOMEWORK ASSIGNMENTS: a) write down all daily activities along with time estimation and time efficiency percentage, every evening of upcoming week; b) evaluate time management satisfaction and reflect on potential reasons for effectiveness and ineffectiveness; and c) compare time efficiency percentages across days
  - WEEK 2/SESSION 2: focused on helping participants to plan their time more efficiently; participants receive "time management" reminder bracelet to remind them of their practice; presentation on importance of making a week planning; group discussion in which participants talked about how they usually plan their days; participants make detailed planning of their activities for each day of the upcoming work week and are told to specify ways that could help them carry out their activities more efficiently; participants estimate how much time they would spend on each of their activities
  - HOMEWORK ASSIGNMENTS: see work 1
  - WEEK 3/SESSION 3: sharing of experiences and evaluation of intervention
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: not specified

Outcomes	**Outcomes collected and reported:**

- self-compassion - SCS
- mindfulness, accept without judgement - subscale Kentucky Inventory of Mindfulness Skills (KIMS-E)

Smeets 2014 *(Continued)*

- mindfulness, nonreactivity to inner experience - subscale KIMS-E
- life satisfaction - SWLS
- connectedness - Social Connectedness Scale-Revised
- optimism - Life Orientation Test-Revised
- self-efficacy - General Self-Efficacy scale
- positive affect - PANAS
- negative affect - PANAS
- rumination - Ruminative Response Scale-NL-Extended
- worry - Penn State Worry Questionnaire

Time points measured and reported: 1) pre-intervention (1 week before intervention); and 2) post-intervention (1 week after intervention)

Adverse events: not specified

Notes	**Contact with authors:** We contacted authors to ask if missing data had been imputed to perform intention-to-treat analysis (according to text: n = 49 analysed due to exclusions; Table 2: n = 52 analysed), but they had not responded at the time of writing this review **Study start/end date:** not specified **Funding source:** not specified **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** approved by the local committee for research ethics **Comments by authors:** not relevant **Miscellaneous outcomes by the review authors:** not relevant **Correspondence:** Elke Smeets; Department of Clinical Psychological Science, Maastricht University, P.O. Box 616, 6200 MD Maastricht, The Netherlands; elke.smeets@maastrichtuniversity.nl

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "All participants were randomly assigned to either the self-compassion intervention group (N = 27) or the time management control group (N = 25) by means of an Internet-based randomization program (www.randomizer.org)." Quote: "Analyses of variance procedures (ANOVAs) were employed to examine whether there were significant differences between the self-compassion intervention group and the time management control group on study measures at pretest. ANOVA's revealed no significant differences between groups on any of the pretest or demographic measures (all Fs < 2.54, all ps < .05)." Judgement comment: The investigators describe a random component in the sequence-generation process (internet-based randomisation); verified baseline comparability of groups for sociodemographic characteristics and outcomes on the basis of analysis
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding

Smeets 2014 *(Continued)*

Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; but due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "The initial sample comprised 52 female psychology students" Quote: "Three control participants did not complete posttest measurements and were excluded from analyses, leaving a final sample size of 49 participants (N = 27 in the intervention group, and N = 22 in the control group)." Judgement comment: reasons for missing outcome data likely to be related to true outcome, with (slight) imbalance in numbers of missing data between groups (IG: n = 0; CG: n = 3); reasons for missing data not reported; unclear if available case analysis (with n = 49 as indicated in text) or if missing data were imputed to perform intent-to-treat analysis (see Table 2)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Stephens 2012

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** preferred sample size (n = 111) was predetermined by a power analysis using the G*Power 3.1 software (Faul 2007) with medium effect size (0.30), α = 0.05, power = 0.80, 2 groups, and 3 measurements; loss of statistical power by missing of 17% of 210 total measurements (measurements each for 70 participants) **Imputation of missing data:** for missing data points in items: missing value imputation methods using the expectation maximisation (EM) approach (according to authors, imputed values rounded to the nearest whole number) and computation of maximum likelihood estimation (as though there were no missing data)
Participants	**Country:** USA **Setting:** state-supported universities **Age:** mean = 20.9 (SD = 0.95); range = 19 - 23 years **Sample size (randomised):** 70 **Sex:** 62 women, 8 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** perceived stress (PSS): IG: 20.23 (6.37), CG: 20.37 (5.89) **Population description:** baccalaureate nursing students enrolled full-time and in clinical nursing course at 2 university colleges of nursing **Inclusion criteria:** 1) full-time status at 1 of the 2 universities; 2) enrolled in a clinical course; 3) between the ages of 19 - 23; 4) currently have an active mobile phone account; 5) currently have the abili-

Stephens 2012 *(Continued)*

ty to send/receive text messages; and 6) have Twitter account or be willing to establish one prior to beginning of the study

Exclusion criteria: not specified

Attrition (withdrawals and exclusions): post-intervention: 6 did not complete data collection (IG: 3/35 (8.6%); CG: 3/35 (8.6%)); 1-month follow-up: 8 did not complete data collection (IG: 3/35 (8.6%); CG: 5/35 (14.3%)); 1 student not completing time 2 (T2) completed time 3 (T3) assessment

Reasons for missing data: dropped out of nursing programme (n = 2); never took time to set up Twitter account (n = 1); reasons for other missing data not specified

Interventions

Intervention: educational intervention by Twitter to enhance resilience (n = 35)

- *delivery*: online; by Twitter
- *providers*: researcher (Teresa M Stephens, PhD student)
- *duration of treatment period and timing*: 6 weeks; tweets sent on varying days of week and at varying times to avoid predictable schedule, 4 tweets a week
- *description*:
  - educational intervention to increase resilience and social support and decrease perceived stress
  - each week, 4 tweets are sent to participants by twitter account; participants may choose to respond or not
  - intervention focused on enhancing protective factors found to be important in development/enhancement of resilience: 1) social support; 2) positive emotions; 3) humour; 4) knowledge of health behaviours; 5) self-knowledge; and 6) effective coping
  - TWITTER SCRIPT: WEEK 1 – SOCIAL SUPPORT: a) Monday: Call or visit someone each day this week who gives you support. Tell us about it; b) Wednesday: Who helps you the most with the stress of being a nursing student? How do they help you?; c) Friday: Who loves you “no matter what”? Do you rely on them when feeling stressed?; and d) Saturday: Who helps you stay on track or do what is best for you to remain positive and healthy?
  - WEEK 2- POSITIVE EMOTIONS: a) Tuesday: Make your thoughts and words this week be positive. Encourage others to do the same; b) Wednesday: What have you learned from past mistakes or failures?; c) Friday: Who is the most positive influence in your life? What can you learn from him/her?; and d) Saturday: What are you thankful for?
  - WEEK 3 – HUMOUR: a) Monday: Laugh out loud at least once a day. Try smiling at everyone you meet; b) Wednesday: Laughter is a great stress-buster! Who/what makes you laugh?; c) Friday: Don’t forget to laugh at yourself. Humour can be found in almost every situation; and d) Sunday: Spend some time with someone who enjoys life and knows how to laugh. Learn from them
  - WEEK 4 – KNOWLEDGE OF HEALTH BEHAVIOURS: a) Tuesday: Do something everyday this week to improve your health (diet, exercise, sleep). Tell us about it; b) Thursday: Sleep, healthy diet, and exercise are great stress-busters! Try using them in your own life; c) Friday: What did you do this week to be healthier? How did it make you feel?; and d) Saturday: How do you plan to improve or maintain good health? Who supports you in these efforts?
  - WEEK 5 – SELF-KNOWLEDGE: a) Monday: Believing in your ability to make decisions and take actions helps you succeed in the challenge you are facing; b) Wednesday: What is your greatest strength? How does this help you?; c) Friday: Look at mistakes as learning opportunities. Make a plan for the next time you face a similar situation; and d) Sunday: Who/What are your top 3 priorities? Does the way you spend your time reflect your priorities?
  - WEEK 6 – EFFECTIVE COPING: a) Tuesday: Physical coping methods include getting enough sleep, being physically active everyday, and eating healthily. Try them!; b) Wednesday: What creates stress in your life? What helps you cope with stress?; c) Friday: Emotional coping methods include talking to someone you trust, writing in a journal, or receiving counselling. Try them!; and d) Saturday: What can you do to improve your coping skills? Did you try anything new this week?
- *compliance*: 5 engaged in twitter dialogue; similar activity throughout the intervention between IG and CG; for both groups, highest participation in the first week, with 9 responses within each group; steady decline thereafter, with the least participation noted in the last 2 weeks of the study (beginning of new semester)
- *integrity of delivery*: not specified
- *economic information*: gift card at study conclusion

Stephens 2012 *(Continued)*

- *theoretical basis*: adolescent resilience model (Haase 2004); youth resilience framework (Rew 2003); Ahern's model of adolescent resilience: adolescent resilience as outcome of triadic influences of risk, protection and interventions; intervention loosely based on National Center for Victims of Crime (NCVC 2005) Virginia resilience project (Reach In. Reach Out. Finding Your Resilience)

Control: attention control (same number of tweets received) (n = 35)

CONTROL

- *delivery*: online; by Twitter
- *providers*: researcher (Teresa M Stephens, PhD student)
- *duration of treatment period and timing*: 6 weeks; tweets sent on varying days of week and at varying times to avoid predictable schedule, 4 tweets a week
- *description* :
  - Tweets consisting of nursing trivia or questions related to basic nursing knowledge; same style as tweets in IG (questions and statements)
  - TWITTER SCRIPT: WEEK 1 – a) Monday: Check out the CDC website: www.cdc.gov; b) Wednesday: How many bones are in the human body?; c) Friday: What is the bell of the stethoscope used for? and d) Sunday: What is a naevus?
  - WEEK 2: a) Tuesday: Bruxism is teeth grinding during sleep; b) Wednesday: What is a bruit?; c) Friday: How do you determine the mean arterial pressure?; and d) Saturday: Where is the spleen?
  - WEEK 3: a) Monday: A medication's half-life is the time it takes for 1/2 of the drug to be eliminated from the body; b) Wednesday: What does a Holter monitor do?; c) Friday: Emboli come in may forms: blood clot, fat, air, or amniotic fluid; and d) Sunday: R bronchus is longer and straighter than the L increasing the risk of right lobe aspiration pneumonia
  - WEEK 4: a) Tuesday: Antidiuretic hormone is stored in the posterior pituitary gland; b) Thursday: Plain D5W is rapidly metabolised in children, leaving free water which can result in cerebral oedema. c) Friday: What is a low-residue diet?; and d) Saturday: What are S/S of an allergic reaction?
  - WEEK 5: a) Monday: Weight gain is an early symptom of congestive heart failure due to accumulation of fluid; b) Wednesday: If amniocentesis fluid contains Barr bodies, what is the sex?; c) Friday: The therapeutic serum level for Dilantin is 10 - 20 mcg/mL; and d) Sunday: Who was known as the "angel of the battlefield?"
  - WEEK 6: a) Tuesday: Morphine sulphate can suppress respiration and respiratory reflexes, such as cough; b) Wednesday: What is Glucagon?; c) Friday: The parathyroid glands regulate the calcium level in the blood; and d) Saturday: What are Fluorescein drops used for?
- *compliance*: 4 engaged in twitter dialogue; similar activity throughout the intervention between IG and CG; for both groups, highest participation in the first week, with 9 responses within each group; steady decline thereafter, with the least participation noted in the last 2 weeks of the study (beginning of new semester)
- *integrity of delivery*: not specified
- *economic information*: gift card at study conclusion
- *theoretical basis*: not specified

Outcomes

Outcomes collected and reported:

- resilience - CD-RISC
- perceived stress - PSS
- sense of support - Sense of Support Scale

Time points measured and reported: 1) pre-intervention; 2) post-intervention (within 1 week following last tweet; and 3) 1-month follow-up (1 month post-intervention)

Adverse events: not specified

Notes

Contact with authors: We contacted the authors for the number of participants analysed in each group at each time point (Stephens 2018 [pers comm]).

Study start/end date: not specified

Stephens 2012 *(Continued)*

Funding source: research grant from Gamma Chi Chapter of Sigma Theta Tau International

Declaration of interest: not specified

Ethical approval needed/obtained for study: verbal approval obtained from the appropriate administrative personnel at both universities early in the planning process; IRB approval was granted by both institutions prior to the recruitment of participants and any data collection

Comments by authors: not relevant

Miscellaneous outcomes by the review authors: dissertation

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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "A computerized random number generator (www.randomizer.org) was used to randomly select half the participating students at each institution as the experimental group and half as the attention placebo control group." Quote: "An independent samples t-test was used to determine if there were statistically significant differences between the experimental and control groups on age. Results indicate there were no statistically significant differences, t(68) = .47, p = .49." Quote: "According to the chi-square analysis, there were no statistically significant differences between control and experimental groups on race, $\chi^2(1, N=70) = 1.01$, p = .31; and there were no statistically significant differences between control and experimental groups on gender, $\chi^2(1, N = 70) = .56$, p = .45." Judgement comment: investigators describe a random component in the sequence-generation process (computer random-number generator); verified baseline comparability of groups for some sociodemographic characteristics (age, gender, race); baseline comparability for other sociodemographic characteristics (e.g. high school education, employment, health behaviours, sources of financial/emotional support) and outcome variables (see Table 24, statistical (non)significance) unclear
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: no blinding of study personnel (intervention is provided by Twitter by only 1 researcher who also performs outcome assessment); blinding of participants unclear; outcomes are likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: no blinding of outcome assessment (outcome assessment by the same researcher who provides the intervention by Twitter) and the outcome measurement is likely to be influenced by lack of blinding
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "All 70 participants completed T1 data collection." Quote: "A total of six students did not participate in T2 data collection, three from the experimental group (8.6%) and three from the control group (8.6%)." Quote: "A total of eight students did not participate in T3 data collection, three from the experimental group (8.6%) and five from the control group (14.2%)."

Stephens 2012 *(Continued)*

		Quote: "Nine items (Time 2) and one item (Time 3) were determined to be missing at random and were replaced via missing value imputation methods using the expectation maximization (EM) approach." Quote: "The EM method was used to compute missing values for the appropriate scale at the specified time for the missing items. Imputed values were rounded to the nearest whole number and the maximum likelihood estimation was computed as though there were no missing data." Quote: "According to Krueger and Tian (2004), MLM can be used to describe nonlinear relationships across time in a longitudinal dataset with multiple missing data points. This method was chosen over the repeated measures analysis of variance (RM ANOVA) because the MLM can accommodate flexible time schedules, missing data points and because of its emphasis on patterns of change." Quote: "In this study, six participants did not complete the data collection at Time 2 (three from the control group and three from the experimental group), and eight participants did not complete the data collection at Time 3 (three from the experimental group and five from the control group). Two participants did not complete the data collection because they dropped out of the nursing program and another student stated she never took the time to set up her Twitter account. The other students did not give a reason for not completing the data collection." Judgement comment: information received from authors on number of participants analysed in each group and imputation methods: "Each group contained 35 participants (total n=70). For the missing data: I used the expectation maximization (EM) approach. The EM method was used to compute missing values for the appropriate scale at the specified time for the missing items. Imputed values were rounded to the nearest whole number and the maximum likelihood estimation was computed as though there were no missing data."; reasons for missing data unlikely to be related to true outcome (relative balance in missing data between groups: T1: none missing; T2: IG: n = 3, CG: n = 3; T3: IG: n = 3; CG: n = 5); for missing values in single items: missing value imputation methods using the expectation maximization (EM) approach and computation of maximum likelihood estimation
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Venieris 2017

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** A priori power analysis using G*Power 3.17 determined that 171 participants (n = 57 participants per group) were necessary to detect an effect size of 0.4 at a significance level of 0.05 and a power of 0.80. **Imputation of missing data:** no imputation of missing data; per-protocol analysis (i.e. only participants who missed fewer than 3 daily assignments consecutively or overall in 2 IGs) and available-case analysis (only participants who took pre-test and post-test surveys)
Participants	**Country:** USA

Venieris 2017 *(Continued)*

Setting: graduate students from various disciplines at large, public university in the Southwest; training setting: self-guided online intervention
Age: mean = 28.4 (SD = 6.21); range = 20 - 53 years
Sample size (randomised): 234
Sex: 133 women, 97 men, 3 transgender, 1 other
Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline: not specified

Population description: graduate students from various disciplines at large public university in the Southwest

Inclusion criteria: not specified

Exclusion criteria: not specified

Attrition (withdrawals and exclusions):

- post-intervention: n = 74 lost to follow-up/did not complete post-test (32% attrition; IG1: 28; IG2: 38; CG: 8)
- 3-month follow-up: 43 further lost to follow-up/did not complete follow-up (27% attrition from post-test; 50% attrition from pre-test; IG1: 13 further lost to follow-up; CG: 33 further lost to follow-up; in IG2 3 participants who did not complete post-test, completed follow-up assessment)

Reasons for missing data: not specified

Interventions

Intervention 1 (relevant for review): positive psychology intervention (PPI) (n = 78)

- *delivery*: online (managed via Blackboard = online educational system that is used to manage academic courses)
- *providers*: self-guided
- *duration of treatment period and timing*: every day for 3 weeks
- *description*:
  - engaging in 1 of 5 activities (3 grateful things; positive support network message; meditation; writing about a meaningful experience; and exercise) everyday for 3 weeks
  - participants choose 1 activity from a list of 5 to engage in daily, and are advised to engage in each at least twice in 3-week period
  - PPI blackboard shell has instructions for completing each activity
- *compliance*: compliance not specified; completion of all online activities verified by submission of assignments; participants who miss 3 daily assignments, either consecutively or in total, are disqualified from the study; physical activity exercise verified by asking that students use 1 of 4 campus fitness centres, where student identification cards are swiped on entry
- *integrity of delivery*: not specified
- *economic information*: for complete participation: students' ASU student identification cards loaded with USD 30; for participation, participants enter into raffle for a chance to win 1/10 USD 25 gift cards; fitness fees (usually USD 25) waived to encourage participants' usage without incurring costs
- *theoretical basis*: adapted for use as an online protocol from Achor's original version (Achor 2012; Achor 2014); based on positive psychology

Intervention 2: informative stress intervention (n = 78)

- *delivery*: online (managed via Blackboard = online educational system that is used to manage academic courses)
- *providers*: self-guided
- *duration of treatment period and timing*: every day for 3 weeks; participants differ in how long they spent on the lesson they chose for the day; generally 2 - 20 minutes a day to complete a lesson

Venieris 2017 *(Continued)*

- *description* :
  - provided information on participants' BlackBoard shell about the sources and types of stress, its various effects, and positive coping mechanisms that can help individuals manage stress effectively
  - group protocol mirrors the PPI group in a number of different ways: Similar to the PPI group, participants complete daily experiential exercises related to information about stress and stress management. Participants are given a choice of 5 lessons and instructed to complete 1 lesson of their choice everyday for 3 weeks (having choice, like PPI group, decreased chance that availability of choice itself impacted well-being)
  - participants also asked to complete each lesson twice in 3-week period (like PPI)
- *compliance*: compliance not specified; participants who miss 3 daily lessons, either consecutively or in total, are disqualified from the study
- *integrity of delivery*: not specified
- *economic information*: for complete participation: students' ASU student identification cards loaded with USD 30; for participation, participants enter into raffle for a chance to win 1/10 USD 25 gift cards; fitness fees (usually USD 25) waived to encourage participants' usage without incurring costs
- *theoretical basis*: resources for this group intentionally gathered from various sources; information in lessons from available resources on wellness from the university's various service units (ASU Wellness and the Educational Resources from the Patient Portal)

Control: wait-list control (n = 78)

- *description*: After the follow-up tests, participants informed that they were in the control condition and offered the chance to participate in either the PPI or Informative Stress group protocols (4 interested).
- *compliance*: not specified
- *economic information*: for complete participation: students' ASU student identification cards loaded with USD 30; for participation, participants enter into raffle for a chance to win 1/10 USD 25 gift cards; fitness fees (usually USD 25) waived to encourage participants' usage without incurring costs

Outcomes

Outcomes collected and reported:

- perceived stress - GSI-R
- perceived stress, academic stress/academic responsibility - GSI-R
- perceived stress, family/monetary stress/family and financial responsibilities - GSI-R
- perceived stress, environmental stress/university environment - GSI-R
- happiness - Steen Happiness Index
- resilience - RSA
- resilience, perceptions of self - RSA
- resilience, perceptions of future - RSA
- resilience, structured style - RSA
- resilience, social competence - RSA
- resilience, family cohesion - RSA
- resilience, social resources - RSA

Time points measured and reported: 1) pre-intervention; 2) post-intervention; and 3) 3-month follow-up (3 months post-intervention)

Adverse events: not specified

Notes

Contact with authors: We contacted the authors for the subgroup data (means and SDs for all outcomes) for graduate students in Health & Wellness and Social & Behavioral Sciences (Yeghnazar 2019 [pers comm]). Subgroup data were not available until writing of the review

Study start/end date: June – September 2016 (recruitment in Spring 2016; intervention period from 1 June 2016 to 21 June 2016; 3-month follow-up in September 2016)
Funding source: study financially supported by the Graduate and Professional Student Association (GPSA)
Declaration of interest: not specified

Venieris 2017 *(Continued)*

Ethical approval needed/obtained for study: IRB approval (ASU IRB STUDY00004364)
Comments by study authors: not relevant
Miscellaneous outcomes by the review authors: dissertation
Correspondence: Pauline Venieris; now: Pauline Yeghnazar Peck (www.therapywithpauline.com/contact); pauline.yeghnazar@gmail.com; chair of dissertation: Prof Richard Kinnier; Counseling and Counseling Psychology Department; Arizona State University, EDB 446G Counseling and Counseling Psychology TEMPE, Arizona State University; kinnier@asu.edu

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "The 234 participating students were randomly assigned to the three conditions (PPI, informative stress, and wait list) using an online random assignment generator." Quote: "There were no significant differences between the three groups at pretest. No significant differences were found between the treatment groups on any of the covariates, ensuring that the sample sorted evenly into the three treatment groups on the variables used in these analyses." Judgement comment: The investigators describe a random component in the sequence-generation process (online random assignment generator).; verified baseline comparability of groups for sociodemographic characteristics (all Ps > 0.172) and outcome variables (GSIR, SHI, RSA; all Ps > 0.119) on the basis of analysis (see Appendix P, Table 1)
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	Unclear risk	Quote: "While not specifically told about the number and nature of the three treatment conditions, the form stated that they may or may not be asked to participate in different activities (e.g., exercising, journaling). They were informed that while this was a mostly online study, that they may be asked to attend one of the four campus locations twice throughout the three-week period. " Quote: "Each group, which consisted of 85 students, was emailed separately to inform them of the study start date (June 1, 2016) and to review what they would be asked to do." Judgement comment: blinding of participants probably ensured (participants not specifically told about number/nature of 3 conditions; only informed that they may or may not be asked to participate in different activities, e.g. exercising, journalling); insufficient information about blinding of study personnel (interventions delivered by online educational system)
Blinding of outcome assessment (detection bias) Subjective outcomes	Unclear risk	Judgement comment: insufficient information about blinding of outcome assessment to permit judgement of 'Low risk' or 'High risk' (online surveys)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Most of the students who dropped out of the study were in the treatment conditions, suggesting that those groups were most impacted by the timing of this study." Quote: "At the three-month follow-up, 117 students participated (27% attrition from post-test and 50% attrition from pre-test), and were included in the follow-up analyses" Quote: "At the end of the three-week period, 160 students completed the post-test (32% attrition) and were included in the post-test analyses."

Venieris 2017 *(Continued)*

		Quote: "Thus, 234 participants began the study on the first day." Quote: "Complete participation for the control group meant taking pre-test and post-test surveys." Quote: "Complete participation for the experimental and comparison groups meant taking pre-test and post-test surveys as well as completing the daily activities for 21 days (and not missing more than 3 days consecutively or overall)." Judgement comment: reasons for missing data likely to be related to true outcome with imbalance in missing data between groups (lost to follow-up: post-intervention: IG1: 28, IG2: 38; CG: 8; follow-up: IG1: 13 further lost to follow-up; CG: 33 further lost to follow-up; see Appendix E, Table 1); reasons for missing data not provided (for each group); probably per-protocol analysis (i.e. only participants who missed fewer than 3 daily assignments consecutively or overall in 2 IGs) and available-case analysis (only participants who took pre-test and post-test surveys)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified (see Appendix Q, Table 2)

Victor 2018

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** Sample size was calculated a priori using the software G* Power using an expected effect of d = 0.30 and was set to n = 54 participants in total. Based on the assumption of 40% dropouts and exclusions, 30 participants per group or n = 90 in total were sought **Imputation of missing data:** per-protocol analysis (i.e. only participants who completed the intervention) and available-case analysis (i.e. only participants for whom outcomes were obtained and who completed post-test assessments) AND intention-to-treat analysis (ITT) based on 85 participants; last observation carried forward (LOCF) for 5 participants with missing post-test assessments; 4 participants with missing pretest assessments could not be considered in ITT analysis
Participants	**Country:** Germany **Setting:** intervention offered at psychiatric outpatient department of university Witten/Herdecke **Age:** mean = 22.85 (SD = 2.49) years **Sample size (randomised):** 89; exclusion of 24 students not fulfilling the inclusion criteria AFTER the intervention period due to ethical reasons; including 43 psychology students (28 in 2 groups relevant for this review) **Sex:** 42 women, 15 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** all participants with Global Severity Index (GSI) value in the Brief Symptom Inventory-18 (BSI-18) ≥ 4 (above cut-off for symptom burden); BSI-18 GSI: IG 9.95 (5.56), CG1: 11.22 (6.08), CG2: 12.74 (8.35) **Population description:** university students (including psychology students) **Inclusion criteria:** symptom burden in the Brief Symptom Inventory (BSI-18) GSI ≥ 4 at pretest (i.e. above cut-off estimated in non-clinical sample in global GSI (M = 3.87); see Spitzer et al 2011) **Exclusion criteria:** 1) psychosis; and 2) suicidality

Victor 2018 *(Continued)*

Attrition (withdrawals and exclusions):

- exclusions after randomisation: 24 exclusions in general since inclusion criteria not fulfilled;
- did not start intervention/waiting period as randomised: IG: 0, CG1: 1; CG2: 3 withdrawals
- withdrawals during intervention/waiting period: IG: 2; CG1: 0; CG2: 0
- lost to follow-up at post-intervention assessment (i.e. did not complete the assessment): IG: 0; CG1: 0; CG2: 2

Reasons for missing data:

- for 24 participants excluded after randomisation: inclusion criteria not fulfilled
- for 1 withdrawal in CG1 and 3 withdrawals in CG2 after randomisation: reasons not specified
- for 2 withdrawals in IG during intervention: lack of time
- for 2 lost to follow-up: reasons not specified

Interventions

Intervention: Personal Model of Resilience (PRM) (n randomised not stated; n = after exclusion of 24 students not fulfilling the criteria: 22)

- *delivery*: face-to-face; individual setting; worksheets
- *providers*: 6 trained and supervised master-level students of university of Witten/Herdecke as coaches
- *duration of treatment period and timing*: 3 week-intervention with 3 x 90-minute consultations/coaching sessions
- *description*:
  - resilient emotions, thoughts, metaphors, images and behaviours are activated in 4 steps or 3 sessions (work sheets translated based on workshop material of Padesky 2012)
  - SESSION 1: SEARCH FOR RESILIENCE (“Resilienzsuche"):
    - To begin, participants are taught that every person, even with big problems, is resilient in certain areas, i.e. pursues certain projects despite of adversities
    - Resource areas are activated where the participant cultivates hobbies or things that are part of his/her life in a positive way (e.g. cultivate friendships); in this way, positive emotions are activated
    - CREATING A PRM: in the context of a selected resilience area, resilient behaviours are worked out: How did the participant cope with adversities in order to maintain the resource area or to develop him/herself? Typical resilience strategies that are used over different situations are worked out (e.g. ask for support, flexibility, optimism) and summarised in the PRM
    - PRM includes all relevant strategies at the level of behaviour, automatic thoughts, attitudes and metaphors/images; homework: participant checks his/her strategies in daily life and supplements them
  - SESSION 2: APPLICATION IN PROBLEM AREA:
    - resilience model is discussed and supplemented; identification of problem areas; resilience strategies from the PRM are considered if they are helpful for the problem area or how they can be adapted to the problem area; development of behavioural experiments on the resilience strategies
    - preparation of conducting the behavioural experiments as homework
  - SESSION 3: EVALUATION & TRANSFER:
    - behavioural experiments are discussed; strategies of PRM are transferred to other difficult situations and participants are supported to systematically use their resilience strategies
- *compliance*: 2/22 participants withdrew from the intervention (lack of time)
- *integrity of delivery*: integrity of delivery not specified; supervision for coaches
- *economic information)*: financial recommendation was not advertised for the study; psychology students received credit points (Versuchspersonenstunden); PRM represents an economic and strengths-based alternative to problem-focused counselling for students
- *theoretical basis*: combined intervention;
  - strength-based cognitive behavioural therapy
  - based on PRM (Padesky 2012): basis of cognitive therapy and positive psychology, focus is on explicitly using existing resources and resilience strategies

Victor 2018 *(Continued)*

Control 1: attention control (ABC model)**(relevant for this review)** (n randomised not stated; n = after exclusion of 24 students not fulfilling the criteria: 19)

- *delivery*: face-to-face; individual setting
- *providers*: 6 trained and supervised master-level students of university of Witten/Herdecke as coaches
- *duration of treatment period and timing*: 3 week-intervention with 3 x 90-minute consultations/coaching sessions
- *description*:
  - analogous to PRM: 4 steps or 3 sessions
  - SESSION 1: WORK OUT ABC (Activating event, Beliefs, Consequences) MODEL:
    - association between activating event (A), appraisal/thoughts (B) and consequences for feelings and behaviour (C) is explained
    - Problem areas are collected and prioritised. For 1 difficult situation in the problem area, the activating situation (A) and consequences (C) are explored and dysfunctional thoughts (B) are worked out according to the ABC model
    - CHALLENGING DYSFUNCTIONAL THOUGHTS: Using socratic dialogue, dysfunctional thoughts are disputed and alternative thoughts are identified. Homework: participants asked to analyse further situations in the problem area and to develop more helpful thoughts
  - SESSION 2: TESTING ALTERNATIVE THOUGHTS:
    - dysfunctional thoughts from daily life are disputed in more depth and new situations are analysed according to ABC model
    - dysfunctional thoughts for more activating situations are identified, disputed and functional thoughts are developed
    - homework: participants asked to test more helpful thoughts in daily life, to practise and to evaluate them
  - SESSION 3: GENERALISED APPLICATION OF ABCs: Through the analysis of further problem areas, participants are encouraged to generalise functional thoughts
- *compliance*: 1/19 participants withdrew after randomisation (i.e. did not begin the intervention); remaining 18 participants completed the intervention
- *integrity of delivery*: integrity of delivery not specified; supervision for coaches
- *economic information:* financial recommendation was not advertised for the study; psychology students received credit points (Versuchspersonenstunden)
- *theoretical basis*: cognitive behaviour therapy, specifically ABC model (Ellis 1991)

Control 2: wait-list control (n randomised not stated; n = after exclusion of 24 students not fulfilling the criteria: 24)

- *compliance*: 3/24 participants did not start the waiting period; of the remaining 21 participants, no-one withdrew during the waiting period
- *economic information:* financial recommendation was not advertised for the study; psychology students received credit points (Versuchspersonenstunden)

Outcomes

Outcomes collected and reported:

- psychopathology - BSI-18
- self-esteem - RSES
- incongruence - K-INK incongruence questionnaire
- depression - BDI-II
- resilience - RS

Time points measured and reported: 1) pre-intervention; 2) 3-week follow-up (3 weeks post-intervention)

Adverse events: no systematic assessment of adverse events; but no negative effects mentioned by participants in verbal feedback

Victor 2018 *(Continued)*

Notes	**Contact with authors:** We contacted the authors for subgroup outcome data of psychology students (i.e. means and SDs for all outcomes reported in Table 2 with the number of participants analysed) (Victor 2019 [pers comm]). **Study start/end date:** not specified **Funding source:** not specified **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** study was positively evaluated by the IRB of the university Witten/Herdecke **Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** article in German (translated); subgroup outcome data for psychology students sent from authors **Correspondence:** Dr Philipp Victor; Department of Psychology and Psychotherapy, University Witten/Herdecke, Alfred-Herrhausen-Straße 44, 58448 Witten; philipp.victor@uni-wh.de

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Die Intervention (PRM) wurde im randomisierten kontrollierten Prä-Post-Design mit einer aktiven KVT-Vergleichsintervention (ABC) und einer Wartekontrollgruppe (WKG) evaluiert." ["The intervention (PRM) was evaluated in a randomised controlled pre-post design with an active CBT control condition (ABC) and a waitlist control group (WKG)."] Quote: "Teilnehmende wurden auf Basis einer zufallsgenerierten Liste in Reihenfolge ihrer Teilnahme-zusage einer Bedingung zugeordnet."; ["Based on a randomly generated list, participants were assigned to conditions in order of their confirmation to participate in the study."] Quote: "Vor Beginn der Intervention bzw. der Wartezeit unterschieden sich die drei Gruppen in ANOVAs auf keiner Evaluationsdimension."; ["Before the beginning of the intervention or the waiting period, the three groups did not differ in any dimension of evaluation in ANOVAs."] Quote: "Zwischen den Interventionsgruppen bestanden Prä keine signifikanten Unterschiede in Alter, Geschlecht, vorangegangener psychotherapeutischer Behandlung, Studiengang, Semesteranzahl (Tabelle 1) oder einem der eingesetzten Messinstrumente (Tabelle 2)."; ["At pretest, there were no significant differences between the groups in age, gender, previous psychotherapeutic treatment, studies or number of semesters (Table 1) or any of the used assessment instruments (Table 2)."] Judgement comment: investigators describe a random component in the sequence-generation process (random list); verified baseline comparability of groups for sociodemographic characteristics (age, gender, previous treatment, studies, semester; all Ps > 0.21) and outcomes of interest on the basis of analysis
Allocation concealment (selection bias)	Unclear risk	Judgement: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment (online survey); but due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to

Victor 2018 *(Continued)*

		questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Abbildung 1. CONSORT Flussdiagramm. Persönliches Resilienzmodell (PRM), ABC-Modell (ABC), Wartekon- trollgruppe (WKG)."; ["Figure 1. CONSORT Flow chart. Personal model of resilience (PRM), ABC model (ABC), waitlist control (WKG)."] Quote: "89 Studierende interessierten sich für die Studie und wurden den drei Bedingungen PRM, ABC oder WKG zugelost. 85 begannen die erste Online-Messung und stimmten Teilnahme und Datenauswertung zu. 4 brachen bereits nach der Randomisierung ab, 3 davon in der WKG."; ["89 students were interested in the study and were randomized to the three conditions PRM, ABC and WKG. 85 began the first online assessment and consented to participate in the study and the data processing. 4 withdrew after randomization, 3 of them in the WKG."] Quote: "61 Studierende wiesen Prä eine Symptombelastung von BSI-18 GSI ≥ 4 auf; 57 nahmen an der Post-Messung teil und wurden in die Analyse einbezogen (Completer)."; ["At pretest, 61 students had a symptom burden of ≥ 4 in the BSI-18 GSI (--> were included in the study); 57 took part in the posttest assessment and were considered in the analysis (completers)"] Quote: "Dropouts wurden mit Completern hinsichtlich demographischer und testpsychologischer Kennwerte verglichen. Eine Intention-to-treat-Analyse wurde mittels ANCOVAs analog der oben beschriebenen Systematik für die Gesamtstichprobe durchgeführt; bei fehlenden Post-Messungen wurde jeweils der Prä-Wert fortgeschrieben (LOCF)."; ["Dropouts were compared with completers concerning demographic and psychological measures. Analogous to the description above, an intention-to-treat analysis using ANCOVAs was performed for the total sample; in case of missing posttest values, the corresponding pretest value was used (LOCF)."] Judgement comment: reasons for missing data likely to be related to true outcome with (slight) imbalance in missing data between groups (PRM: 2 withdrew from the intervention due to lack of time; ABC: 1 withdrew after randomisation (reasons unknown); WKG: 3 withdrew after the randomisation, 2 did not complete post-test assessment); per-protocol analysis (i.e. only participants who completed the respective intervention; "completers") and available case analysis (only participants for whom outcomes were obtained at post-test) + intent-to-treat analysis (with last observation carried forward method)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Waddell 2005

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified

Waddell 2005 *(Continued)*

Participants	**Country:** Canada **Setting:** baccalaureate nursing program in an urban university **Age:** range = 20-40 years **Sample size (randomised):** 25 **Sex:** not specified for total sample **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** students from the second and third years of a basic baccalaureate nursing program **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** after phase 1: n = 5 dropouts (IG: 4/14 (28.6%); CG: 1/11 (9.1%)) **Reasons for missing data:** academic and family life demands (n = 5)

Interventions	**Intervention:** career planning and development programme (n = 14)
	
	• *delivery*: phase 1: face-to-face; group sessions (workshop) + career planning and development book in addition to student career planning and development workbook folder; phase 2: face-to-face group sessions; individual career coaching is offered
	• *providers*: not specified
	• *duration of treatment period and timing*: phase 1: single 3-hour workshop; phase 2: 2 3-hour working sessions and individual coaching offered
	• *description*:
	  ◦ phase 1: introduction to Donner and Wheeler's career planning and development model, which was adapted for use with nursing students
	  ▪ PHASE: SCANNING YOUR ENVIRONMENT: foundation of career-planning process; activity to become better informed and see the world through differing perspectives; taking stock of the world in which you live; understanding current realities in your country, health care system, and work environment as well as future trends at global, national, and local levels within and outside of health care and the nursing profession
	  ▪ PHASE: SELF-ASSESSMENT AND REALITY CHECK: identifying your values, experiences knowledge, strengths and limitations; key to exploring new opportunities; together with environmental scan helps you to identify future directions; reality check allows you to seek validation of your self-assessment and expand your view of yourself
	  ▪ PHASE: CREATING YOUR CAREER VISION: exploring possibilities guided by your environmental scan and self-assessment; vision of your potential future; focus on what is possible and realistic for you in both the short and long-term; link between who you are and who you can become
	  ▪ PHASE: STRATEGIC CAREER PLAN: formulating a blueprint for action; specifying the activities, timespan and resources you need to help you achieve your goals and career vision
	  ◦ phase 2: career planning and development model introduced in phase 1 is explored in further depth and applied to the intervention group's current academic setting and professional experiences; individual career coaching is offered to participants
	• *compliance*:
	  ◦ n = 4 dropouts after phase 1 (academic and family life demands)
	  ◦ phase 2: no participants request individual career coaching during course of study
	  ◦ after end of project: 5 of 10 participants in IG asked for and received individual coaching
	• *integrity of delivery*: not specified
	• *economic information*: not specified for intervention; focus group participants were paid CAD $35.00 honorarium

Waddell 2005 *(Continued)*

- *theoretical basis*: based on Career Planning and Development Model (Donner 1998)

Control: no intervention (n = 11). Participants in CG offered CPD program at completion of phase 2; at that time, they also received career planning and development book with student career planning and development workbook folder

- *compliance*: n = 1 dropout after phase 1 (academic and family life demands)

Outcomes	**Outcomes collected and reported:** • career planning activities, career vision - CPAM • career planning activities, self-assessment - CPAM • career planning activities, scanning the environment - CPAM • career planning activities, strategic career planning - CPAM • career decision-making, self-efficacy - Career Decision-Making Self-Efficacy Scale Short Form **Time points measured and reported:** 1) pre-intervention (pre-test of phase 1); 2) during intervention (within 2 weeks after intervention in phase 1); 3) during intervention (pre-test of phase 2); and) 1-month follow-up (1-month after intervention in phase 2, i.e. 1 month after total intervention) **Adverse events:** not specified
Notes	**Contact with authors:** no correspondence required **Study start/end date:** phase 1: during fall 1999/2000 academic year; phase 2: 2000/2001 academic year **Funding source:** not exactly specified; probably also by scholarship of Gail J Donner and Mary M Wheeler (donnewheeler) **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** approved by the university ethics review board at the study site **Comments by authors:** not relevant **Miscellaneous outcomes by the review authors:** not relevant **Correspondence:** Janice Waddell, RN, PhD; Department of Nursing, Ryerson University, 350 Victoria Street, Toronto, Ontario M5B 2K3, Canada; jwaddell@ryerson.ca

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "All participants in Phase One were invited to continue their involvement in Phase Two, with the understanding that participants would remain in the group (intervention/control) to which they were originally randomly assigned." Quote: "The self-selected participants from the initial randomized group were then randomly assigned to control or intervention groups." Quote: "No significant differences in career planning activities and career decision-making were found between the control and intervention groups before the career planning and development program intervention was introduced." Judgement comment: insufficient information about random sequence generation to permit judgment of 'Low risk' or 'High risk'; verified baseline comparability of groups for outcomes of interest on the basis of analysis; baseline comparability for sociodemographic characteristics unclear

Waddell 2005 *(Continued)*

Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgment of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (large part of intervention is face-to-face) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; however, due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Quote: "All participants in Phase One were invited to continue their involvement in Phase Two, with the understanding that participants would remain in the group (intervention/control) to which they were originally randomly assigned. Of the 25 original participants, 5 students dropped out of the study citing academic and family life demands. The remaining 20 participants (10 in each group) requested to continue their study involvement for the 2000/2001 academic year." Quote: "After the end of the project and the academic term, however, 5 of the 10 (3 third-year and 2 fourth-year students) intervention group participants" Quote: "All Phase One and Two participants completed and returned their questionnaires." Judgement comment: reasons for missing data unlikely to be related to true outcome (imbalance in missing data between groups: after phase 1: n = 5 dropouts in total; IG: n = 4; CG: n = 1; but see reasons for missing data: family and academic life demands); not clearly specified how many participants were analysed (phase 2 post-test)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Waddell 2015

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** no imputation of missing data; not specified if attrition from intervention or lost to assessments; probably per-protocol analysis (only participants who took part in allocated intervention) and available-case analysis (only participants for whom outcomes were obtained)
Participants	**Country:** Canada **Setting:** collaborative baccalaureate nursing degree programme at academic sites (2 colleges, 1 university site)

Waddell 2015 *(Continued)*

Age: range = 18 - 22 years

Sample size (randomised): 142 (recruited in 2 cohorts in year 1, n = 120, and beginning of year 3, n = 22)

Sex: not specified; most of analysed sample was female

Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline: not specified

Population description: nursing students in a collaborative baccalaureate degree program

Inclusion criteria: not specified

Exclusion criteria: not specified

Attrition (withdrawals and exclusions): probably attrition of n = 70 participants over study course (not specified which group)

Reasons for missing data: CG: probably information about assignment to control group; IG: probably due to time commitment; most students withdrew in year 2,which is considered by students and faculty to be most demanding and difficult

Interventions

Intervention: career planning and development (CPD) programme (n not specified; for 72 participants analysed: n = 33)

- *delivery*: face-to-face; group sessions (workshop)
- *providers*: 3-hour workshop by principal investigator (PI) who is an experienced career coach; faculty study participants with training and expertise in career coaching guide and structure the discussions; coaches debriefed following each workshop to ensure consistency in approach to workshop facilitation
- *duration of treatment period and timing*:
  - 3 years
  - 3-hour workshop in first term of year 2 of the 4-year BScN academic programme
  - 3-hour, year-specific workshop sessions at beginning of each academic term in programme years 2 - 4, respectively (6 intervention sessions, 18 hours in total)
- *description*:
  - INTRODUCTION WORKSHOP: introduction to CPD model
  - 6 x YEAR-SPECIFIC WORKSHOP SESSIONS: guided career-visioning exercise at the beginning of each session in which students are asked to imagine the “perfect day” in their “perfect career”; participants encouraged to give themselves the freedom to dream and imagine what is possible
  - With their career vision in mind, participants complete a self-assessment focused on (a) the values embedded in their vision that they determine to be most significant, (b) the areas of strength they believe they possess in relation to the professional competencies required to “live” their vision, and (c) the areas they need to develop in terms of the professional competencies necessary to progress toward their vision
  - Participants then discuss specific career goals arising from their vision that would guide them to shape their academic work in the coming term to build on their strengths and work on identified areas for development. Finally, participants create a career plan that outlines activities, resources, timelines, and indicators of success for each of their identified career goals
  - Marketing strategies in general and in relation to participants’ career goals and plans are discussed in each intervention session; participants explore who and what within their programme could help them actively participate in, and shape the curriculum to achieve their goals
  - They also investigate which marketing strategies would help them articulate their overall career vision and specific term goals to faculty, preceptors, peers, and mentors
  - CPD model is applied consistently across years of the programme and is responsive to established year-specific curricular focus and student experiences within the programme year: curriculum foci for years 2 - 4 are: knowledge of self in the context of health; knowledge of others in the context of illness; knowledge of community in the context of primary health care; and integration of profes-

Waddell 2015 *(Continued)*

sional self into the healthcare system; different year-specific foci help participants tailor the programme and activities to their evolving needs and the academic context in each term

- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: based on a standardised, multi-component CPD model (Waddell 2009)

Control: TAU (standard undergraduate curriculum group) (n not specified; for 72 participants analysed: n = 39)

- *delivery*: not specified
- *providers*: not specified
- *duration of treatment period and timing*: not specified
- *description*:
  - Participants in CG are offered CPD programme along with individual career coaching after 4 years of their academic programme and after 12-month follow-up in IG
  - BUT: Specific and limited elements of the CPD Model (career vision and career plan) were integrated into Year 3 of the programme within a nursing leadership course
  - In year 4, a similar CPD assignment targeting the career vision and plan components of the CPD model was added to a professional issues and trends course. In order not to jeopardise study integrity, faculty teaching in year 3 and year 4 courses should refer students to the student guide *Building Your Nursing Career: A Guide for Students* (Waddell 2009) as a resource, but would not include the teaching of CPD in the content of classroom discussions; i.e. brief introduction to these elements of the CPD model distinctly different in scope and breadth from the 6-session interactive CPD programme in IG
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: not specified

Outcomes	**Outcomes collected and reported:** • career planning activities, total score - CPAM • career planning activities, career visioning - CPAM • career planning activities, self-assessment - CPAM • career planning activities, environmental scan - CPAM • career planning activities, career plan - CPAM • career planning activities, marketing - CPAM • career decision-making, self-efficacy - CDMSES-SF • total score career planning activity and self-efficacy - CPAM and CDMSES-SF **Time points measured and reported:** 1) pre-intervention (year 2 of baccalaureate programme, prior to randomisation); 2) during intervention, year 3 of baccalaureate programme; 3) post-intervention, year 4 of baccalaureate programme; and 4) 12-month follow-up (12 months post-intervention/after baccalaureate programme); 4) presented in 2nd report **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors for the number of participants randomised to each group and whether there were 70 missing, but they had not responded at the time of writing this review **Study start/end date:** not specified **Funding source:** funding support by Social Sciences and Humanities Council **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** research ethics board approval

Waddell 2015 *(Continued)*

Comments by authors: not relevant

Miscellaneous outcomes by the review authors: Waddell 2015 is the first of 3 reports on this study; besides this 1st report on the undergraduate student outcomes of the programme, 2nd paper will examine graduate nurses' experiences at 12 months post-graduation, 3rd paper will explore faculty outcomes for those participating in the programme

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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Eligible students who consented to participate were randomly assigned by means of a random numbers chart with allocation concealment, to one of two conditions: (a) a 4-year CPD group (intervention) or (b) a 4-year standard undergraduate curriculum group (control)." Quote: "There were no significant group differences in terms of marital status (majority were single), number of children (majority were childless), registration with the Registered Nurses Association of Ontario (majority were not members), or employment status. Finally, there were no significant group differences in terms of previous CPD training/ involvement outside of this study (most respondents reported no previous engagement in CPD activities)." Quote: "Mean career scores, including total scores (p = 0.002) and subscale scores, were higher for all intervention participants except at Time 1 (when baseline scores for the initial 142 participants were gathered prior to randomization where there were no significant between group differences)." Judgement comment: investigators describe a random component in the sequence-generation process (random-numbers chart); verified baseline comparability of groups for sociodemographic characteristics and outcome variables on the basis of analysis (mean career scores refers to total score of CPD activities and self-efficacy as well as subscales in Table 1)
Allocation concealment (selection bias)	Unclear risk	Quote: "Eligible students who consented to participate were randomly assigned by means of a random numbers chart with **allocation concealment**, to one of two conditions: (a) a 4-year CPD group (intervention) or (b) a 4-year standard undergraduate curriculum group (control)." Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'; unclear if random-sequence generation was concealed from personnel or participants, or both; exact method not described
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Quote: "A large number of those randomized into the control group dropped out of the study after completing the pre-study measures and being informed of their assignment to the control group." Judgement comment: no blinding of participants and personnel (face-to-face intervention; CG participants were informed of being in the control group) and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; but due to performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)

Waddell 2015 *(Continued)*

Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "One hundred and twenty students in their first year in the program consented to participate (Cohort # 1). Due to participant attrition in Year 2 of the program, a second recruitment phase was undertaken as the Year 2 cohort was beginning the third year of their program." Quote: "A final sample size, after accounting for attrition, was an additional 22 participants (Cohort # 2) for a total of 142 participants entering the third year of the program." Quote: "The final sample for quantitative data analysis consisted of 50 participants from Cohort #1 (Intervention = 29, Control = 21) and 22 participants from Cohort #2 (Intervention = 4, Control = 18) for a total of 72 participants, 33 of whom were in the intervention group and 39 in the control group." Quote: "large number of those randomized into the control group dropped out of the study after completing the pre-study measures and being informed of their assignment to the control group." Quote: "The time commitment involved may have been a major factor that contributed to attrition in the intervention group. These participants were required to attend one 3-hour CPD workshop per term, per program year. The majority of students who withdrew from the study during its first year were in Year 2, which is considered by students and faculty to be the most demanding and difficult, as students' clinical hours increase to 11 per week in addition to five classroom or online courses per term." Judgement comment: insufficient information about attrition/exclusions (number of participants randomised to each group not stated; number of attrition per group not specified; not specified if attrition from intervention or lost to assessments); probably per-protocol analysis (only participants who took part in allocated intervention) and available-case analysis (only participants for whom outcomes were obtained) since only 72 participants were analysed
Selective reporting (reporting bias)	Unclear risk	Judgement comment: no study protocol available; published report seems to include all expected outcomes, including those that were prespecified; unclear if Time 4 refers to 12-month follow-up since not further specified in text

Wang 2012

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified **Imputation of missing data:** no imputation of missing data; per-protocol analysis (only participants who took part in intervention)
Participants	**Country:** China **Setting:** students from medical university; setting of training not specified **Age:** mean = 20.45 (SD = 0.97) years **Sample size (randomised):** 70

Wang 2012 *(Continued)*

Sex: 40 women, 28 men

Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline: Symptom Checklist (SCL-90) subscales: somatisation: IG: 1.58 (0.41), CG: 1.55 (0.38); obsessive-compulsive: IG: 2.72 (0.38), CG: 2.55 (0.48); interpersonal sensitivity: IG: 2.32 (0.51), CG: 2.17 (0.46); depression: IG: 2.06 (0.42), CG: 2.10 (0.52); anxiety: IG: 2.00 (0.38), CG: 2.02 (0.43); hostility: IG: 1.81 (0.47), CG: 1.84 (0.51); phobic anxiety: IG: 1.84 (0.63), CG: 1.71 (0.46); paranoid ideation: IG: 1.79 (0.42), CG: 1.90 (0.41); psychoticism: IG: 1.78 (0.32), CG: 1.82 (0.28); other symptoms: IG: 1.95 (0.53), CG: 1.83 (0.47); Global Severity Index: IG: 179.70 (19.70), CG: 176.70 (23.00)

Population description: students (freshman and sophomores) with mental crisis from medical university

Inclusion criteria: participants with psychoticism factor > 2.2 in SCL-90

Exclusion criteria: not specified

Attrition (withdrawals and exclusions): 2 dropouts (did not participate); unclear which group

Reasons for missing data: not specified

Interventions

Intervention: positive psychology-oriented group counselling (n = not specified; of 68 analysed participants: n = 33)

- *delivery*: face-to-face (structured leader-led) group counselling sessions (4 groups in total with 8 - 9 participants); theoretical presentations and practical activities; daily diary
- *providers:* researchers themselves are group leaders; researchers are qualified as counsellors and have received training from relevant groups
- *duration of treatment period and timing*: 6 weekly 2½-hour sessions; participants required to have a diary during study period
- *description*:
  - focus on positive cognition, emotional training and practical problem-solving
    - In the aspect of CULTIVATING POSITIVE COGNITION, it mainly touches the students' perceptions through theoretical introduction, role-playing, self-confidence training and post-event summary
    - In terms of CULTIVATING POSITIVE EMOTIONS, through warm-up activities, relaxation meditation, etc. students create a positive and pleasant atmosphere
    - in the SOLUTION OF PRACTICAL PROBLEMS, use games or stories to clarify the truth, and guide students to apply by arranging tasks or case reproductions; students encouraged to expose their own problems and get support and help from their peers in the group
  - In order to improve the effectiveness of group coaching, participants are required to record daily positive awareness, experience or related events through a diary during the study period
  - INTERVENTION THEMES: each activity organised around a theme; specific activities include: walking close to the sunshine (acquaintance and support, basic concepts of positive psychology); letting go of the past (gratefulness, forgiveness); let the future come (belief, hope, realistic optimism); enjoy the present (inputting life, accepting self); changing (ABC theory, procrastination theory); happiness upgrading (summary, future plan-sharing and parting)
- *compliance*: not specified
- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: based on positive psychology; based on concept of active psychotherapy and applied research, combined with theoretical presentations and practical activities, focusing on positive cognition, emotional training and practical problem-solving

Control: not specified (n = not specified; of 68 analysed participants: n = 35)

Outcomes

Outcomes collected and reported:

- somatisation - SCL-90
- obsessive-compulsive - SCL-90

Wang 2012 *(Continued)*

- interpersonal sensitivity - SCL-90
- depression - SCL-90
- anxiety - SCL-90
- hostility -SCL-90
- phobic anxiety - SCL-90
- paranoid ideation - SCL-90
- psychoticism - SCL-90
- other symptoms (sleep and diet) - SCL-90
- Global Severity Index (GSI) - SCL-90
- well-being/happiness - General Well-Being Schedule
- resilience - Resilience Scale for Chinese Adolescents

Time points measured and reported: 1) pre-intervention (1 week before start of intervention); 2) post-intervention ; and 3) 3-month follow-up (3 months post-intervention)

Adverse events: not specified

Notes

Contact with authors: no correspondence required

Study start/end date: not specified

Funding source: not specified

Declaration of interest: not specified

Ethical approval needed/obtained for study: not specified

Comments by authors: not relevant

Miscellaneous outcomes by the review authors: article in Chinese (translated)

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Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "在检出的本科生中,遵循自愿招募的原则,经简 短访谈后纳入团体。鉴于团体干预的适应性,排除症 状自评量表中精神病性因子大于 2.2 的成员,最终选 取大一、大二学生 70 名,随机分配到试验组和对照组" ["In view of the adaptability of group intervention, members with a psychotic factor greater than 2.2 in the self-rating scale of the exclusion syndrome were selected, and 70 freshmen and sophomores were selected and randomly assigned to the experimental group and the control group."] Quote: "全程有效参与干预的学生共 68 名,其中试验组 33 名, 男 12 名,女 21 名,年 龄(20.4±1.09)岁,对 照 组 35 名,男 16 名,女 19 名,年龄 20.5±0.85)岁,两组间年 龄、性别、专业等基本情况经分析差异无统计学意义P>0.05)" ["A total of 68 students participated in the intervention, including 33 experimental groups, 12 males and 21 females, aged (20.4±1.09) years old, 35 in the control group, 16 males and 19 females, aged 20.5±0.85). At the age of the two groups, the differences in age, gender, and specialty between the two groups were not statistically significant (P>0.05)"] Quote: "3.1 两组间测量指标的基线比较 干预前两组各 项指标平衡,均无统计学意义(P>0.05)" ["3.1 Baseline comparison of measured indicators between the two groups. There was no statistically significant difference between the two groups before the intervention (P>0.05).]

Wang 2012 *(Continued)*

		Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk'; verified baseline comparability of groups for sociodemographic characteristics and outcomes of interest on the basis of analysis
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) Subjective outcomes	High risk	Judgement comment: blinding of participants and personnel probably not done (face-to-face intervention) and outcome is likely be related to true outcome
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Judgement comment: insufficient information about blinding of outcome assessment; but due to potential performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Judgement comment: number of participants randomised to each group not specified, unclear in which group dropout of 2 occurred; per-protocol analysis (only participants who participated in the study)
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol available but it is clear that the published reports include all expected outcomes, including those that were prespecified

Warnecke 2011

Study characteristics	
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** target sample size for the trial was 42 students per group (control and intervention); This number is based on data from a previous study of university students, which found a mean pre-test PSS score of 18.11 (SD 6.19). These data are consistent with findings from the small unpublished pilot trial undertaken in our cohort last year. The trial was powered to detect a 4-point difference (SD 0.6) in PSS score, using a 2-tailed test, α = 0.05 and power = 0.80, and allowing for a 10% dropout rate. The cohort from which we recruited our participants numbered 194 students **Imputation of missing data:** no imputation of missing data specified (missing data treated as absent and were not assigned a score; no participants excluded from analysis); according to authors intention-to-treat analysis; based on outcome data received from authors (24 analysed in IG, 32 analysed in CG): available-case analysis
Participants	**Country:** Australia **Setting:** guided mindfulness practice using CD; home setting **Age:** mean = 23.92 (SD = 3.2) years **Sample size (randomised):** 66 **Sex:** 42 women, 24 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** • depression ((DASS); maximum score: 42): IG: 6.9 (7.0), CG: 5.5 (5.6); anxiety (DASS; maximum score: 42): IG: 8.1 (6.5), CG: 6.3 (6.9); stress (DASS; maximum score: 42): IG: 14.3 (8.7), CG: 12.3 (6.6); PSS (maximum score: 40): IG: 16.5 (6.5), CG: 15.0 (4.8)

Warnecke 2011 *(Continued)*

- all participants screened for psychological distress using Kessler Psychological Distress Scale (K10): all included studies with K10 score < 30

Population description: medical students

Inclusion criteria: medical students in the final 2 years of their degree course

Exclusion criteria: individuals with potentially significant psychological distress in need of immediate assessment and management (K10 questionnaire score ≥ 30)

Attrition (withdrawals and exclusions): 1 withdrawal in IG after trial start (withdrew before data collection and did not receive allocated intervention); lost to follow-up: post-intervention: 9 (IG: 7, CG: 2); 2-month follow-up (only in IG): 5

Reasons for missing data: no reasons specified; participants lost to follow-up failed to respond to correspondence

Interventions

Intervention: guided mindfulness practice (brief self-guided mindfulness of breath practice) (n = 32)

- *delivery*: audio CD; individual setting
- *providers*: self-guided training
- *duration of treatment period and timing:* 8 weeks; 30 minutes daily practice
- *description*:
  - guided mindfulness practice
  - CD contains 30 minutes spoken guided mindfulness practice that participants are asked to follow independently every day during 8-week period
  - intervention available at www.utas.edu.au/health/students/medicine/stress-management. See website for detailed information:
    - introduction (5 minutes)
    - relaxation – guided relaxation with no background sounds (30 minutes)
    - relaxation – guided relaxation with background ocean sounds (30 minutes)
    - mindfulness – breath awareness (25 minutes)
    - mindfulness – advanced practice of breath awareness (30 minutes)
    - beach sounds for relaxation (30 minutes)
    - relaxation – brief guided relaxation (5 minutes); participants asked to complete record of their practice
- *compliance*:
  - 1 withdrawal after data collection (i.e. did not receive allocated intervention)
  - adherence to intervention protocol: only 64% (20/31) completed record of practice over the 8 weeks of the intervention; participants asked to undertake intervention daily for 30 minutes over 56 days: mean number of days the intervention was undertaken by participants completing the adherence intervention record: 26.7 (range = 0 - 52 days)
  - NO REQUIREMENT of participants to continue intervention in 8-week post-study follow-up period: all IG participants who completed follow-up data also completed record of ongoing practice; 68% (13/19) reported no ongoing sessions; 6 participants who continued to use mindfulness sessions reported using intervention on a mean of 12.2/56 days (range = 3 - 29 days)
- *integrity of delivery*: not specified
- *economic information (intervention cost, changes in other costs as result of intervention)*: not specified
- *theoretical basis*: mindfulness-based

Control: TAU (n = 34)

- *delivery*: not specified
- *providers*: not specified
- *duration of treatment period and timing*: 8 weeks
- *description*: mindfulness intervention CD given to CG at the end of 8-week study as incentive to remain in the study
- *compliance*: no withdrawals during treatment period

Warnecke 2011 *(Continued)*

- *integrity of delivery*: not specified
- *economic information*: not specified
- *theoretical basis*: not specified

Outcomes	**Outcomes collected and reported:** • perceived stress - PSS • depression - DASS • anxiety - DASS • stress - DASS **Time points measured and reported:** 1) pre-intervention; 2) post-intervention (end of 8-week intervention); and 3) 2-month follow-up (i.e. 2 months post-intervention or 4 months after baseline) ONLY in IG **Adverse events:** no reported adverse effects of intervention
Notes	**Contact with authors:** We contacted the authors for the post-intervention means and SDs for both primary and secondary outcomes in both groups with the number of participants analysed, respectively. We also asked if missing data had been imputed (Warnecke 2019 [pers comm]). **Study start/end date:** June 2009 (recruitment) – October 2009 **Funding source:** supported by a seeding grant awarded by the Australian and New Zealand Association for Health Professional Educators (ANZAHPE) **Declaration of interest:** none **Ethical approval needed/obtained for study:** approval from the University of Tasmania Human Research Ethics Committee (H0010500) **Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** post-intervention means and SDs for outcomes received from author **Correspondence:** Dr Emma Warnecke; School of Medicine, University of Tasmania; emma.warnecke@utas.edu.au; Private Bag 34, Hobart, Tasmania 7001, Australia; Tel: 00 61 3 6226 4757; Fax: 00 61 3 6226 4894

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: We carried out a multicentre, single-blinded, randomised controlled trial" Quote: "Eligible participants were randomised centrally, using block randomisation with block sizes of two, to the intervention arm or the usual care control arm." Quote: "There were no statistically significant differences between the two arms at baseline in either demographics or baseline outcome scores." Judgement comment: insufficient information about random-sequence generation to permit judgement of 'Low risk' or 'High risk' (method of random sequence generation is not described); verified baseline comparability of groups for sociodemographic characteristics and outcomes of interest on the basis of analysis (all Ps > 0.12)
Allocation concealment (selection bias)	Unclear risk	Judgement comment: insufficient information about allocation concealment to permit judgement of 'Low risk' or 'High risk' (i.e. method of allocation concealment during randomisation procedure is not described, only blinding of intervention specified)
Blinding of participants and personnel (performance bias)	High risk	Quote: "We conducted a multicentre, single-blinded, randomised controlled trial (RCT) with intention-to-treat analysis."

Warnecke 2011 *(Continued)*

Subjective outcomes		Quote: "Randomisation was not blinded to the individual participant because of the nature of the intervention." Quote: "Participant packs were prepared centrally. All packs contained a CD cover so that trial packs in the two arms of the study looked identical. The purpose of this was to conceal allocation." Quote: "Participants were specifically advised not to inform others about which group they were in and not to discuss the intervention. Participants were also advised not to give the intervention to anyone else." Judgement comment: single-blind study; no blinding of participants and the outcome is likely to be influenced by lack of blinding
Blinding of outcome assessment (detection bias) Subjective outcomes	High risk	Quote: "Both the research assistant who scored and entered data and the statistician who analysed the results were blinded to group allocation." Judgement comment: insufficient information about blinding of outcome assessment; research assistants who scored and entered as well as analysed the data were blinded to group allocation; but unclear if blinded research assistant also performed the outcome assessment (i.e. distributed the questionnaires); due to performance bias (no blinding of participants), the review authors judge that the participants' responses to questionnaires may be affected by the lack of blinding (i.e. knowledge and beliefs about intervention they received)
Incomplete outcome data (attrition bias) All outcomes	High risk	Quote: "Figure 1 Progress of participants through the trial" Quote: "One participant withdrew from the trial after it began. This participant had been allocated to the intervention arm, but withdrew before any data had been collected. Baseline data (T1) were collected for all 65 remaining participants." Quote: "We conducted a multicentre, single-blinded, randomised controlled trial (RCT) with intention-to-treat analysis." Quote: "Given the difference in dropout rates between the intervention and control arms, data were analysed to look for any statistical difference in those who did not complete T2 data. We found no statistically significant difference in age, sex or baseline scores for perceived stress, depression, anxiety or stress in participants who dropped out of the trial, suggesting that they left at random." Quote: "Results were analysed on an intention-to-treat basis. Missing data were treated as absent and were not assigned a score. No participants were excluded from the analysis." Judgement comment: reasons for missing data unlikely to be related to true outcome (imbalance in missing data between groups: IG: 1 withdrawal, 7 lost to follow-up vs CG: 0 withdrawal, 2 lost to follow-up; but see additional analysis with no significant difference in demographic and outcome variables between completers and non-completers suggesting random loss); according to authors, intention-to-treat analysis; but missing data were treated as absent and not assigned a score; based on outcome data received from authors (24 analysed in IG, 32 analysed in CG): available-case analysis
Selective reporting (reporting bias)	Low risk	Judgement comment: no study protocol or trial registration available but it is clear that the published reports include all expected outcomes, including those that were prespecified

α: alpha, significance level; ASQ: Attributional Style Questionnaire; BAI: Beck Anxiety Inventory; BDI-II: Beck Depression Inventory; BPS: best possible self; Brief-COPE: Brief Coping Orientation to Problems Experience Scale; BSN: Baccalaureate nursing students; BRS: Brief

Resilience Scale; BSI: Brief Symptom Inventory; CBT: cognitive behavioural therapy; CD: compact disc; CDMSES-SF: Career Decision-Making Self-Efficacy Scale - Short Form; d: delta (Cohen's d, effect size); CD-RISC: Connor-Davidson Resilience Scale; CES-D: Center for Epidemiology Studies Depression Scale; CFS: Coping Flexibility Scale; CG: control group; CORE-OM: Clinical Outcomes in Routine Evaluation - Outcome Measure; CPAM: Career Planning Activities Measure; CPD: career planning and development; DASS: Depression, Anxiety and Stress Scale; ERS: Emotion Regulation Scale; FFMQ: Five Facets Mindfulness Questionnaire; GAD-7: Generalised Anxiety Disorder scale; GPA: grade point average; Grit: grit as "perseverance and passion for long-term goals (i.e. working strenuously toward challenges, maintaining effort and interest over years despite failure, adversity, and plateaus in progress"; Duckworth 2007, p 1087-8); GSEQ: General Self-Efficacy Questionnaire; GSI: Global Severity Index; GSI-R: Graduate Stress Inventory - Revised; HADS-D: Hospital Anxiety and Depression Scale - German version; IG: intervention group; IRB: Institutional Review Board; ITPQ: Implicit Personality Theory Questionnaire; ITT: intention-to-treat analysis; JSEHPS: Jefferson Scale of Empathy - Health Professions - Students version; K10: Kessler Psychological Distress Scale; KIMS-E: Kentucky Inventory of Mindfulness Skills; LOCF: last observation carried forward; LSAS-SR: Liebowitz Social Anxiety Scale - Self-report; MASQ: Mood and Anxiety Symptom Questionnaire; MAST: Maastricht Acute Stress Test; MBI: Maslach Burnout Inventory; MBSR: Mindfulness-Based Stress Reduction; mDES: Modified Differential Emotion Scale; MSC: Brief Mindfulness-based Compassion; MSS: Mindfulness Skills for Students; n = sample size (e.g. in respective group), NHS: National Health Service; NURSE: Nurture nurse, Use resources, foster Resilience, Stress and Environment management; OQ-45.2: Outcome Questionnaire; PANAS: Positive and Negative Affect Schedule; PCQ: Psychological Capital Questionnaire; PMSS-D: Perceived Medical School Stress Scale - German version; PRP: Penn Resilience Program; PSQI: Pittsburgh Sleep Quality Index; PSS: Perceived Stress Scale; PTSD: post-traumatic stress disorder; RCI: Resilience and Coping Intervention; RCT: randomised controlled trial; RS: Resilience Scale; RSA: Resilience Scale for Adults; RSES: Rosenberg Self-Esteem Scale; SCL90-R: Symptom Check List - Revised; SCL-27-plus: Symptom Checklist-27 plus; SCS: Self-Compassion Scale; SD: standard deviation; SPS: Social Provision Scale; STAI: State-Trait Anxiety Inventory; SWLS: Satisfaction With Life Scale; US: unconditioned stimulus; USB: universal serial bus; UWES-17: Utrecht Work Engagement Scale; vs: versus; WEMWS: Warwick-Edinburgh Mental Well-being Scale; WHOQOL: World Health Organization Quality of Life Scale; WOC: Ways of Coping Questionnaire.

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
ACTRN12617000300370	Study withdrawn/terminated prematurely
Brady 2016	Ineligible intervention
De la Fuente 2018	Ineligible intervention
De Vibe 2013	Ineligible intervention
Duan 2019	Ineligible intervention
Dvořáková 2017	Ineligible intervention
Esch 2013	Ineligible intervention
Huennekens 2018	Ineligible intervention
Pogrebtsova 2018	Ineligible intervention
Sampl 2017	Ineligible intervention
Song 2015	Ineligible intervention
Van Dijk 2015	Ineligible intervention
Victor 2017	Ineligible study design

Characteristics of studies awaiting classification *[ordered by study ID]*

Arch 2014

Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** not specified for total study **Imputation of missing data:** not specified; probably available-case analysis (only participants who completed TSST
Participants	**Country:** USA **Setting:** laboratory **Age:** mean = 19.53 years (analysed sample) **Sample size (randomised):** not specified; probably 107 **Sex:** 105 women **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** no exact values for state anxiety specified **Population description:** undergraduate women **Method of recruitment:** not specified **Inclusion criteria:** 1) reported no use of oral contraception or other prescription medication; 2) fluent in English; 3) non-smokers; 4) non-drug users; 5) physically healthy (no reported fever or ill-nesses, no diseases or conditions that may impact stress responses such as endocrine disorders, autoimmune disorders, cardiovascular or respiratory conditions, etc.) **Exclusion criteria:** 1) drinking caffeinated or alcoholic beverages in the 3 hours prior to the TSST; 2) exercising in the 3 hours prior to the TSST; 3) consuming anything other than water for the hour prior; 4) using any drugs or medications for 24 hours prior **Attrition (withdrawals and exclusions):** 3 exclusions from salivary biomarker analyses; 1 with-drew; 1 was withdrawn **Reasons for missing data:** 2 withdrawals: 1 refused to do TSST, i in high distress at baseline (i.e. pale, shaking, appearing physical unwell); 3 exclusions from salivary biomarker analyses due to technical problems
Interventions	**Intervention:** self-compassion training (n randomised not specified) • *delivery*: instructions by voice recordings in a laboratory room; recordings at home accessed through secure website • *providers*: experimenters (female experimenters and 2 TSST judges: 1 male, 1 female) • *duration of treatment period and timing:* 2 sessions scheduled 4 days apart (session 1: 10-minute recording, listening to similar recording once a day for the following 3 days; session 2: final 5-minute recording and TSST between 1 pm and 6 pm); 45 minutes in total

Arch 2014 *(Continued)*

- *description*:
  - Meditations focused on cultivating kindness and acceptance towards the self, and to a lesser extent towards others
  - Meditations consisted of phrases (“may I be happy...may I be at ease...”; p 4) that women were asked to repeat silently with intention and self-kindness
  - Phrases included traditional and study-specific content that drew from Neff's (Neff 2003a; Neff 2003b) conceptualisation of self-compassion (“may I know that my joys and struggles are shared by others...”; p 4).
  - 1 female voice was used for instructions in both active conditions
  - SESSION 1:
    - 10-minute, condition-specific recording
    - opportunity to ask questions
    - participants instructed to listen to a “similar recording" (p 4) once a day for the following 3 days (‘self-compassion’ or ‘meditation’ not mentioned)
    - participants instructed that attending to recordings is "extremely important" and "may help prepare for second session" and should be listened to at home "without any distractions" (p 4)
  - SESSION 2 (TSST session):
    - Prior to TSST instructions, women in self-compassion condition listened to final 5-minute condition-specific recording with instructions that: “The rest of the study will be challenging. To help you prepare for the challenge, we invite you to listen to a recording similar to the ones you listened to at home...”. (p 4)
- *compliance*: no difference between self-compassion and attention control in frequency of audio-recordings use between session 1 (s1) (mean = 3.00; SD = 0.57) and and session 2 (s2) (mean = 2.80; SD = 0.69): t(76.11) = −1.44, P = 0.15, d = 0.33). No differences on a 5-item, study-specific measure (α = 0.80) concerning attention to the recordings (e.g. "I tried my best to stay focused on the recordings"; p 6), using a 0 - 4 scale, with higher scores = greater attention); both groups indicated relatively high compliance (self-compassion: mean = 3.29 (SD = 0.67); attention control: mean = 3.06 (SD = 0.64); t(83) = −1.59, P = 0.12, d = 0.35)
- *integrity of delivery*: Independent evaluators blind to condition viewed randomly-selected live sessions in the second half to check for consistency in experimenter behaviour; no results specified
- *economic information* : course credit or payment for study participation
- *theoretical basis*: based on self-compassion literature (Neff 2003a; Neff 2003b); work builds on nascent work in this area (Fredrickson 2008; Kok 2013; Pace 2009) in important ways

Control 1: attention control (placebo; n randomised not specified)

- *delivery*: instructions by voice recordings in a laboratory room; recordings at home accessed by secure website
- *providers*: experimenters (female experimenters and 2 TSST judges: 1 male, 1 female)
- *duration of treatment period and timing:* 2 sessions scheduled 4 days apart (session 1: 10-minute recording, listening to similar recording once a day for 3 following days; session 2: final 5-minute recording and TSST between 1 pm and 6 pm); 45 minutes in total
- *description* :
  - control recordings: excerpts from a psychology textbook chapter on cognition, with content plausibly relevant to TSST preparation, including discussions of problem-solving, judgement, and thinking
  - 1 female voice used for instructions in both active conditions
  - SESSION 1:
    - 10-minute, condition-specific recording
    - opportunity to ask questions
    - participants instructed to listen to a “similar recording" (p 4) once a day for the following 3 days (‘self-compassion’ or ‘meditation’ were not mentioned); participants instructed that

Arch 2014 *(Continued)*

attending to recordings is "extremely important" and "may help prepare for second session" and should be listened to at home "without any distractions" (p 4)

- SESSION 2 (TSST session):
  - Prior to TSST instructions, women in attention-control condition listened to final 5-minute condition-specific recording with instructions that: “The rest of the study will be challenging. To help you prepare for the challenge, we invite you to listen to a recording similar to the ones you listened to at home...” (p4)

- *compliance*: no difference between self-compassion and attention control in frequency of audio-recordings use between s1 (mean = 3.00; SD = 0.57) and and s2 (mean = 2.80; SD = 0.69): t(76.11) = −1.44, P = 0.15, d = 0.33. No differences on a 5-item, study-specific measure (α = 0.80) concerning attention to the recordings (e.g. "I tried my best to stay focused on the recordings"; p 6), using a 0-to-4 scale, with higher scores = greater attention); both groups indicated relatively high compliance (self-compassion: mean = 3.29 (SD = 0.67); attention control: mean = 3.06 (SD = 0.64); t(83) = −1.59, P = 0.12, d = 0.35)
- *integrity of delivery*: Independent evaluators blind to condition viewed randomly-selected live sessions in the second half to check for consistency in experimenter behaviour; no results specified
- *economic information (intervention cost, changes in other costs as result of intervention)*: course credit or payment for study participation
- *theoretical basis*: not specified

Control 2: no intervention (n randomised not specified)

- *providers*: experimenters (female experimenters and 2 TSST judges: 1 male, 1 female)
- *duration of treatment period and timing:* 2 sessions scheduled 4 days apart (no listening to recordings in or between sessions, but TSST in second session between 1 pm and 6 pm)
- *description*: participants did not listen to recordings during or between sessions; invited to sit quietly or read (provided) neutral-content magazines during the s2 period that women in the other conditions heard the recording
- *integrity of delivery*: independent evaluators blind to condition viewed randomly-selected live sessions in the second half to check for consistency in experimenter behaviour; no results specified
- *economic information*: course credit or payment for study participation

Outcomes

Outcomes collected and reported:

- self-compassion (trait and state) - Self Compassion Scale
- state anxiety - Subjective Units of Distress
- state anxiety - State-Trait Anxiety Inventory
- salivary cortisol - saliva samples
- salivary alpha-amylase - saliva samples
- high-frequency heart rate variability (respiratory sinus arrhythmia) - ECG

Time points measured and reported:

- TRAIT & STATE SELF-COMPASSION: 1) pre-intervention (beginning of s1); 2) during intervention (beginning of s2); 3) post-intervention and after stressor exposure in TSST (35 minutes post TSST)
- SALIVARY BIOMAKERS (5 assessments during s2): 1) during intervention, before stressor exposure in TSST/baseline TSST; 2) post-intervention, immediately after stressor exposure in TSST; 3) post-intervention, 10 minutes after TSST; 4) post-intervention, 20 minutes after TSST; 5) post-intervention, 35 minutes after TSST
- SUDS (6 assessments during s2): 1) during intervention, before stressor exposure in TSST/baseline TSST; 2) during intervention, in speech preparation phase of TSST; 3) post-intervention, immediately after stressor exposure in TSST; 4) post-intervention, 10 minutes after TSST; 5) post-intervention, 20 minutes after TSST; 6) post-intervention, 35 minutes after TSST
- STAI (4 assessments during s2): 1) during intervention, before stressor exposure in TSST/baseline TSST; 2) during intervention, in speech preparation phase of TSST; 3) post-intervention, 10 minutes after TSST; 4) post-intervention, 20 minutes after TSST

Arch 2014 *(Continued)*

	• RSA: 1) during intervention, before stressor exposure in TSST/baseline TSST (5 minutes); 2) during intervention, 5 minutes in speech preparation phase of TSST; 3) during intervention and during TSST (10 minutes); 4) post-intervention, after TSST (10 minutes in recovery phase) **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the study authors for the number of participants randomised in total (N = 107?) and to each group, as well as the means and SDs for all outcomes at each measurement point with the number of participants analysed, respectively. In another inquiry, we asked whether healthcare students were included in the sample. We received the response that the "majors of the undergraduate female subjects in the study had not been asked; however, they were recruited from an Intro Psychology class and the corresponding author was sure that a decent portion went on to be psychology majors, although she had no way of knowing which ones" (quote; Arch 2019 [pers comm]). **Study start/end date:** not specified **Funding source:** 1 author supported with startup funds from the University of Colorado Boulder; 1 author partially supported by National Institutes of Health (NIH) grant (CA126971) **Declaration of interest:** All study authors declare that they have no conflicts of interest **Ethical approval needed/obtained for study:** human participants IRB approval **Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** according to the study authors, undergraduates were recruited from introductory psychology classes; but it is unclear if the final sample included participants who were psychology major students **Correspondence:** Joanna J Arch, PhD; Department of Psychology and Neuroscience, University of Colorado Boulder, 345 UCB Muenzinger, Boulder, CO, 80309-0345 USA; Joanna.Arch@Colorado.edu; telephone: 303-492-4634

Baeza-Velasco 2020

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Bauman 2014

Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** findings demonstrate that the intervention lacked power to produce statistically significant group differences; relatively small sample size of 41 students, with only 19 students in the intervention group and 22 students assigned to control group, limited the statistical significance of the findings

Bauman 2014 *(Continued)*

	Imputation of missing data: no imputation of missing data; available-case analysis (only participants for whom outcomes were obtained at pretest and 2 post-tests, i.e. without 4 participants without missing data at 2-week follow-up)
Participants	**Country:** USA **Setting:** students at private, faith-based liberal arts institution on the West coast; setting of training not specified **Age:** range = 18 – 24 years; 18 years: 16 (39%), 19 years: 14 (34.1%), 20 years: 7 (17.1%), 21 years: 1 (2.4%), 22 years: 1 (2.4%), 23 years: 1 (2.4%), 24 years: 1 (2.4%) **Sample size (randomised):** not specified, probably 41 **Sex:** 31 women, 10 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** traditionally-aged undergraduate students (18 to 24 years) at a private, faith-based liberal arts institution on the West coast **Method of recruitment:** students enrolled in the following undergraduate courses during the Fall 2013 semester: Foundations of Psychology (for psychology majors), Introduction to Psychology (for non-psychology majors), and Introductory Statistics **Inclusion criteria:** 1) students enrolled in following undergraduate courses during Fall 2013 semester: Foundations of Psychology (for psychology majors), Introduction to Psychology (for non-psychology majors), Introductory Statistics; 2) students enrolled in these courses required to obtain 4 credit hours of research participation as part of course curriculum **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** 4 cases excluded at 2-week follow-up (post-test 2) **Reasons for missing data:** missing data from that post-test

Interventions	**Intervention:** Psychological Capital (PsyCap) intervention "Navigating the College Experience" (n randomised not specified; in analysed sample: n = 19)
	• *delivery:* face-to-face; group setting (classroom setting); guided imagery, visual media, writing exercises, group discussions, brief content-specific lectures
	• *providers:* author of the publication (Bauman)
	• *duration of treatment period and timing:* 2 weeks; two x 1-hour sessions; session 1: Tuesday evening during the week; session 2: Tuesday evening of subsequent week
	• *description:*
	  ◦ designed to focus on the development of efficacy, hope, optimism, and resilience
	  ◦ following STRATEGIES employed in PsyCap curriculum based on review of literature: (a) imagining and writing about a future best possible self; (b) developing personal goals and subgoals; (c) generating pathways to goals; (d) identifying personal assets/talents/strengths; (e) considering obstacles in achieving goals; (f) vicarious learning, modeling, and self-talk; (g) understanding attribution styles; (h) using the ABCDE (Activating event, Beliefs, Consequences, Dispute, Effects) model to reframe negative events; and (i) redistributing control and responsibility in response to unplanned setbacks

Bauman 2014 *(Continued)*

- WEEK 1:
  - Imagine your best possible self (optimism). Write about your best possible self (optimism).
  - visual imagery: Imagine a best possible self and all that it encompasses (optimism/efficacy).
  - based on the best possible version of yourself, what is one goal you have for this semester under your control? Write it down (hope: goals).
  - brief lecture: Ideal design for goals; goals should be personally valuable, be realistically challenging, contain concrete end points, be objective, be task-oriented, and have an approach framework (hope: agency)
  - brainstorm and generate as many alternative pathways to this goal, regardless of practicality. Write them down (hope: pathways).
  - identify your personal talents/assets/strengths and write down how they contribute to the achievement of your goal (hope: values/resilience: increasing assets)
  - brief discussion on personal assets, strengths, and talents; Give a concrete example; brainstorm and generate more pathways to this goal, considering your assets, strengths, and talents (hope, efficacy)
  - in small groups, discuss goals and pathways with one another, allowing students to hear from others and provide to others alternative potential pathways to various goals (efficacy: vicarious learning/modelling, feedback)
  - make lists of various pathways and consider the resources required to pursue each pathway; deliberate and discard unrealistic pathways (hope: pathway generation)
  - self-reflection: Consider the potential obstacles or barriers that may get in your way of accomplishing your stated goal. Write them down How will your strengths and assets help you overcome these obstacles? Describe on paper. (efficacy: performance, mastery hope: goal setting)
  - share aloud (as a group/with a partner) students' obstacles, allowing for students to hear alternative perspectives on potential obstacles and strategies to overcome them (efficacy: vicarious learning/modelling, positive self-talk/verbal persuasion, optimism: expectancies).
- WEEK 2:
  - review of last session and connection to current session; Last time we focused on goal setting, pathways, assets, and obstacles
  - video clip: positive psychology (stress and coping)
  - self-reflection: What happens when life does not work out the way you want? Reflect on a recent time when you had a strong negative emotional reaction that was out of proportion to the event. What were you feeling? What were your immediate emotional and behavioural responses? What did you believe about the situation? (resilience: cognitive reframing efficacy: physiological and emotional states)
  - brief lecture: discussion on ABCDE model; Share personal experience, walking students through the model, giving them a concrete example. Allow students to help reframe facilitator's situation. (resilience: cognitive behavioural technique)
  - group discussion: Students discuss their situations and reactions. As a group, students generate alternative explanations of beliefs and reactions for one another. (optimism/resilience: reinforcing cognitive processes efficacy: modelling)
  - self-reflection: Reflect on a time when you did not succeed academically (e.g. bad grade, missed assignment, etc.). What did you say to yourself about that? How did you explain that? (optimism: explanatory style)
  - brief lecture: discussion on control and responsibility; personal (interval vs external); permanent (stable vs unstable); and pervasive (global vs specific); provide case sample (optimism: explanatory style, expectancy, perceived control)

- *compliance:* not specified
- *integrity of delivery:* evidence of treatment fidelity: significant increase in hope, efficacy, resilience, optimism in IG following participation in PsyCap intervention, whereas CG will not report significant increase from pretest to post-test 1 or post-test 2: results of multivariate analyses conducted to establish treatment fidelity revealed significant group differences in PsyCap scores in which 29% of variance in scores at post-test 1 and 18% of variance at post-test 2 could be accounted for by the PsyCap intervention implemented in this study; findings similar to Luthans 2006

Bauman 2014 *(Continued)*

- *economic information:* several incentives for participation in workshop provided; students could obtain maximum 4 credits (e.g. 1 credit for completing pretest)
- *theoretical basis:*
  - content and techniques of PsyCap intervention derived from studies that have used similar techniques to successfully demonstrate growth in the individual areas of efficacy, hope, optimism, and resilience among participants
  - literature review
  - PsyCap intervention presented in Luthans 2010 as foundation for the current investigation with special attention given to specific techniques used to increase individual components of PsyCap

Control: wait-list control (n randomised not specified; in analysed sample: n = 22)

- *economic information: a*lso 4 credits for CG participants (e.g. 1 credit awarded for completing pretest)

Outcomes

Outcomes collected and reported:

- psychological capital - PCQ
- resilience - PCQ
- hope - PCQ
- optimism - PCQ
- self-efficacy - PCQ
- psychological well-being - PWB
- autonomy - PWB
- environmental mastery - PWB
- personal growth - PWB
- positive relations with others - PWB
- purpose in life - PWB
- self-acceptance - PWB

Time points measured and reported: 1) pre-intervention; 2) post-intervention (1 day after the conclusion of the treatment group's participation in the PsyCap intervention; post-test 1); 3) 2-week follow-up (2 weeks after the intervention; post-test 2); 4) post-intervention in CG after their participation in 2-week intervention (post-test 3, only in CG)
Adverse events: not specified

Notes

Contact with authors: We contacted the authors for the number of participants randomised (41 or more since 4 exclusions?) in total and to each group as well as the amount of missing data in each group. We also asked whether an available-case analysis post-test had been performed. In a second inquiry, we also asked whether healthcare students were included in the sample. The author responded and expressed her openness to provide the data (Bauman 2019 [pers comm]). However, the response did not include the information on whether healthcare students were included in the final sample; data have not so far been received

Study start/end date: not specified; recruitment during Fall 2013 semester

Funding source: not specified

Declaration of interest: not specified
Ethical approval needed/obtained for study: approval from Azusa Pacific University's IRB upon submission of the research design and instruments

Comments by study authors: not relevant
Miscellaneous outcomes by the review authors: dissertation; recruitment at psychology courses, but unclear if final sample included participants who were psychology major students
Correspondence: Leslie Vaccarello Bauman; dissertation committee chair: Laurie A. Schreiner, PhD; School of Behavioral and Applied Sciences, Department of Higher Education, Azusa Pacific University, Duke 502; lschreiner@apu.edu; Phone (626) 815-5349; Fax (626) 815-5408

Beadel 2016

Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified **Imputation of missing data:** no imputation of missing data; probably per-protocol analysis (see flow chart; without 33 exclusions in both groups and without 7 participants who discontinued intervention; n = 50 analysed)
Participants	**Country:** USA **Setting:** recruitment from college; training and CO2 breathing challenge in laboratory **Age:** not specified **Sample size (randomised):** 90 **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** college students **Inclusion criteria:** college students scoring 27,5 or higher on the ASI **Exclusion criteria:** 1) serious, unstable illnesses, including type I and type II diabetes mellitus, hepatic, renal, gastroenterologic, respiratory, cardiovascular, endocrinologic, neurologic, immunologic, or haematologic disease; 2) 1 or more past seizures without a clear and resolved aetiology; 3) a concussion or other head trauma within the past month; 4) current or past episodes of psychosis; 5) currently taking antidepressants or a non-psychotropic medication with psychotropic effects (e.g. beta-adrenergic blockers), unless the dosage has been stable for a minimum of 1 month prior to the study; 6) self-reported confirmation or possibility of pregnancy; 7) no benzodiazepine medication for at least 48 hours prior to final session of the study (CO2 breathing challenge) **Attrition (withdrawals and exclusions):** 7 withdrawals from interventions (IG: 2, CG: 5); 5 lost to follow-up (IG: 2, CG: 3); 33 exclusions (IG: 14, CG:19) **Reasons for missing data:** 33 exclusions (did not meet ASI cut-off at study session 1); PDSS not usable to assess outcomes (administered at baseline, post-training and follow-up, but due to skip pattern in the measure, only 16 completed full measure at all time points); reasons for losses to follow-up or withdrawals from intervention not specified

Interventions	**Intervention:** Cognitive Bias Modification-Interpretation (CBM-I) (Ambiguous Scenario Training) (n = 45)
	• *delivery:* computer paradigm (Cognitive Bias Modification-Interpretation); presentation of scenarios designed to be ambiguous, but potentially threatening to someone with high anxiety sensitivity
	• *providers:* not specified
	• *duration of treatment period and timing:* 4 x 30-minute sessions (50 novel scenario trials in each session)
	• *description:*
	  ○ Modified CBM-I in this study trains interpretations associated with resilience (in contrast to typical CBM-I paradigms that train contingency between ambiguous threat and positive, anxiety-incongruent outcomes)
	  ○ Scenarios target factors thought to underlie anxiety-sensitive individuals' difficulty recovering from a panic stressor (e.g. fixed beliefs that being anxious is catastrophic, and that they will not recover)
	  ○ At the end of a scenario, participants are presented with a final sentence containing a word fragment to be completed by selecting the missing letter (there is only one solution to one fragment)
	  ○ This word fragment resolves the ambiguity of each scenario in a resilience-congruent (i.e. healthy) direction
	  ○ These resilience-enhancing resolutions include greater flexibility in responding, greater self-efficacy, finding meaning or a silver lining in response to a stressor, and the expression of positive emotionality despite the presence of a stressor; e.g. sample scenario: ''You are at an amusement park and decide to ride a roller coaster with your friends. After you get off the ride, you

Beadel 2016 *(Continued)*

are a bit dizzy and your legs feel weak. Although this makes you anxious, you can still l_ugh with the rest of your friends about how fun the ride was.''
    - The final sentence and word fragment (''laugh'') in this scenario create a resolution that promotes positive emotional expression
    - Finally, each scenario is followed by a comprehension question that requires a ''yes'' or ''no'' answer and is designed to reinforce the resolution of the ambiguity. e.g. question for the scenario above: ''Are you able to laugh with the rest of your friends despite feeling anxious?'';
    - Participants are not allowed to advance through training until they provide the correct missing letter for the word fragment, and then the correct answer to the comprehension question.
    - If participants complete the trials for a given session prior to the end of the 30 minutes, they then undergo a modified iteration of the same scenarios until the time has expired (e.g. reading the scenarios aloud), following Steinman 2014. The first iteration requires participants to read the trials aloud, and the second iteration asks participants to complete three letters from the word fragment in the final sentence
- *compliance:* 43 of 45 allocated to IG completed intervention (i.e. 2 discontinued study prior to follow-up)
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* CBM; Ambiguous Scenario Training adapted from Mathews 2000

Control: attention control (sham version); neutral version of CBM (n = 45)

- *delivery:* computer paradigm (CBM-I); presentation of scenarios that are neutral in valence
- *providers:* not specified
- *duration of treatment period and timing: 4 x* 30-minute sessions
- *description:*
    - None of the trials were related to the development of resilience, and approximately 75% of the trials were unrelated to anxiety sensitivity content (the decision to allow 25% of the content to relate to anxiety sensitivity was made to enhance credibility of the control condition)
    - CG task designed to match the Ambiguous Scenario Training paradigm for task demands, such as attention, time, format, and other nonspecific factors
    - e.g. control scenario: ''You are watering your household plants. As you make your way around the house, you notice that one of your plants is wilting. You decide to move the plant into more direct sunli_ht.'' The comprehension question for this scenario was: "Are you watering your plants?"
- *compliance:* 40 of 45 allocated to CG completed intervention (i.e. 5 discontinued study prior to follow-up)
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* variation of Ambiguous Scenario Training with scenario content neutral in valance (Steinman 2014)

Outcomes

Outcomes collected and reported:

- anxiety sensitivity - ASI
- panic disorder severity - PDSS **- not reported at post-test and follow-up**
- resilience-relevant interpretation bias – resilience-congruent recognition ratings - RRT
- resilience-relevant interpretation bias – resilience-incongruent recognition ratings - RRT
- physical interpretations/anxiety-relevant interpretations - Brief Body Sensations Interpretation Questionnaire Physical subscale
- state anxiety - SUDS
- panic attack symptoms - Diagnostic Symptom Questionnaire (sum score, physical symptoms, cognitive symptoms)

Time points measured and reported: 1) pre-intervention; 2) post-intervention; 3) 2-month follow-up (2 months after final laboratory session)
Adverse events: not specified

Beadel 2016 *(Continued)*

Notes	**Contact with authors:** We contacted the authors for the number of participants analysed in each group at post-test and follow-up as well as means and SDs for SUDS at the beginning and at the end of CO2 breathing challenge in both conditions. In a second inquiry, we also asked if healthcare students were included in the sample. We received the response from the authors that "all of the participants were college undergraduates enrolled in a participant pool from introductory psychology courses, but there were no additional information about whether of the participants may have been health professionals, though this is unlikely" (Beadel 2019 [pers comm]). **Study start/end date:** not specified **Funding source:** funded by a Templeton Science of Prospection Award to Bethany Teachman **Declaration of interest:** Jessica R. Beadel, Andrew Mathews, Bethany A. Teachman declares that they have no conflict of interest **Ethical approval needed/obtained for study:** not specified **Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** according to authors, college undergraduates enrolled in participant pool from introductory psychology courses; unclear if any health professionals (though unlikely) **Correspondence:** Jessica R. Beadel, University of Virginia, P.O. Box 400400, Charlottesville, VA 22904, USA; jrb2mx@virginia.edu

Chen 2018b

Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified in conference abstract **Imputation of missing data:** not specified
Participants	**Country:** China **Setting:** not specified **Age:** not specified **Sample size (randomised):** 40 **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** students with depression **Population description:** urban college students with depression **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** cognitive coping group training and psychological intervention (n randomised not specified) • *delivery:* probably face-to-face; group setting • *providers:* not specified • *duration of treatment period and timing:* not specified • *description:* content not further specified • *compliance:* not specified • *integrity of delivery:* not specified • *economic information:* not specified • *theoretical basis:* cognitive coping training; not further specified **Control:** TAU (normal training; n randomised not specified)

Chen 2018b *(Continued)*

- *delivery:* not specified
- *providers:* not specified
- *duration of treatment period and timing:* not specified
- *description:* not specified
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* not specified

Outcomes	**Outcomes collected and reported:** • depression - Self-Rating Depression Scale **- only pre-intervention difference between groups in depression score reported (P > 0.05)** • affective style - Affective Style Questionnaire**- not reported** • SCSQ (unclear which scale, abbreviation not explained in conference abstract) **- not reported** **Time points measured and reported:** 1) pre-intervention; 2) post-intervention; 3) 6-month follow-up; **only pre-intervention difference reported** **Adverse events:** not specified
Notes	**Contact with authors:** We were not able to contact the study authors on whether the intervention focused on resilience and if healthcare students were included in the final sample, since we identified no contact data (e-mail address) of the authors. **Study start/end date:** not specified **Funding source:** not specified **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** not specified **Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** several eligibility criteria of this review unclear (inclusion of healthcare students, focus on resilience) **Correspondence:** Chen C.Y.; Wuhan University of Technology, Wuhan, 430070, China and Zhongnan University of Economics and Law, Wuhan, 430073, China; no e-mail address identified

Clark 2019

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Crane 2020

Methods	

Crane 2020 *(Continued)*

Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Despeaux 2019

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

DRKS00011265

Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified in trial registration **Imputation of missing data:** not specified
Participants	**Country:** Germany, Austria, Switzerland **Setting:** online intervention **Age:** not specified **Sample size (randomised):** 264 targeted **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** college students with significant minor resilience **Inclusion criteria:** 1) student status; 2) significant minor resilience (1 SD below average); 3) internet access, consent; 4) sex: both; 5) age: no minimum or maximum age limit **Exclusion criteria:** 1) individuals who have been diagnosed with a mental disorder within the past 12 months; 2) individuals who are on a waiting list for a psychotherapy, are currently in treatment or have experienced psychotherapeutic treatment in the last 12 months; 3) current or life-longing psychotic or bipolar disorder; 4) individuals with high suicide risk **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** StudiCare: Resilienz (n randomised not specified) • *delivery:* online intervention • *providers:* self-help intervention; unguided; only technical support provided • *duration of treatment period and timing:* 7 modules

DRKS00011265 *(Continued)*

- *description:* aims to increase the resilience of the participants; content not further specified
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information:* intervention free of charge and open to students below average resilience
- *theoretical basis:* not specified

Control: wait-list control (n randomised not specified)

- *description:* available after 12 months (also described as TAU)

Outcomes

Outcomes collected and reported:

Primary outcome:

- resilience - scale not specified

Secondary outcomes:

- depressive symptoms - PHQ9
- anxiety disorder - GAD-7
- self-esteem - RSES
- alcohol dependency - AUDIT-Consumption
- affective component of well-being - PANAS
- psychological well-being - Ryff's PWB Scales-29
- self-compassion - SCS - Short-Form
- detection of psychological health costs - Client Service Receipt Inventory
- perceived stress - PSS
- appetitive motifs - Enjoyment Orientation Scale
- intervention expectation - Credibility/Expectancy Questionnaire
- therapeutic expectations towards the training - Working Alliance Inventory for Technology Based Interventions
- satisfaction with the treatment - Client Satisfaction Questionnaire

Outcomes reported not specified
Time points measured and reported: post-intervention (8 weeks after randomisation); time points reported not specified
Adverse events: not specified

Notes

Contact with authors: We contacted the authors to ask whether the trial also included healthcare students, but received no response

Study start/end date: date of first enrolment: 24 March 2017; end date not specified
Funding source: primary sponsor: BARMER GEK (Hauptverwaltung, Produktentwicklung, Versorgungsmanagement, Prävention); European Union
Declaration of interest: not specified

Ethical approval needed/obtained for study: approved by Ethics Committee of Friedrich-Alexander-University Erlangen-Nürnberg
Comments by study authors: website, studicare.com; secondary trial registration: ISRCTN13856522 (Spanish partner study)
Miscellaneous outcomes by the review authors: based on trial registration, recruiting; unclear if trial also includes healthcare students

Correspondence: Dr Daniel Ebert, Nägelsbachstraße 25a, 91052 Erlangen, Germany; Daniel.Eber@fau.de; phone +49 9131 8567567

DRKS00013765

Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified in trial registration **Imputation of missing data:** not specified
Participants	**Country:** Germany, Austria, Switzerland **Setting:** online intervention **Age:** not specified **Sample size (randomised):** 260 targeted **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available):** not specified **Population description:** resilient college students **Inclusion criteria:** 1) student status; 2) internet access; 3) consent; 4) sex: both; 5) age: no minimum or maximum age limit **Exclusion criteria:** 1) individuals with significant minor resilience (1 SD below average); 2) individuals who have been diagnosed with a mental disorder within the past 12 months; 3) individuals who are on a waiting list for a psychotherapy, are currently in treatment or have experienced psychotherapeutic treatment in the last 12 months; 4) current or lifelong psychotic or bipolar disorder; 5) individuals with high suicide risk **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** StudiCare: Resilienz UP (n randomised not specified) • *delivery:* online intervention • *providers:* self-help intervention; unguided; only technical support provided • *duration of treatment period and timing:* 7 modules • *description:* content not further specified • *compliance:* not specified • *integrity of delivery:* not specified • *economic information* not specified • *theoretical basis:* not specified **Control:** wait-list control (n randomised not specified) • *description:* available after 12 months (also described as TAU)
Outcomes	**Outcomes collected and reported:** Primary outcome: • resilience - scale not specified Secondary outcomes: • depressive symptoms - PHQ-9 • anxiety disorder - GAD-7 • self-esteem - RSES • alcohol dependency - AUDIT -Consumption • affective component of well-being - PANAS • psychological well-being - Ryff Scales of PWB-29 • self-compassion - SCS - Short-Form • detection of psychological health costs - Client Service Receipt Inventory • perceived stress - PSS • appetitive motifs - Enjoyment Orientation Scale

DRKS00013765 *(Continued)*

- intervention expectation - Credibility/Expectancy Questionnaire
- therapeutic expectations towards the training - Working Alliance Inventory for Technology Based Interventions
- satisfaction with the treatment - Client Satisfaction Questionnaire

Outcomes reported not specified
Time points measured and reported: post-intervention (8 weeks after randomisation); time points reported not specified
Adverse events: not specified

Notes

Contact with authors: We contacted the authors to ask whether the trial also included healthcare students, but received no response

Study start/end date: date of first enrolment: 15 March 2018; end date not specified

Funding source: primary sponsor: BARMER GEK (Hauptverwaltung, Produktentwicklung, Versorgungsmanagement, Prävention); European Union
Declaration of interest: not specified

Ethical approval needed/obtained for study: approved by Ethics Committee of Friedrich-Alexander-University Erlangen-Nürnberg
Comments by study authors: website, studicare.com
Miscellaneous outcomes by the review authors: based on trial registration, recruiting; unclear if trial also includes healthcare students

Correspondence: Dr Daniel Ebert, Nägelsbachstraße 25a, 91052 Erlangen, Germany; Daniel.Eber@fau.de; phone +49 9131 8567567

Enrique 2019

Methods

Study design: RCT
Study grouping: parallel group
Unit of randomisation: individuals
Power (power & sample size calculation, level of power achieved): Taking a conservative approach, they expect a small effect size for well-being outcomes (d = 0.2), based on a meta-analysis of RCTs on positive psychology interventions; taking an equally conservative approach, at the minimum they anticipate a similar effect size for resilience outcomes. Therefore, given a small expected effect size of 0.2 for resilience and well-being outcomes and recent guidelines for estimating sample size for pilot RCTs designed with 90% power and 2-sided 5% significance, based on a non-central t-distribution approach, a sample size of 75 was determined (25 per arm)
Imputation of missing data: not specified, but all analyses will be based on the intention-to-treat principle according to study protocol

Participants

Country: Ireland
Setting: internet-delivered intervention
Age: not specified in trial registration or study protocol
Sample size (randomised): 75
Sex: not specified
Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline: not specified, but see exclusion criteria: students with psychotic or bipolar disorder, at risk of suicide and currently in psychological treatment excluded
Population description: undergraduate and postgraduate college students
Inclusion criteria: 1) above 18 years of age; 2) registered student at the university
Exclusion criteria: 1) individuals with psychotic or bipolar disorder; 2) individuals at risk of suicide; 3) individuals currently in psychological treatment
Attrition (withdrawals and exclusions): not specified
Reasons for missing data: not specified

Enrique 2019 *(Continued)*

Interventions	**Intervention 1:** internet-delivered intervention for resilience with **human** support (Space for Resilience; n planned = 25)
	• *delivery:* delivered on Web 2.0 platform using interactive content; each module follows structured format (videos, informational content, interactive activities, mindfulness meditations, homework suggestions, summaries); personal stories and accounts from others incorporated into presentation of material
	• *providers:* supporters = counsellors or trainee counselling staff working at the university's student counselling service who have already widely used the SilverCloud depression and anxiety interventions; have access to participant levels of engagement with the programme through online platform and provide **individualised reviews** to participants
	• *duration of treatment period and timing (frequency, duration of each session):* 8 weeks
	• *description:*
	  ◦ receive 4 reviews from supporters fortnightly during 8-week period
	  ◦ 7 modules:
	  ▪ 1) building resilience: introduces the concept of resilience and allows the user to analyse their current levels of resilience and set goals for the programme; practice of mindfulness and its relevance for resilience is introduced
	  ▪ 2) purpose: focuses on purpose, meaning and values; user is encouraged to identify their values, what matters most to them in life and their passions, and find ways to incorporate these into the key life roles they undertake
	  ▪ 3) self: focuses on self-esteem and self-compassion; user is encouraged to identify their strengths and align them to their values and passions; users also invited to challenge their negative self-talk and replace it with more compassionate statements
	  ▪ 4) connections: supports users in reflecting on their social networks and improving their relationships and communities; information about communication styles is provided and the user is given tips for improving their communication skills
	  ▪ 5) body: focuses on creating a healthy lifestyle by developing positive habits for sleep, diet and exercise; behavioural activation techniques are provided and the user can track their daily lifestyle choices and observe how they impact on their mood
	  ▪ 6) mind: focuses on thoughts and offers balanced optimism and gratitude as alternatives to negative or distorted thinking
	  ▪ 7) moving forward: looks at active coping methods for dealing with problems, and prepares the user for coming to the end of the programme; users have the opportunity to review their progress since starting the programme and set goals for the future
	• *compliance:* not specified
	• *integrity of delivery:* The online system will automatically record information about the programme usage. All user activity within the programme (i.e. clicking through the content, updating an activity, saving a journal entry) is recorded with a time stamp. Thus, a session is defined as any time that the user logs on to the platform and the length of the session is determined by subtracting the time of the last time stamp of that session, to the time of the login. Total time spent in the programme is therefore calculated by adding the total time that the user spent in each session. The system also tracks the number of activities completed, the percentage of programme viewed and the number of reviews offered by the supporter (in the human support condition)
	• *economic information :* not specified in trial registration or study protocol
	• *theoretical basis:* based primarily on positive psychology and comprises cognitive components previously incorporated in other resilience interventions, including cognitive flexibility, optimism,challenging negative self-talk, behavioural activation and active coping , as well as information on social support, lifestyle factors and values
	
	Intervention 2: internet-delivered intervention for resilience with **automated** support (Space for Resilience; n planned = 25)
	• *delivery:* delivered on Web 2.0 platform using interactive content; each module follows structured format (videos, informational content, interactive activities, mindfulness meditations, homework suggestions, summaries); personal stories and accounts from others incorporated into presentation of material; automated support/reviews sent by messages on online platform

Enrique 2019 *(Continued)*

- *providers:* **automated support = generic, precast reviews**, i.e. no individualised reviews based on each participant's level of engagement; messages pre-written by clinicians with many years of clinical experience and knowledge of delivering online support; all messages follow similar structure
- *duration of treatment period and timing:* 8 weeks
- *description:*
  - receive 4 reviews during 8-week period (reviews scheduled to be sent at moment of sign-up, week 2, week 4, and week 7)
  - 7 modules:
    - 1) building resilience: introduces the concept of resilience and allows the user to analyse their current levels of resilience and set goals for the programme; practice of mindfulness and its relevance for resilience is also introduced
    - 2) purpose: focuses on purpose, meaning and values; user is encouraged to identify their values, what matters most to them in life and their passions, and find ways to incorporate these into the key life roles they undertake
    - 3) self: focuses on self-esteem and self-compassion; user is encouraged to identify their strengths and align them to their values and passions; users are also invited to challenge their negative self-talk and replace it with more compassionate statements
    - 4) connections: supports users in reflecting on their social networks and improving their relationships and communities; information about communication styles is provided and the user is given tips for improving their communication skills
    - 5) body: focuses on creating a healthy lifestyle by developing positive habits for sleep, diet and exercise; behavioural activation techniques are provided and the user can track their daily lifestyle choices and observe how they impact on their mood
    - 6) mind: focuses on thoughts and offers balanced optimism and gratitude as alternatives to negative or distorted thinking
    - 7) moving forward: looks at active coping methods for dealing with problems, and prepares the user for coming to the end of the programme; users have the opportunity to review their progress since starting the programme and set goals for the future
- *compliance:* not specified in trial registration or study protocol
- *integrity of delivery:* The online system will automatically record information about the programme usage. All user activity within the programme (i.e. clicking through the content, updating an activity, saving a journal entry) is recorded with a time stamp. Thus, a session is defined as any time that the user logs on the platform and the length of the session is determined by subtracting the time of the last time stamp of that session, to the time of the login. Total time spent in the programme is therefore calculated by adding the total time that the user spent in each session. The system also tracks the number of activities completed, the percentage of programme viewed and the number of reviews offered by the supporter (in the human support condition).
- *economic information:* not specified in trial registration or study protocol
- *theoretical basis:* based primarily on positive psychology and comprises cognitive components previously incorporated in other resilience interventions, including cognitive flexibility, optimism,challenging negative self-talk, behavioural activation and active coping, as well as information on social support, lifestyle factors and values

Control: wait-list control (n planned = 25)

Outcomes

Outcomes collected and reported:

Primary outcome:

- resilience - CD-RISC
- happiness - Pemberton Happiness Index

Secondary outcomes:

- resilience - BRS
- depression - PHQ – 4 items
- anxiety - PHQ-4

Enrique 2019 *(Continued)*

	• self-esteem - RSES • perceived stress - PSS - 4 items Other measures: • satisfaction with treatment - Satisfaction with Treatment Outcomes reported not specified **Time points measured and reported:** 1) pre-intervention; 2) post-intervention; time points reported not specified **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors for information about the inclusion of healthcare students, but received no response **Study start/end date:** see trial registration: October 2018 to May 2019 **Funding source:** funded by joint resources provided from SilverCloud Health and Student Counselling Service, Trinity College Dublin **Declaration of interest:** 4 authors are employees of SilverCloud Health, 2 of them are members of the e-mental health research group, School of Psychology, Trinity College Dublin **Ethical approval needed/obtained for study:** approved by the research ethics committee at the School of Psychology, Trinity College Dublin (Approval ID: SPREC112018-12; 27th November 2018) **Comments by study authors:** trial registration: ISRCTN11866034 **Miscellaneous outcomes by the review authors:** according to trial registration: no longer recruiting, overall trial status: completed, unpublished trial (last update in April 2019); inclusion of healthcare students unclear **Correspondence:** A. Enrique; E-Mental Research group, School of Psychology, Trinity College Dublin, Ireland and Clinical Research & Innovation, SilverCloud Health, Dublin, Ireland; corresponding author: D. Richards; E-Mental Research group, School of Psychology, Trinity College Dublin; Ireland; derek.richards@tcd.ie

Flett 2020

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Games 2020

Methods	
Participants	
Interventions	
Outcomes	

Games 2020 *(Continued)*

Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Gerson 2013 (study 1)

Methods	**Study design:** RCT, according to authors; but (systematic) non-random approach: alternation **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** A power analysis using the G*Power 3 program indicated that power was low for a medium effect size with 28 participants (f^2 = 0.32 for a multiple linear regression with 3 predictors and f = 0.25 for an analysis of covariance); preliminary study (findings should be interpreted cautiously given number of variables and very small sample size) **Imputation of missing data:** not specified; per-protocol analysis (only participants who completed treatment in both groups)
Participants	**Country:** USA **Setting:** university, psychology lab **Age:** mean = 19.9 (SD = 2.17) years; range = 18 - 26 years **Sample size (randomised):** 33 **Sex:** 20 women, 13 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** depression (BDI-II)): IG: 7.88 (3.50), CG: 14.00 (7.94) **Population description:** undergraduates at a small, private university in southern California **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** attrition of 5 participants (IG: 1, CG: 4) **Reasons for missing data:** not specified

Interventions	**Intervention:** Program for Accelerated Thriving and Health (PATH) (n = 16)
	• *delivery:* face-to-face; group sessions (6 or fewer participants); PowerPoint slides, small-group discussions; handouts at end of session 1 and beginning of session 2
	• *providers:* delivered by nonclinical personnel with minimal training; 3 group leaders selected for their interest in participating in a psychology research team (undergraduate seniors who had completed a year-long course in research methods); training: reviewing scripts and handouts and participating in approximately 1 hour of discussion with 1 of the principal investigators about key elements of the programme; PI available between meetings to address any questions/concerns that arose from group sessions; 1 male, 2 female group leaders; informal presentation style
	• *duration of treatment period and timing:* 3 x 60- to 90-minute sessions/meetings over approximately 3 weeks
	• *description:*
	  ◦ focus on building an adaptive explanatory style in undergraduates
	  ◦ each meeting: presents scripted lecture about the relevance and components of pessimistic, optimistic, and personal control explanatory styles, accompanied by colourful PowerPoint

Gerson 2013 (study 1) *(Continued)*

slides and interspersed with small-group discussions of thought questions distributed in 2 handouts
    - SESSION 1:
        - study title; (examples of stressful events)
        - importance of building resilience to stress: self-perpetuating cycle between feeling overwhelmed and responding maladaptively
        - Ellis' A-B-C (Activating event, Belief, Consequences) model and impact of cognitions on feelings and behaviours
        - importance of perspective and explanatory style
        - explanatory style and its dimensions: internality, stability, and globality
        - dangers of negative expectations: self-fulfilling prophecy with own and others' belief
        - pessimistic explanatory style: Internal, stable, and global attributions for negative events
        - negative impact of a pessimistic style: self-fulfilling prophecy
        - negative impact of a pessimistic style: self-perpetuating cycle; (handout 1)
    - SESSION 2:
        - study title (handout 1)
        - dimensions of explanatory style: review
        - importance of positive expectations: self-fulfilling prophecy
        - getting perspective: considering worst, best, and realistic outcomes
        - de-catastrophising: maintaining specificity regarding negative events
        - considering best possible outcomes
        - being realistic: considering likely outcomes and their positive elements
        - getting perspective: review (examples)
        - pessimistic and optimistic explanatory styles and their importance in A-B-C model
        - personal control explanatory style (handout 2)
    - SESSION 3:
        - study title
        - pessimistic, optimistic, and personal control explanatory styles: review
        - benefits of taking personal responsibility and active skill-building; (handout 2)
        - getting perspective: review
        - comparison of pessimistic, optimistic, and personal control explanatory styles
        - importance of active, assertive problem-solving
        - process of active problem-solving: identifying goals and realistic possibilities, taking action, and evaluating outcomes
    - HANDOUTS:
        - presented characters' responses to 7 complex negative situations
        - handout 1: participants asked to analyse each response in terms of uses of internality, stability, and globality, and then to offer an optimally constructive response; group leaders guide discussion with the assistance of a response key
        - handout 2: presents 7 brief negative scenarios for practising applications of pessimistic, optimistic, and personal control explanatory style
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information:* study participation credit for psychology courses, opportunity to learn about managing stress, and summary of findings
- *theoretical basis:* literature on optimism and optimistic style (Peterson 2000); concept of thriving (Carver 1998); expectations regarding the adaptiveness of optimistic and personal control explanatory styles formed the basis for the programme's content

Control: wait-list control (n = 17)

- *compliance:* not specified
- *economic information:* study participation credit for psychology courses, opportunity to learn about managing stress, and summary of findings

Gerson 2013 (study 1) *(Continued)*

Outcomes	**Outcomes collected and reported:** • thriving/resilience - CD-RISC-10 • optimism/optimistic explanatory style - ASQ • personal control explanatory style - ASQ • depression - BDI-II **Time points measured and reported:** 1) pre-intervention; 2) post-intervention; 3) 3-week follow-up (follow-up only for IG; post-intervention for CG which also receives intervention after waiting period) **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors for the means and SDs for the outcomes in both groups at each of the 3 time points and received the response that data for study 1 appeared to be corrupted (Gerson 2018b [pers comm]). We also asked for the potential inclusion of healthcare students in the sample, but received no response to this inquiry **Study start/end date:** not specified **Funding source:** supported in part by a Summer Undergraduate Research Fellowship provided by the Office for Undergraduate Research of California Lutheran University **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** approved by the university's IRB **Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** for study 1, unclear if psychology students were included in the study **Correspondence:** Marylie W. Gerson; Department of Psychology, California Lutheran University, 60 W. Olsen Road, mail code 3800, Thousand Oaks, CA 91360, USA; mgerson@callutheran.edu

Gerson 2013 (study 2)

Methods	**Study design:**RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** Although power with a sample of 63 approached a moderate level for a multiple linear regression analysis with 3 predictors (f^2 = .70), it was still low for an analysis of covariance (f = .50), so caution should be used in interpreting findings **Imputation of missing data:** not specified; form of per-protocol analysis (only participants who took part in treatment in general; participants who only attended 1st session were also considered)
Participants	**Country:** USA **Setting:** university, psychology lab **Age:** mean = 21.58 (SD = 3.88); range = 17 - 50 years **Sample size (randomised):** not exactly specified; 63 finally analysed; probably 73 randomised **Sex:** 52 women, 12 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** depressive symptoms at baseline not specified **Population description:** undergraduates **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** 9 dropouts (IG: 5, CG: 4); 1 exclusion (IG) **Reasons for missing data:** not specified
Interventions	**Intervention:** Program for Accelerated Thriving and Health (PATH) (n = 36)

Gerson 2013 (study 2) *(Continued)*

- *delivery:* face-to-face; group sessions (3 - 7 participants); PowerPoint slides, handouts, discussion sessions
- *providers:* group leaders selected for their interest in participating in a psychology research team; 6 student research assistants led the groups (4 seniors, 1 junior, 1 beginning student in psychology master's programme); importance of maintaining consistency across groups and conditions emphasised
- *duration of treatment period and timing: 3 x* 30- to 50-minute sessions spaced over 5- to 6-day period
- *description:*
  - focus on teaching undergraduates an adaptive explanatory style in order to promote thriving and resilience; sessions similar in form and content to Gerson 2013 (study 1)
  - several slides modified or condensed to emphasise application of explanatory style to coping with stressful experiences by using a combination of personal control style and positive mindset
  - 3 dimensions of explanatory style translated into 3-step process, beginning with focus on decreasing perceived globality (step 1: getting perspective by seeing event as specific and limited), followed by increasing unstable (temporary), internal attributions (step 2: considering what changeable aspects of one's self or behaviours may have been to blame or could be changed for the future) and ending with decreasing perceived stability (permanence) in general (step 3: realising that bad things do not last forever, so it is important to know when to "Let go"); participants encouraged in Step 2 to consider anything they could do differently for the future, but to realise when there was nothing more they could do; Step 3 described as important because some experiences are not within one's control and could not have been prevented
  - SESSION 1:
    - introduction of globality, internality, stability and summary of the 3-step process
    - participants can jot down any questions for the leader to address at the next session
    - participants encouraged to think about applications of 3 steps to their own experiences before next session
  - SESSION 2:
    - review of 3-step process
    - discussion of HANDOUT 1: asks participants to describe a stressful experience, rate how upsetting it had been, and note how they have responded to it, to analyse their response in terms of globality, internality, and perceptions of permanence/changeability, to indicate how they have felt about the experience, to describe a pessimistic way of explaining the experience; and finally, to re-analyse the experience by applying the 3 steps, volunteers share their response and group leaders guide discussions using response key
    - after handout: illustration of self-perpetuating cycle of hopelessness and review of the 3-step process
    - HANDOUT 2: presents 7 brief scenarios of various explanatory styles for negative events; participants instructed to analyse each scenario in terms of uses of globality, internality, and perceived permanence and then to offer an optimally-constructive response; group leaders again guide discussion with assistance of response key
    - end of Session 2 with questions of participant to leader for next session
  - SESSION 3: only discussion of participants' questions and review of 3-step process
- *compliance:* 5 dropouts between pretest and first group meeting, 4 only attended 1st meeting
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* literature on optimism and optimistic style; concept of thriving; expectations of the adaptiveness of optimistic and personal control explanatory styles formed the basis for the programme's content

Control: attention control (equivalent in every way to IG except for content; n = 37)

- *delivery:* face-to-face; group sessions (2 - 7 participants with exception of 2 single-member groups); PowerPoint slides, handouts, discussion sessions
- *providers:* group leaders selected for their interest in participating in a psychology research team; 6 student research assistants led the groups (4 seniors, 1 junior, 1 beginning student in psychol-

Gerson 2013 (study 2) *(Continued)*

	ogy master's programme); importance of maintaining consistency across groups and conditions emphasised
	• *duration of treatment period and timing:* 3 x 30- to 50-minute sessions spaced over 5- to 6-day period
	• *description:*
	  ○ differs from IG only in content
	  ○ following topics addressed: nature of stress, nature of stressors, variations in the impact of stressors, stress-related disorders, diathesis-stress hypothesis, mind–body connection, stressor–stress connection, 3 phases of the stress response, response, the anxiety and performance curve, the benefits of moderate arousal, and the positive consequences of the resistance phase
	  ○ HANDOUT 1: 7 scenarios for analysis in terms of stages of the stress response
	  ○ HANDOUT 2: asks participants to describe some stressors in their lives, to rate the intensity of the stressors, and to analyse them in terms of the 3 stages of the stress response and/or the anxiety and performance curve
	• *compliance:* 4 dropouts between pretest and first group meeting, 3 only attended 1st meeting
	• *integrity of delivery:* not specified
	• *economic information:* not specified
	• *theoretical basis:* not specified

Outcomes	**Outcomes collected and reported:** • thriving/resilience - CD-RISC-10 • optimism/optimistic explanatory style - ASQ (only at post-intervention) • personal control explanatory style - ASQ • depression - BDI-II **Time points measured and reported:** 1) pre-intervention; 2) post-intervention **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors for the number of participants randomised (N = 73?) in total and to each group as well as for the means and SDs for the outcomes in both groups at each time point (Gerson 2018a [pers comm]). In a second inquiry, we also asked if healthcare students were included in the sample and whether subgroup data could be provided, but received no response **Study start/end date:** not specified (held at start of new school year) **Funding source:** supported in part by a Summer Undergraduate Research Fellowship provided by the Office for Undergraduate Research of California Lutheran University **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** approved by the university's IRB **Comments by study authors:** not relevant **Report ID (e.g. duplicate publications, follow-up studies):** not relevant **Miscellaneous outcomes by the review authors:** means, SDs and sample sizes for both groups at pre- and posttest for resilience and depression provided by authors; unclear if psychology students were included in the study **Correspondence:** Marylie W. Gerson; Department of Psychology, California Lutheran University, 60 W. Olsen Road, mail code 3800, Thousand Oaks, CA 91360, USA; mgerson@callutheran.edu

Harrer 2018

Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** The sample size allowed the detection of effect sizes of d = 0.41 with a power (1− β) of 0.80 with α of.05 and was based on a

Harrer 2018 *(Continued)*

	meta-analysis on internet-based interventions for college students, which reported an SMD of 0.73 for stress but lower effects for depression outcomes (SMD = 0.43). A sample size of 150 was therefore chosen to detect significant changes for secondary outcomes in this study such as depression **Imputation of missing data:** Analyses based on the intention-to-treat (ITT) principle were conducted, with missing data imputed using a Markov chain Monte Carlo multivariate imputation algorithm with 100 estimations per missing and all variables set as predictors for imputation. Imputed datasets were then aggregated to obtain 1 imputed dataset; completer analysis + ITT analysis
Participants	**Country:** Germany **Setting:** internet- and app-based intervention **Age:** mean = 24.1 (SD = 4.1) years **Sample size (randomised):** 150 **Sex:** 112 women, 38 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** depression (CES-D; 0 - 45) : IG: 24.31 (9.06), CG: 23.97 (8.63); anxiety (Spielberger STAI; 6 - 24): IG: 16.05 (3.37), CG: 15.77 (4.22); emotional exhaustion (MBI; 5 - 30): IG: 21.63 (4.49), CG: 22.27 (4.31); 106 participants (76.8%) indicated that they were first-time help-seekers; 77.3% (IG: 58/75; CG: 58/75) showed clinically relevant depressive symptoms at baseline **Population description:** college students at German-speaking universities with elevated levels of stress (PSS-4 ≥ 8) **Inclusion criteria:** 1) elevated levels of perceived stress (PSS-4 ≥ 8; representing a level of stress one SD = 2.92 above the mean of 4.49 in a large student sample); 2) enrolment in a German-speaking university at the beginning of the training; 3) age ≥ 18 years; 4) internet access; 5) willingness to provide self-report data at all assessment points; 6) informed consent **Exclusion criteria:** 1) self-reported diagnosis of dissociative symptoms or psychosis in the past; 2) considerable risk for suicide (BDI item 9 > 1; "I feel I would be better off dead" or "I would kill myself if I had the chance") **Attrition (withdrawals and exclusions):** post-intervention: 11 lost to assessment (all in IG, 14.7%); all participants in CG (n = 75) provided data; follow-up: 45 lost to assessment (IG: 35/46.7%, CG: 10/13.3%) **Reasons for missing data:** not specified for 56 lost to assessment/follow-up at different assessments

Interventions	**Intervention:** TAU + StudiCare Stress (n = 75)
	
	• *delivery:*
	  ◦ StudiCare Stress: internet- and mobile-based training with feedback on demand
	  ◦ personal diary app could be downloaded by participants
	  ◦ Before beginning with the intervention, participants could request automatic daily messages containing short motivational prompts and ultrabrief training exercises by SMS (short message service), aimed at facilitating transfer of learned strategies into daily life routine
	• *providers:*
	  ◦ participants guided by eCoach, a trained student in a master's programme in psychology
	  ◦ contact between eCoach and intervention participants solely established online (no face-to-face meeting)
	  ◦ guidance consisted of 3 parts: (1) monitoring adherence (sending up to 3 reminders when a module was not completed during 1 week through the internal platform messaging system and by email), (2) checking the intervention platform back-end for participants who had completed a new module to unlock the next module and send standardised motivational messages through the platform (3) providing feedback on demand
	  ◦ When requesting help, participants received feedback within 48 hours
	  ◦ feedback reflected participants' individual questions and problems and gave positive reinforcement
	  ◦ feedback on demand available for each participant from module 1 until completion of the booster session and was given by the internal messaging system of the training platform
	• *duration of treatment period and timing:* eight main 30- to 90-minute modules; participants advised to complete at least 1 and maximum of 2 modules a week; i.e. intervention intended to be

Harrer 2018 *(Continued)*

completed in about 5 - 7 weeks; participants instructed to monitor their mood 2 to 3 times each week, using either the app or a printout of the PDF for their entries

- *description:*
  - TAU: routine health care
  - StudiCare Stress: 8 main modules
    - SESSION 1: INTRODUCTION: psycho-education, information about stress and preview of subsequent sessions
    - SESSION 2: PROBLEM-SOLVING: stress management strategies, systematic problem-solving using a 6-step individualised problem-solving heuristic
    - SESSION 3: MUSCLE- AND BREATH RELAXATION: recap and modification of the problem-solving heuristic, information on basic principles of muscle and breath relaxation, audio exercises for daily usage
    - SESSION 4: MINDFULNESS: recap of muscle- and breath relaxation and addition of detached mindfulness components into the routine, metacognitive strategies for dealing with self-criticism
    - SESSION 5: ACCEPTANCE AND TOLERANCE: recap of metacognitive strategies, dealing with unsolvable problems, psycho-education on and exercises for acceptance and tolerance of unpleasant emotions
    - SESSION 6: SELF-COMPASSION: fostering self-compassion in precarious situations, defusion of self-worth and performance, writing a self-compassionate letter, cognitive restructuring to overcome dysfunctional perfectionistic thought-action patterns
    - SESSION 7: MY MASTER PLAN: recognising physical warning signs, recap of coping strategies for solvable and unsolvable stressors, creating a plan for the future
    - SESSION 8: BOOSTER SESSION: further information on self-help and psychotherapy, evaluation of training transfer, recap of all sessions, repetition of previous exercises, finding future directions for development
  - Elective modules integrated at the end of sessions 2 to 7 could be chosen based on individual need and interest, covering student-specific topics: social support, rumination and worrying, time management, procrastination, test anxiety, sleep, motivation, nutrition and exercise, and dealing with writer's block and concentration:
    - SOCIAL SUPPORT: communication styles, receiving and providing support
    - RUMINATION & WORRYING: reflection on positive and negative aspects of worry, coping with uncertainty
    - TIME MANAGEMENT: effective time scheduling, common planning fallacies, learning to prioritise procrastination Identifying situations in which procrastination occurs, strategies to reduce procrastination
    - TEST ANXIETY: effective studying techniques, using paradoxical intentions, de-catastrophising blackouts
    - SLEEP: sleep restriction
    - MOTIVATION: finding reasons for lacking motivation, exercising delay of gratification
    - NUTRITION & EXERCISE: creating an individual eating and exercise schedule, dealing with relapses
    - DEALING WITH WRITER'S BLOCK: reasons and coping strategies for writer's block
    - CONCENTRATION: audio-based concentration exercises
  - strong emphasis on transfer of acquired knowledge, strategies, and techniques into the students' daily life through homework assignments
  - general structure of app-based diary entries:
    - How do you feel today? (emoticons: happy–sad–anxious–angry)
    - How stressed out do you feel today? (rating scale 1 - 10)
    - Describe what happened today. (free text)
    - Were you able to identify any things contributing to your stress levels today? (free text)
    - Are there any techniques you previously learned that you may be able to apply? (free text)
    - Do you want to add a photo to your entry? (upload button)
- *compliance:*
  - On average, participants in the IG completed 5.05 modules (SD 2.78), which equals 72.1% of the intervention; participants completed optional add-on modules in most sessions (82.1%) in

Harrer 2018 *(Continued)*

which they were available; most participants completed rumination & worrying (59%, 44/75), whereas only 8 of the 75 participants completed social support (11%)
    - 46 of the 75 participants in the IG (61%) downloaded and logged into the diary app at least once
    - Activation of the automated SMS messages was requested by 4 of 75 participants in the IG (5%) during the study
    - Very few participants (5%, 4/75) requested individual feedback, resulting in 5 content feedbacks for the entire sample. The eCoach sent 289 reminders (3.85 reminders per participant)
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:*
    - based on cognitive-behavioural and third-wave techniques and aligns with Lazarus' transactional model of stress in differentiating between problem-focused and emotion regulation–focused coping
    - derived from GET.ON Stress, a Web-based stress management intervention for employees

Control: TAU + wait-list control (n = 75)

- *delivery:* for TAU not specified
- *providers:* TAU offered by routine health care
- *duration of treatment period and timing:* for TAU not specified
- *description:* were not given access to intervention until 3 months after randomisation, but had full access to TAU
- *compliance:* not specified
- *integrity of delivery:* for TAU not specified
- *economic information :* for TAU not specified
- *theoretical basis:* for TAU not specified

Outcomes

Outcomes collected and reported:

Primary outcome:

- perceived stress - PSS-4

Secondary outcomes:

Mental health:

- depression - CES-D
- state anxiety - STAI
- well-being/overall marker of mental health - WHO-Five Well-Being Index
- emotional exhaustion - subscale MBI

Risk and protective factors:

- dysfunctional perfection - Revised Almost Perfect Scale
- resilience - CD-RISC-10
- self-compassion - SCS
- self-esteem - RSES

College-related outcomes:

- academic work impairment (presenteeism and loss of productivity) - Presenteeism Scale for Students subscale for work impairment (Work Impairment Scale)
- academic productivity losses - adaption of the Presenteeism Scale for Students' work output scale (current percentage to which participants were able to reach usual academic productivity)
- academic self-efficacy - academic self-efficacy scale
- academic worrying - Academic Worrying Questionnaire

Additional measures:

Harrer 2018 *(Continued)*

- demographic variables
- prior contact with professional health providers **- not reported**
- satisfaction with intervention (only IG) - Client Satisfaction Questionnaire adapted to web-context
- treatment credibility and expectancies - Credibility and Expectancy Questionnaire

Time points measured and reported: 1) pre-intervention; 2) post-intervention; 3) 5-week follow-up (at 3 months after randomisation; i.e. 5 weeks after end of 7-week intervention); treatment credibility and expectancies only measured at pre-intervention
Adverse events: not specified

Notes	**Contact with authors:** We contacted the authors for information on whether the intervention focused on fostering resilience and if healthcare students were included in the sample, but received no response **Study start/end date:** 9 May 2016 (start of recruitment) - 30 January 2017 (follow-ups completed) **Funding source:** partly funded by BARMER (major healthcare insurance company in Germany) **Declaration of interest:** Daniel David Ebert (DDE) reports to have received consultancy fees or served in the scientific advisory board from several companies such as Minddistrict, Lantern, Schön Kliniken, and German health insurance companies (BARMER, Techniker Krankenkasse). DDE and Mathias Harrer are also stakeholders of the Institute for health trainings online (GET.ON), which aims to implement scientific findings related to digital health interventions into routine care. Harald Baumeister reports to have received consultancy fees and fees for lectures or workshops from chambers of psychotherapists and training institutes for psychotherapists. In the past 3 years, Ronald C Kessler (RCK) received support for his epidemiological studies from Sanofi Aventis, was a consultant for Johnson & Johnson Wellness and Prevention, Sage Pharmaceuticals, Shire, Takeda, and served on an advisory board for the Johnson & Johnson Services Inc, and Lake Nona Life Project. RCK is a co-owner of DataStat, Inc, a market research firm that carries out health care research. **Ethical approval needed/obtained for study:** approved by the University of Erlangen-Nuremberg ethics committee (Erlangen, Germany; 322_15 B) **Comments by study authors:** study carried out as part of the WHO World Mental Health International College Student project; trial registration number: German Clinical Trial Register DRKS00010212; website, studicare.com **Miscellaneous outcomes by the review authors:** According to the feedback from the authors in another trial (DRKS00011800) using an intervention (StudiCare Fernstudierende) that is adapted from the intervention investigated here (StudiCare Stress), the intervention also aims to foster health-promoting factors (secondary outcomes), such as resilience and the reduction of perceived stress; but unclear if healthcare students were included in the final sample **Correspondence:** Mathias Harrer, BSc; Clinical Psychology and Psychotherapy; Friedrich-Alexander-University Erlangen-Nuremberg, Nägelsbachstraße 25a, Erlangen, 91052, Germany; mathias.harrer@fau.de; Phone: 49 1708237654

Heath 2020

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Herrero 2019

Methods	**Study design:** RCT **Study grouping:** parallel **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** So far, there are no data about the effect sizes that can be obtained in Internet-based interventions for the prevention of depression or other common mental health disorders mainly focusing on promoting resilience. However, previous studies on online interventions have shown effect sizes of between 0.36 and 0.50 for the reduction of symptoms of depression and between 0.32 and 0.42 for the reduction of symptoms of anxiety. At least similar effects on improving resilience are expected. Adopting a conservative approach, the sample size is based on the smallest effect size detected in previous studies (Cohen's d = 0.32), a significance level of 0.05, a power of 0.80, and a dropout rate of 30%, on the primary outcome measure (CD-RISC). The planned sample size of 464 participants is sufficient to detect a small effect size (Cohen's d = 0.32). Covariate adjustment for relevant baseline prognostic factors will further increase the power. To ensure recruitment feasibility, 5 universities (with an estimated number of 170,000 students) will take part in the trial **Imputation of missing data:** according to study protocol, intention-to-treat and per-protocol analysis; to assess the effect of missing data on the primary analysis the primary outcome will be reanalysed after a multiple imputation strategy (developed within blinded data review) was applied to the data; ITT sample comprises all randomised participants who provided the primary outcome measure within the initially assigned study arm
Participants	**Country:** Spain, Germany, Switzerland **Setting:** internet-based programme **Age:** not specified in study protocol and conference abstract **Sample size (randomised):** 464 (planned) **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** university students with low levels of resilience **Inclusion criteria:** 1) university students with a score of 1 SD below the mean of the sample on the CD- RISC-25; 2) adequate knowledge to understand and read Spanish or German; 3) access to the internet, and the ability to use a computer **Exclusion criteria:** 1) university students with a history of a common mental health disorder in the past 12 months; 2) university students who are on a waiting list for psychotherapy or are currently or have been in psychotherapeutic treatment within the past 12 months; 3) individuals with a current psychotic or bipolar disorder or a history of one; 4) individuals at risk for suicide **Attrition (withdrawals and exclusions):** not specified in study protocol and conference abstract **Reasons for missing data:** not specified in study protocol and conference abstract

Interventions	**Intervention:** unguided internet-based intervention CORE (Cultivating our Resilience; also named as ICare-R in conference abstract Botella 2016 (n = 232 planned)
	• *delivery:*
	  ◦ internet-based; CORE runs on Minddistrict platform, a web-based eHealth platform
	  ◦ Minddistrict is the technology partner within the ICare project. The Minddistrict platform allows researchers and therapists to produce intervention content and deliver this content to patients. Among the tools that the platform provides, this trial includes the possibility to record daily data in a mobile application, the use of a logical sequence that allows the therapist to deliver specific content related to the answer given by the patient (conditional content). Moreover, it ensures secure and encrypted communication between patients and therapist
	  ◦ includes multimedia elements (videos, audios, vignettes, images); allows user to keep different records through PC and Tablet
	• *providers:* unguided
	• *duration of treatment period and timing:* 6 weeks (weekly sessions/modules)

Herrero 2019 *(Continued)*

- *description:*
  - main objective: to teach skills and strategies to cope with daily life stressors in order to enhance resilience and coping skills, promote self-empowerment, and increase well-being
  - 6 interactive modules for weekly sessions:
    - welcome: introduction module to the programme, with an explanation about the tools and how to use CORE
    - psycho-education; explanation of psychological well-being and the concept of resilience: a) understand the concept of psychological well-being, its most important aspects, and their relevance in life; b) understand the concept of resilience and the importance of training and cultivating it
    - autonomy; building my way enhancement of autonomy: a) develop a healthy lifestyle (by pursuing balance in several areas: activity, food, sleep). This lifestyle will allow the person to focus on his/her goals in life; b) increase psychological well-being by working on the abilities and potentially related to values and goals in life
    - mindfulness and self-compassion; training in mindfulness, savouring, and an attitude of self-compassion: a) learn the meaning of "mindfulness", how to develop this ability, and the benefits that its practice can bring; b) learn to distance ourselves from our thoughts and how to handle them; c) understand the importance of, recognise, capture, and enjoy the good moments; d) develop the skill of kindness and self-care, i.e. the capacity for self-compassion
    - overcoming obstacles; development of coping strategies to deal with daily difficulties in life: a) be aware of the importance of facing problems properly; b) learn the problem-solving technique and how to apply it; c) learn the role of our thoughts in the way we feel and how to be flexible in our way of interpreting situations
    - connecting to others; acknowledge the relevance of relationships and how they can be helpful in the construction of well-being: a) recognise the importance of our social relations; b) learn to care for and improve our social relations; c) learn to promote quality relationships, which can contribute to maintaining and strengthening resilience
    - purpose in life and personal growth: encourage students to deal with the future with a positive attitude, taking into account what is important for each person and planning the future according to these objectives
  - organised in 6 dimensions: autonomy, self-acceptance, environmental mastery, purpose in life, positive relations, and personal growth
  - modules also include exercises to practice proposed skills
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* therapeutic components are evidence-based techniques selected following the Riff model of well-being

Control: TAU (n = 232 planned)

- *delivery:* not specified
- *providers:* not specified in study protocol and conference abstract
- *duration of treatment period and timing:* not specified
- *description:* usual attention at university; receive access to prevention programme CORE by end of last follow-up
- *compliance:* not specified
- *integrity of delivery:economic information:* not specified
- *theoretical basis:* not specified

Outcomes	**Outcomes collected and reported:** Primary outcome: • resilience - CD-RISC Secondary outcomes:

Herrero 2019 *(Continued)*

- well-being - Ryff Scales of PWB-29
- depression - PHQ
- positive affect - PANAS
- negative affect - PANAS
- anxiety - Generalized Anxiety Disorder Questionnaire
- perceived stress - PSS-4
- self-esteem - RSES
- self-compassion - SCS - Short Form
- enjoyment - EOS
- substance abuse - AUDIT-Consumption
- personality - 10-Item Big Five Inventory
- economic evaluation - Client Service Receipt Inventory (CSRI)
- programme evaluation - CEQ; Client Satisfaction Questionnaire
- working alliance - Working Alliance Inventory for Technology Based Interventions

Other measures:

- sociodemographic data

Outcomes reported not specified
Time points measured and reported: 1) pre-intervention; 2) during intervention (4 weeks); 3) post-intervention (8 weeks); 4) 4-month follow-up (at 6 months/24 weeks, i.e. 6 weeks after 8-week intervention); 5) 10-month follow-up (at 12 months/48 weeks, i.e. 40 weeks after 8-week intervention); resilience at screening, pre-intervention, post-intervention and follow-ups; depression, anxiety, PANAS and perceived stress at all time points but screening; personality and CEQ only at pre-intervention; self-esteem, alcohol at pre-, mid-, and post-intervention; well-being, self-compassion, CSRI, EOS at pre- and post-intervention and follow-ups; therapeutic alliance at mid- and post-intervention; treatment satisfaction only at post-intervention; **time points reported not specified**
Adverse events: not specified

Notes

Contact with authors: We contacted the authors for the study status and received the response that data could not yet be accessed until the recruitment was finished (Herrero 2018 [pers comm]).

Study start/end date: see trial registration: September 2015 - July 2019
Funding source: Tfunding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 634757
Declaration of interest: no competing interests declared

Ethical approval needed/obtained for study: approved by local ethical commissions in each country
Comments by study authors: trial registration number ISRCTN13856522; study is part of the European research project: Integrating Technology into Mental Health Care Delivery in Europe (ICare, No 634757; http://www.icare- online.eu)

Miscellaneous outcomes by the review authors: see trial registration: recruitment status: no longer recruiting, overall trial status, completed (last update: March 2020); information received from authors: at the end of project, analysis is currently started, first publication expected to be ready by the end of 2019; unclear if final sample included healthcare students
Correspondence: Cristina Botella; Universitat Jaume I, Av. Vicent Sos Banyat s/n, Castellón 12071, Spain; botella@uji.es

ISRCTN17156687

Methods

Study design: RCT
Study grouping: parallel group
Unit of randomisation: individuals

ISRCTN17156687 *(Continued)*

	Power (power & sample size calculation, level of power achieved): not specified in trial registration **Imputation of missing data:** not specified
Participants	**Country:** Finland **Setting:** smartphone-delivered intervention **Age:** range = 18 - 40 years (see inclusion criteria) **Sample size (randomised):** 120 targeted **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** Finnish university students with diagnosed depression **Method of recruitment:** recruited through the Finnish Student Health Service's centres in 4 Finnish cities; Tampere, Turku, Jyväskylä and Helsinki; patients with depression from Finnish Student Health Service (YTHS) **Inclusion criteria:** 1) diagnosis of a depressive disorder (ICD-10 (International Classification of Diseases-10): diagnoses F32 or F33) at the time of enrolment; 2) willingness to commit to the 8-week online therapy programme; 3) no prior established mindfulness practice/meditation experience; 4) aged 18 - 40 years; 5) living in Finland; 6) has a smartphone with iOS or Android mobile operating system; 7) access to mobile internet **Exclusion criteria:** 1) previous suicide attempts; 2) severe suicidal ideation; 3) other serious mental disorders such as psychosis or severe personality disorders; 4) active substance abuse; 5) ongoing psychotherapy **Attrition (withdrawals and exclusions):** not specified in trial registration **Reasons for missing data:** not specified in trial registration

Interventions	**Intervention:** TAU (regular treatment for depression) + Ascend therapy programme (n = 60 planned)
	• *delivery:* delivered by smartphone application provided by Meru Health Inc. (participants do not meet each other physically, but form an online peer-group within the application); combined setting (communication with therapist + communication with group by programme chat; group of 8 - 15 individuals for 8-week course); all information and introductions to practices are given inside the application
	• *providers:* guided by therapist; healthcare professionals with training in MBSR/MBCT and with cognitive behavioural therapy skills
	• *duration of treatment period and timing:* 8 weeks; average of 10 - 40 minutes of daily practice, 6 days a week
	• *description:*
	  ◦ educational material on depression and related symptoms (texts, videos, audios)
	  ◦ audio-guided mindfulness practices (e.g. sitting, walking, body scanning)
	  ◦ cognitive behavioural therapy (CBT)-styled thought reflection (e.g. thought diary)
	  ◦ phone calls with a therapist (default: baseline, and more often only if needed)
	  ◦ chat with a therapist (therapist's response to participant is guaranteed within 24 hours): there are no requirements for the amount (minimum or maximum) of chatting
	  ◦ peer-group: programme participants constitute an anonymous peer-group of 8 - 15 individuals that undergo the programme simultaneously; participants are able to see each other's chat messages with the therapist (group chat), but they are not able to comment on each other's messages. Also, there is a private chat option with the therapist, and participants choose themselves whether they wish to use private chat or group chat.
	  ◦ All participants receive oral and written directive for the potential abrupt depressive symptom worsening, where contacting physician/going to the emergency is recommended, along with contacting one's own Ascend programme therapist
	• *compliance:* not specified
	• *integrity of delivery:* not specified
	• *economic information (intervention cost, changes in other costs as result of intervention):* not specified
	• *theoretical basis:* mindfulness- and CBT-based

ISRCTN17156687 *(Continued)*

Control: TAU (n = 60 planned)

- *delivery:* not specified
- *providers:* delivered by Finnish Student Health Service
- *duration of treatment period and timing:* frequency of the appointments is modified according to patients' individual needs
- *description:*
  - TAU may include appointments with nurses, psychologists and/or physicians, laboratory tests, and it may or may not include antidepressant medication
  - TAU does not involve any psychotherapy
  - possibility of attending Ascend therapy programme free of charge once study is completed
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* not specified

Outcomes	**Outcomes collected and reported:** Primary outcome: • depressive symptoms - PHQ 9 Secondary outcomes: • anxiety symptoms - GAD7 • sleep problems - ISI • quality of life - EUROHIS-Qol 8-item index • internalization of mindfulness skills - FFMQ - Short Form • experienced stress symptoms - PSS • resilience - RS • user-friendliness of mobile phone (online therapy programme) application - System Usability Scale Outcomes reported not specified **Time points measured and reported:** 1) pre-intervention; 2) 2 weeks; 3) 4 weeks 4) 6 weeks; 5) 8 weeks; 6) 3 months; 7) 6 months post-intervention; user-friendliness of mobile phone application only measured at 8 weeks; **time points reported not specified** **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors to ask if the trial also included healthcare students, but received no response **Study start/end date:** 1 April 2018 - 31 December 2019 **Funding source:** Meru Health Inc.; Lifeline Ventures Inc. **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** Ethics Committee of the Tampere University Central Hospital **Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** recruitment status: not longer recruiting; overall trial status: completed (last updated: September 2019); unclear if healthcare students included in final sample **Correspondence:** Dr Anu Raevuori; Meru Health; Lapinlahdenkatu 16, Helsinki 00180, Finland

Jackson 2019

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Kanekar 2010

Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** A sample size of 25 students in each group was reached considering an alpha of 0.05, power of 0.70 and estimated effect size of 0.70; study accounted for attrition of 5 participants and hence the sample size was increased to 30 per group; some of the limitations of the study: small sample size (considerable dropout of 21) **Imputation of missing data:** no imputation of missing data reported; unclear how many participants dropped out of the intervention and how many did not complete the questionnaires; probably available-case analysis (only participants for whom outcomes were obtained) and per-protocol analysis (only participants who completed allocated intervention)
Participants	**Country:** USA **Setting:** large research-1 university in Ohio **Age:** mean = 24.67 (SD = 2.68); range = 21 - 33 years **Sample size (randomised):** 60 **Sex:** 5 women, 34 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** No-one in the study population ever had mental illness and the group was mentally healthy **Population description:** international students of Asian Indian origin enrolled full-time at large Research-I university in Ohio **Inclusion criteria:** 1) student had to be an Indian citizen by birth; 2) student must have lived for at least 15 years in India immediately prior to entering the USA **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** high dropout rate (n = 21 dropouts) **Reasons for missing data:** not specified; reasons can be conjectured to be time commitment to the study, participant interest in the study, length of survey instrument
Interventions	**Intervention:** internet-based intervention to enhance social support, hardiness, and acculturation (n = 30) • *delivery:* web-based instruction; online instruction delivered through BlackboardTM; reminder e-mails sent once a week to encourage participants to complete the online modules and attempt the activities • *providers:* self-guided intervention • *duration of treatment period and timing:* 3 sessions over 2 months

Kanekar 2010 *(Continued)*

- *description:*
  - focused on social support, hardiness and acculturation
  - SESSION 1: social support; discusses types of social support, benefits of social support, relationship between social support and mental health; activities for participants to identify and build social support around them
  - SESSION 2: hardiness; discusses benefits of hardiness, activities to increase commitment, control and challenge
  - SESSION 3: acculturation; discusses different components of acculturation; benefits of acculturation; ways one could increase acculturation in the American culture
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information* cash incentive
- *theoretical basis:* no theoretical foundation specified; multimodal

Control: attention control (general health awareness and wellness intervention; n = 30)

- *delivery:* web-based instruction; online instruction delivered through BlackboardTM; reminder e-mails sent once a week to encourage participants to complete the online modules and attempt the activities
- *providers:* self-guided intervention
- *duration of treatment period and timing:* 3 sessions over 2 months
- *description:*
  - focused on general health awareness and wellness
  - SESSION 1: wellness and eating; information on identifying dietary habits, ways for maintaining regular weight and response of body to variety of foods
  - SESSION 2: wellness and physical activity; information on motivation for physical activity, easy steps for physical activity, ways to maintain regular physical activity
  - SESSION 3: wellness and thinking; ways to maintain positive attitude, increasing will power, and developing opportunities for creative expression
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information:* cash incentive
- *theoretical basis:* not specified

Outcomes

Outcomes collected and reported:

- mental health - Kessler Psychological Distress Scale-K-10
- social support - ISEL
- social support, belonging - ISEL
- social support, appraisal - ISEL
- social support, tangible support - ISEL
- acculturation - American International Relations Scale
- acculturation, language usage - American International Relations Scale
- acculturation, perceived prejudice - American International Relations Scale
- acculturation, acculturation - American International Relations Scale
- hardiness - hardiness scale
- hardiness, challenge - hardiness scale
- hardiness, commitment - hardiness scale
- hardiness, control - hardiness scale

Time points measured and reported: 1) pre-intervention; 2) post-intervention
Adverse events: not specified

Notes

Contact with authors: We contacted the authors about the inclusion of healthcare students in the sample. We received the response from the authors that "health-related international students were not specifically targeted by the study and there could have been some health professionals in

Kanekar 2010 *(Continued)*

	the sample; the sample was composed of international students from diverse departments across the university campus" (Kanekar 2019 [pers comm]). **Study start/end date:** not specified **Funding source:** not specified **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** IRB approval at the University of Ohio (June 2007) **Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** according to authors, there could have been some health professionals in the final sample, but unclear how many and which participants **Correspondence:** Prof. Manoj Sharma, PhD; Health Promotion and Education, University of Cincinnati, P.O. Box 210068 Cincinnati, OH 45221-0068; manoj.sharma@uc.edu; manoj.sharma@jsums.edu

Kon 2019

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Liu 2016

Methods	**Study design:** randomisation unclear based on full text **Study grouping:** not specified **Unit of randomisation:** not specified **Power (power & sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified
Participants	**Country:** not specified **Setting:** training setting not specified **Age:** not specified **Sample size (randomised):** not specified **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** college students (who want to improve the mental ability, interpersonal skill, with good mental state instead of obvious psychological disorder) **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** positive group psychology counselling (n randomised not specified) • *delivery:* group setting; probably face-to-face • *providers:* not specified

Liu 2016 *(Continued)*

- *duration of treatment period and timing:* 8 weeks
- *description:*
  - The scheme of group psychology counselling is based on the idea and method of positive psychology and combines with the reality of the school as well as the protective principle of resilience
  - Create the positive and warm atmosphere of group guidance and accept the response of the members, designing the scheme from the 5 dimensions of the resilience:
    - purpose concentration: learn the concept of positive psychology and train to focus on the positive aspects
    - emotional control: perceive the emotion, allow the existence of unhealthy emotions and learn methods to deal with it
    - positive cognition: learn the emotional ABC theory, actively adjust the cognition and train positive thinking
    - family support: introspect the relation with parents and carry out gratitude training
    - interpersonal assistance: find out methods to deal with interpersonal problems through brainstorming and learn to improve ability in the interpersonal communication through face-to-face interaction
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* positive psychology

Control: no intervention (n randomised not specified)

Outcomes	**Outcomes collected and reported:** • resilience (total score) - Adolescent Resilience Scale • resilience dimension, purpose concentration • resilience dimension, emotional control • resilience dimension, positive cognition • resilience dimension, personal strength • resilience dimension, family support • resilience dimension, interpersonal assistance • resilience dimension, sustaining strength • thinking, gain and growth - Group Activity Unit Record Chart to carry out qualitative evaluation **- not reported** **Time points measured and reported:** 1) pre-intervention; 2) post-intervention **Adverse events:** not specified
Notes	**Contact with authors:** We were not able to contact the authors to ask for the study design (randomisation) and the potential inclusion of healthcare students, since we had no contact data (e-mail address) of the authors **Study start/end date:** not specified **Funding source:** Funds Project: 2015 Heilongjiang Province Philosophy and Social Science Planning Project **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** not specified **Comments by study authors:** Lian Liu, female, the Han nationality, master, research direction: Psychological health education **Miscellaneous outcomes by the review authors:** several eligibility criteria of this review unclear for this study (randomisation; inclusion of healthcare students) **Correspondence:** Lian Liu; Heihe University; Heihe, China

Liu 2019

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

NCT02867657

Methods	**Study design:** RCT **Study grouping:** parallel **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified in trial registration **Imputation of missing data:** not specified
Participants	**Country:** Denmark **Setting:** training setting not specified **Age:** not specified **Sample size (randomised):** 72 (estimated enrolment) **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** bachelor students at Danish Universities and University Colleges **Inclusion criteria:** 1) age 18 years and older (adult, older adult); 2) bachelor student at a Danish Universities or University Colleges; 3) a score of 16 or above on the PSS **Exclusion criteria:** 1) smoking; 2) psychiatric diagnosis (depression, anxiety, adjustment disorder, post-traumatic stress disorder, personality disorder, psychosis); 3) untreated ADHD, autism, abuse and risk of suicide **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** mindfulness in nature (n randomised not specified) • *delivery:* not specified; probably face-to-face • *providers:* not specified • *duration of treatment period and timing:* 5 days • *description:* mindfulness retreat in nature; MBSR curriculum with meditation and yoga • *compliance:* not specified • *integrity of delivery:* not specified • *economic information:* not specified • *theoretical basis:* MBSR **Control 1:** attention control: mindfulness indoor (n randomised not specified) • *delivery:* not specified; probably face-to-face • *providers:* not specified • *duration of treatment period and timing:* 5 days

NCT02867657 *(Continued)*

- *description:* mindfulness retreat indoor; MBSR curriculum with meditation and yoga
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* MBSR

Control 2: wait-list control (n randomised not specified)

- *delivery:* not specified; probably face-to-face
- *providers:* not specified
- *duration of treatment period and timing:* 2 days
- *description:* mindfulness retreat in nature is offered 6 months later
- *compliance:* not specified

Outcomes

Outcomes collected and reported:

Primary outcomes:

- stress - PSS
- self-compassion - SCS

Secondary outcomes:

- mindfulness - FFMQ
- breath counting - behavioural measurement of attention
- Nuclear Factor-kB gene expression
- Interleukin (IL)-1 gene expression
- IL-6 gene expression
- C-reactice protein expression
- heart rate variability
- blood pressure
- Connectedness to Nature Scale
- Glucocorticoid Receptor gene expression
- Receptor-interacting serine/threonine-protein kinase-2 gene expression
- Tumor Necrosis Factror (TNF)-α gene expression
- C-C Motif Chemokine Ligand 5 gene expression
- IL-8 gene expression
- Telomerase reverse transcriptase (TERT) gene expression
- TERC gene expression
- IL-1β protein expression
- IL-2 protein expression
- IL-4 protein expression
- IL-6 protein expression
- IL-8 protein expression
- IL-10 protein expression
- IL-12p70 protein expression
- IL-13 protein expression
- TNF-α protein expression
- Interferon-ɣ protein expression

Outcomes reported not specified
Time points measured and reported: 1) post-intervention (at end of 5-day retreat); time points reported not specified
Adverse events: not specified

NCT02867657 *(Continued)*

Notes	**Contact with authors:** We contacted the authors for the trial status and the potential inclusion of healthcare students, but received no response **Study start/end date:** June 2016 - November 2018 (estimated completion date according to trial registration) **Funding source:** VIA University College **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** not specified **Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** unclear if healthcare students were included; trial status unclear **Correspondence:** Jesper Dahlgaard, PhD; VIA University College, Aarhus, Denmark, DK-8200; jesd@via.dk; phone: +45 8755 2992

NCT03669016

Methods	**Study design:** RCT **Study grouping:** parallel **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified
Participants	**Country:** Finland **Setting:** face-to-face training: training setting not specified; internet-based training: online **Age:** not specified **Sample size (randomised):** 120 (estimated enrolment) **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** undergraduate students of Faculty of Medicine **Inclusion criteria:** 1) all undergraduate students of Faculty of Medicine, University of Helsinki who have started their studies in year 2009 or later **Exclusion criteria:** 1) students who can not participate fully in the intervention (self-evaluated); 2) students who have severe mental problems (like anxiety or depression) when the study starts; 3) students who have had a great loss or trauma in near past, or some other mental or physical health problem that could make participation difficult. This is evaluated based on how the students answer the following measures in the baseline questionnaire: answers to the CORE-OM questionnaire, answers to the questions where students evaluate themselves for anxiety, depression, mental health. If students say they have some other mental disorder, they are not accepted into the study **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention 1:** Face-to-face group-based mindfulness (n randomised not specified) • *delivery:* face-to-face; group setting • *providers:* not specified • *duration of treatment period and timing:* 8 weekly 75- to 90-minute sessions; participants are supposed to practise mindfulness skills in spare time 10 - 30 minutes a day • *description:* manual from Cambridge University *Mindfulness Skills for Students* is used • *compliance:* not specified • *integrity of delivery:* not specified • *economic information:* not specified

NCT03669016 *(Continued)*

- *theoretical basis:* based on Jon Kabat-Zinn's course Mindfulness Based Stress Reduction (Kabat-Zinn 1990) and Williams 2011; adapted for university students

Intervention 2: Internet-based mindfulness training (n randomised not specified)

- *delivery:* internet-based
- *providers:* self-guided
- *duration of treatment period and timing:* 8-week course with 60-minute starting and ending meetings
- *description:* participants practice mindfulness, doing other tasks (writing, reading, reflecting) on their own
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* based on mindfulness and ACT

Control: no intervention (n randomised not specified)

- *description:* wait-list control; no training during the study

Outcomes

Outcomes collected and reported:

Primary outcome:

- Clinical Outcomes in Routine Evaluation Outcome Measure

Secondary outcomes:

- stress - cortisol as stress indicator
- resilience in studies - Workplace Acceptance and Action Questionnaire
- social support in studies - questionnaires of social support
- study load in studies - questionnaire of healthy work measure
- students' possibilities to influence their own studies - healthy work measure
- functional ability in studies - functional ability at work scale
- subjective experience of quality of life - 1 Likert question adapted from different questionnaires
- mental well-being - WEMWS
- personality - parts of Big Five
- sense of coherence - Sense of Coherence Scale
- resilience - RS
- experiences of own health - questionnaire of Kunttu 2017
- quality and length of sleep - Basic Nordic Sleep Questionnaire shortened
- fatigue in day-time - Questionnaire from Health 2000/2001 Research in Findland
- amount of nightmares during previous month - questionnaires Sandman 2015
- own evaluation of mental health - evaluation of symptoms of mental health during previous month
- approximate amount of exercise - Questionnaire from Health 2000/2001 Research in Finland
- regularity of eating habits - own evaluation
- approximate amount of caffeine used daily - own evaluation
- approximate amount of use of alcohol and cigarettes daily - own evaluation
- mindfulness skills - FMI
- stress and recovery of it - healthy work measure
- previous experience in practicing mindfulness and/or meditation - self-evaluation
- amount and quality of independent mindfulness practice - self-evaluation

Outcomes reported not specified
Time points measured and reported: 1) pre-intervention (3 weeks before the intervention starts); 2) post-intervention; 3) 4 months follow-up; for students' possibilities to influence their own stud-

NCT03669016 *(Continued)*

	ies, participants' own evaluation of their mental health, previous experiences in practising mindfulness and/or meditation: only pre-intervention; for amount and quality of independent mindfulness practice: only post-intervention and 4 months follow-up; **time points reported not specified** **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors to ask whether the primary focus of the intervention was on fostering resilience or if resilience was only measured as a secondary outcome, but received no response from the authors **Study start/end date:** August 2018 - April 2019 **Funding source:** sponsor: University of Helsinki **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** not specified **Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** recruitment status according to trial registration: recruiting (last updated in September 2018); unclear if fostering resilience was primary focus; resilience is only mentioned once under secondary outcomes **Correspondence:** principal investigator: Saara Repo, PhD; University of Helsinki, Finland; saara.repo@helsinki.fi; phone: +358405189456

NCT03903978

Methods	**Study design:** RCT **Study grouping:** parallel **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified in trial registration **Imputation of missing data:** not specified
Participants	**Country:** Spain, Argentina and Mexico **Setting:** web-based intervention **Age:** not specified **Sample size (randomised):** 324 (estimated enrolment) **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** Spanish-speaking university students **Inclusion criteria:** 1) age: 18 - 60 years; 2) university students with a SD score below the sample mean on the CD-RISC-25; 3) adequate knowledge to understand and read Spanish and/or be Spanish-speaking; 4) internet access and computer skills **Exclusion criteria:** 1) university students who are on a waiting list for psychotherapy or who are or have been undergoing psychotherapy in the last 12 months; 2) individuals with a current or past psychotic or bipolar disorder; 3) individuals at risk of suicide **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** Unguided web-based resilience intervention (CORE; n = 108 planned) • *delivery:* internet-based; includes multimedia elements (videos, audios, vignettes, images) • *providers:* not specified • *duration of treatment period and timing:* 6 weekly modules

NCT03903978 *(Continued)*

- *description:*
  - main objective is to teach coping skills and strategies to cope with stressful everyday situations in order to improve resilience, promote self-efficacy and increase well-being
  - 6 interactive modules designed for weekly sessions
  - organised in 6 dimensions: autonomy, self-acceptance, environmental mastery, purpose in life, positive relationships, and personal growth
  - Each module includes exercises to practice the proposed skills
  - 6 weekly modules:
    - Welcome: introduction module to the programme, with an explanation about the tools and the way to use CORE
    - psycho-education: explanation of psychological well-being and the concept of resilience
    - autonomy, building my way: enhancement of autonomy
    - mindfulness and self-compassion: training in mindfulness, savouring, and an attitude of self-compassion
    - overcoming obstacles: development of coping strategies to deal with daily difficulties in life
    - connecting to others: acknowledge the relevance of relationships and how they can be helpful in the construction of well-being
    - purpose in life and personal growth: approach the future with a positive attitude, planning goals for the future.
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* Cognitive Behavioral Therapy

Control 1: active control; Healthy lifestyle psycho-educational programme; HLP; n = 108 planned)

- *delivery:* not specified
- *providers:* not specified
- *duration of treatment period and timing:* not specified
- *description:*
  - provides information to promote a healthy lifestyle, on issues related to physical and mental health and physical activity, as well as diet and sleep management
  - beginning of a lifestyle change: The participant will learn to identify healthy and risky behaviours and recognise obstacles that prevent them from adopting a healthy lifestyle
  - physical activity: The importance of "moving on" and activating behaviour will be taught through regular exercise information to improve mood
  - diet: This module is dedicated to teaching the importance of diet for good physical and mental health. The Mediterranean diet will be taken as an example of a balanced diet, because it does not differ from the habits of other countries
  - sleep: The importance of good sleep will be addressed with information and strategies for understanding the relationship between sleep and overall health
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* components of psycho-education based on the intervention protocol for depression (Castro 2015); based on low-intensity psychological intervention models for mild or moderate depressive symptoms in primary care (García-Herrera 2011; NICE 2009; Nieuwsma 2012)

Control 2: wait-list control (n = 108 planned)

- *description:* given access to CORE training after last follow-up; also described as care as usual (CAU)
- *compliance:* not specified

Outcomes	**Outcomes collected and reported:**
	Primary outcome:

NCT03903978 *(Continued)*

- resilience - CD-RISC

Secondary outcomes:

- well-being - Ryff Scales of PWB - 29 items
- depression - PHQ
- responses to positive affect states - Responses to Positive Affect questionnaire
- positive affect - PANAS
- negative affect - PANAS
- anxiety - GADQ
- perceived stress - PSS-4
- self-compassion - SCS - Short Form
- personality - 10-Item Big Five Inventory
- patient expectations and credibility about treatment - CEQ
- client satisfaction with health services - Client Satisfaction Questionnaire
- therapeutic alliance between the technological tool and the patient - Working Alliance Inventory for Technology Based Interventions
- frequency and severity of anxiety symptoms - Overall Anxiety Severity and Impairment Scale
- depression severity and impairment - Overall Depression Severity and Impairment Scale
- expectations and positive affectivity towards the future - Openness to the future Scale

Other outcomes:

- sociodemographic data

Outcomes reported not specified
Time points measured: 1) pre-intervention; 2) post-intervention; 3) 6-month follow-up; 4) 12-month follow-up; **time points reported not specified**
Adverse events: not specified

Notes

Contact with authors: We contacted the authors to ask if the trial also included healthcare students, but only received the response from the authors that they were starting the analysis for the project (Herrero 2019 [pers comm]).

Study start/end date: November 2018 - November 2020 (estimated study completion data)
Funding source: Universitat Jaume I
Declaration of interest: not specified

Ethical approval needed/obtained for study: not specified
Comments by study authors: not relevant

Miscellaneous outcomes by the review authors: unclear if healthcare students were also included in the trial; trial status according to trial registration: enrolling by invitation; last updated in April 2019
Correspondence: study director: Cristina Botella, PhD; University Jaume I, Castellon, Spain

NCT04064372

Methods

Participants

Interventions

Outcomes

NCT04064372 *(Continued)*

Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

NCT04416074

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Noormohamadi 2019

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Oman 2008

Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** To obtain greater statistical power, the trialists focus on comparing the effects of receiving either 1 of the intervention groups against outcomes from a control group; relatively small sample size and correspondingly reduced statistical power for assessing precise changes over time, or differences in treatment effect that may be associated with covariates **Imputation of missing data: OMAN 2008:** not specified; intention-to-treat analysis according to authors, with 44 participants (i.e. including 1 participant who did not participate in assessment at post-test); but per-protocol analysis (without 3 who dropped out before intervention or after Session 1); **SHAPIRO 2011:** LOCF for missing data on several variables at post-intervention (for 1) and 12-month follow-up (for 3); but also per-protocol analysis (without 2 dropouts in MBSR before intervention)
Participants	**Country:** USA **Setting:** undergraduates recruited from catholic university; setting of training not specified **Age:** range = 18 - 24 years **Sample size (randomised):** 47 **Sex:** 35 women, 9 men

Oman 2008 *(Continued)*

	Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline: not specified **Population description:** undergraduate students at a small private university in California (e.g. recruitment in psychology department classrooms) **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** 3 dropouts after randomisation/before intervention (MBSR: 2) or after Session 1 (EPP: 1); post-intervention: 1 lost to follow-up/did not complete assessment; Shapiro 2011: 12-month follow-up: 3 (MBSR: 1, CG: 2) with missing data on several variables **Reasons for missing data:** for 3 dropouts after randomisation/before intervention or after Session 1: death of a parent (n = 1 in EPP), had overextended himself (n = 1 in MBSR), no reason reported (n = 1 in MBSR); reasons for participants lost to follow-up/with missing data in assessments (see also Shapiro 2011) not specified

Interventions	**Intervention 1:** Meditation Management of Stress – MBSR; n = 16; exchange between 2 intervention groups after randomisation due to scheduling conflicts: MBSR: n = 17)
	• *delivery:* face-to-face; group sessions; practising formal sitting meditation, informal discussion, didactics
	• *providers:* not specified
	• *duration of treatment period and timing:* 8 weekly 90-minute sessions
	• *description:*
	  ◦ MMS defined as stress-management programme that teaches a form of sitting meditation as a primary skill (1), teaches non-sitting practices that can be used throughout the day to recover or maintain meditative/calm states of mind (2), cultivation of attitudes or character strengths that support meditative states of mind (3) and drawing motivation through literature or other people who exemplify or actively seek meditative or calm states of mind
	  ◦ IG1 (MBSR):
	  ■ meditation (sitting): mindfulness meditation
	  ■ daily practices (non-sitting or informal): mindful attention, recalling the mind to the breath etc.
	  ■ attitudinal support: patience, letting go, etc.
	  ■ motivational support: poetry reflecting mindfulness perspectives; instructor personally uses and models skills; (encouraged) long-term support to meet regularly with group of others doing similar practices
	• *compliance:* Of 29 participants randomised to 2 intervention groups: 83% attended all (n = 11) or all but one (n = 13) of the 8 sessions.; 3 missed 2 sessions; 2 (1 in MBSR, 1 in EPP) missed 3 or 4 meetings (due to sickness)
	• *integrity of delivery:* not specified
	• *economic information:* not specified
	• *theoretical basis:* corresponded closely to MBSR training
	
	Intervention 2: Meditation Management of Stress – Easwaran's Eight-Point Program (EPP; n = 16; exchange between MBSR and EPP after randomisation due to scheduling conflicts: EPP: n = 15)
	• *delivery:* face-to-face; group sessions; practising formal sitting meditation, informal discussion, didactics
	• *providers:* not specified
	• *duration of treatment period and timing:* 8 weekly 90-minute sessions
	• *description:*
	  ◦ MMS defined as stress-management programme that teaches a form of sitting meditation as a primary skill (1), teaches non-sitting practices that can be used throughout the day to recover or maintain meditative/calm states of mind (2), cultivation of attitudes or character strengths that support meditative states of mind (3) and drawing motivation through literature or other people who exemplify or actively seek meditative or calm states of mind

Oman 2008 *(Continued)*

- IG2 (EPP):
  - meditation (sitting): passage meditation
  - daily practices (non-sitting or informal): focused attention, recalling the mind to a cue word etc.
  - attitudinal support: slowing down, detachment etc.
  - motivational support: reading reflecting meditative perspectives; instructor: personally uses and models skills; (encouraged) long-term support to meet regularly with group of others doing similar practices

- *compliance:* Of 29 participants randomised to MBSR or EPP: 83% attended all (n = 11) or all but one (n = 13) of the 8 sessions.; 3 missed 2 sessions; 2 (1 in MBSR, 1 in EPP) missed 3 or 4 meetings (due to sickness)
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* consisted primarily of training in core EPP practices, such as passage meditation, focused attention and slowing down

2 intervention groups were combined in statistical analysis

Control: wait-list control (n = 15)

- *compliance:* not specified

Outcomes

Outcomes collected and reported:

- perceived stress - PSS
- rumination - rumination subscale Rumination and Reflection Questionnaire
- forgiveness - subscale Heartland Forgiveness Scale
- hope - Adult Dispositional Hope Scale
- mindfulness - Mindfulness Attention Awareness Scale
- subjective well-being - PANAS + SWLS
- self-compassion - SCS
- empathy - Interpersonal Reactivity Index

Time points measured and reported: 1) pre-intervention; 2) post-intervention (after 8-week interventions); 3) 2-month follow-up (2 months post-intervention); 4) 12-month follow-up (12 months post-intervention) (only in Shapiro 2011)
Adverse events: not specified

Notes

Contact with authors: We contacted the authors to ask for the means and SDs for the treatment group (MBSR and EPP combined) for each outcome at each time point and whether the 12-month follow-up had been conducted for the combined IG and not only for MBSR (as reported in Shapiro 2011). We also asked whether healthcare students were included in the final sample, but received no response to our inquiries

Study start/end date: recruitment in fall 2004; exact study dates not specified
Funding source: Metanexus Institute (grant: "Learning from Spiritual Examples: Measures & Intervention"), John Templeton Foundation, Academic Council of Learned Societies, Contemplative Mind in Society, Fetzer Institute, Santa Clara University Internal Grants for Research, and the Spirituality and Health Institute, Santa Clara University
Declaration of interest: not specified

Ethical approval needed/obtained for study: approval from the IRBs of the overall administering organisation and the university
Comments by study authors: not relevant
Miscellaneous outcomes by the review authors: Shapiro 2011 reported part of data of study described in Oman 2008; follow-up study with 12-month follow-up; interventions MBSR and EEP analysed in combined manner in Oman 2008; unclear if psychology students were included in the study

Oman 2008 *(Continued)*

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Palma-Gómez 2020

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Roghanchi 2013

Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** small sample size (n = 24) as main limitation; achieved power not specified **Imputation of missing data:** not specified
Participants	**Country:** Iran **Setting:** university **Age:** mean = 21.53 (SD = 1.86); range = 19 - 24 years **Sample size (randomised):** 24 **Sex:** 16 women, 8 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** first year undergraduate students admitted into the counselling centre at Razi University, Iran **Method of recruitment:** not specified **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** Rational emotive behaviour therapy (REBT) and art therapy (engraving on copper) (n = 12) • *delivery:* face-to-face, group sessions • *provider:* researchers • *duration of treatment period and timing:* 10 weekly 2-hour sessions; REBT sessions: presenting programme of REBT for 50 minutes + summarising for 10 minutes; homework assignments

Roghanchi 2013 *(Continued)*

- *description:*
  - purpose of REBT interventions in this research: change cognitive (thinking), emotive (feeling) with behavioural (acting) techniques for the improvement of participants and to assist them in the development of their individual adaptive behaviour
  - SESSION 1: a) REBT: introducing, "Quick Autobiographies" technique, aims and process group, consent and contract forms, summary and conclusion; b) art: "Breathing" technique, talking about craft, engraving and art therapy, process of engraving, disputing about selected images, summary
  - SESSION 2: a) REBT: "name games" technique, reviewing previous session, "here and now", presenting A-B-C model: A (activating events), B (behaviour), and C (consequence), "self-talk", "Shame-attacking" technique and role-playing, summary and conclusion; b) art: practising "Mirroring" technique and role-playing, pasting pictures onto plates of wood, appearing feeling and thinking about art-making, summary
  - SESSION 3: a) REBT: recalling A–B–C model, representing A–B–C–D–E, "should", "ought", and "musts", presenting homework about A–B–C–D–E model and self-help form, summary and conclusion; b) art: presenting "Self-portraits: Realistic Tools" technique, making chisel, engraving into wood, encouraging members to express their feelings and thinking about process of the meeting and presenting feedback to each other, summary
  - SESSION 4: a) REBT: recalling A–B–C–D–E model, learning of Ellis's 15 main irrational, monitoring negative automatic thoughts and presenting homework assignments, summary and conclusion; b) art: Masks" technique, continuous engraving on the wood and pasting pictures on copper plates, disputing, summary
  - SESSION 5: a) REBT: presenting a summary of previous week sessions, monitoring homework assignment, "cognitive disputing" technique, and role-playing, presenting homework, summary and conclusion; b) art: training "Advertisements" technique and role-playing, starting engraving onto copper, discussing about artwork, presenting feedback, summary
  - SESSION 6: a) REBT: reviewing the previous session; monitoring homework assignment; "Reframing" technique, role-playing and feedback; "Coping self-statements" technique, role-playing, feedback; presenting homework; summary and conclusion; b) art: presenting "Aspects of Self" technique, role-playing; continuous engraving onto plates of copper, discussing about artwork, feedback; summary
  - SESSION 7: a) REBT: reviewing the previous session; monitoring homework assignment, training "imaginal disputing" technique, role-playing, feedback; presenting homework about "imaginal disputing" technique, summary; b) art: presenting "self-statements" technique and role-playing; continuous engraving, discussing about artwork and presenting feedback; summary
  - SESSION 8: a) REBT: reviewing the previous session; monitoring homework assignment, training "behaviour disputing" technique, role-playing, feedback; presenting homework about "behaviour disputing" technique, summarise; b) art: presenting "good or bad" technique, role-playing; continuation of engraving, discussing about artwork, feedback; summary
  - SESSION 9: a) REBT: reviewing the previous session; monitoring homework assignment, explaining "cost-benefit analysis" technique, "lifeline" technique; presenting a design for change in future life; summarise and conclusion; b) art: presenting "Losses" technique and role-playing; continuation of engraving, discussing about artwork, presenting feedback; summary
  - SESSION 10: a) REBT: reviewing the previous session; expressing final sentences by the counsellor, sharing thoughts and feelings concerning the final of the group; encouraging members to express changes, understanding, and insights themselves during the process of REBT; participants wrote a letter about themselves to important people in their lives; b) art: describing "Reviewing Artwork"; separating images created from the pitch; the facilitator closed the group session with arguments of tenderness, presenting positive feedback; post-test assessments (Self-esteem and Resilience Questionnaire) were completed by participants
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information :* not specified
- *theoretical basis:* Rational emotive behaviour therapy: important view to cognitive-behavioural therapy (CBT) as the approach uses cognitive (thinking), emotive (feeling), and behavioural (acting) techniques for the improvement of participants and treatment of mental disorders; art therapy based on Liebmann 2004: warming up, art-making, discussion

Roghanchi 2013 *(Continued)*

	Control: wait-list control (n = 12) • *compliance:* not specified
Outcomes	**Outcomes collected and reported:** • resilience - CD-RISC Persian version • self-esteem - Persian version of Coppersmith's Self-esteem Inventory **Time points measured and reported:** 1) pre-intervention; 2) post-intervention **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors for the SDs for both outcomes at both time points and if there had been any missing data. We also asked if healthcare students had been included in the final sample, but received no response **Study start/end date:** not specified **Funding source:** not specified **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** not specified **Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** unclear if healthcare students were included in the study **Correspondence:** Mahmoud Roghanchi, PhD; School of Social Science, Razi University, Kermanshah, Iran and School of Educational Studies, Universiti Sains Malaysia, 11800 USM, Penang, Malaysia; mahmoudroghanchi@yahoo.com

Seligman 2007

Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power & sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified; available-case analysis (only participants for whom outcomes were obtained)
Participants	**Country:** USA **Setting:** recruited from college; training setting in part probably University of Pennsylvania for classroom-based workshops, also web-based materials and e-mail coaching **Age:** not specified **Sample size (randomised):** 240 **Sex:** 156 women, 84 men **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** depression (BDI): IG: 9.8 (5), CG: 10.4 (5.7); all participants with BDI score 9 - 24 (mild to moderate depressive symptoms); anxiety (BAI): IG: 10 (5.7), CG: 11.8 (7.6) **Population description:** first-year undergraduates at the University of Pennsylvania **Inclusion criteria:** 1) at risk for depression by virtue of scoring between 9 and 24 on the BDI, which are considered mild to moderate levels of depressive symptoms; 2) read and sign the voluntary consent form **Exclusion criteria:** BDI score above 24 (as these individuals were more likely to be in a current major depressive episode, and the purpose of the study was to prevent depression, not to treat current depression; 1.5% above 24) **Attrition (withdrawals and exclusions):** 13 lost to follow-up: pre-intervention (IG: 11, CG: 2); post-intervention: no further loss to follow-up; 6 further losses at 1- follow-up (IG: 4, CG: 2); 9 further losses at 2- follow-up (IG: 6, CG: 3); over total study course: 28 lost to follow-up (IG: 21: CG: 7); attrition rate often exceeds 5.4% **Reasons for missing data:** too busy; studying abroad for 1 or 2 semesters

Seligman 2007 *(Continued)*

Interventions	**Intervention:** cognitive-behavioral workshop along with web-based materials and e-mail coaching (n = 113)
	• *delivery:*
	  ◦ CLASSROOM-BASED WORKSHOP: face-to-face group sessions (10 - 12 participants) with between-meeting homework; workshop manual for leaders; rapport-building, lecturing, PowerPoint presentations with multimedia (video, animation, audio, role-playing by actors), participant role-playing, games and activities, group discussion, homework review, use of detailed participant's notebook with homework and written materials that review major points of workshop; 1 individual meeting with leader
	  ◦ WEB-BASED SUPPLEMENT: interactive (multiple choice questions with feedback for correct answers, links provided when answers were incorrect); COACHING BY E-MAIL after completion of classroom-based workshop; triggered face-to-face boosters (individual) for participants with increase of 4 or more points on BDI over consecutive assessment
	• *providers: w*orkshop leaders + coaches: trained and experienced cognitive therapists who currently or had worked at Aaron Beck's Center for Cognitive Therapy in Philadelphia, Pennsylvania; prior to intervention: 25-hour training from Dr Karen Reivich (developer of structured manual); throughout workshop: supervision by Karen Reivich; in total: 10 leaders who delivered 12 workshops over 2-year period; highly detailed and scripted manual to standardise the delivery of the workshop
	• *duration of treatment period and timing:*
	  ◦ CLASSROOM-BASED WORKSHOPS: 8 weekly 2-hour sessions; between-meeting homework; access to web-based supplement throughout follow-up
	  ◦ COACHING BY E-MAIL in 6 months following completion of workshop (6 e-mails in total)
	  ◦ OPTIONAL BOOSTERS: triggered face-to-face boosters (single 30- to 45-minute booster) when participants had increase of ≥ 4 points on the BDI over consecutive assessments
	• *description:*
	  ◦ CLASSROOM-BASED WORKSHOP: cognitive-behavioural techniques; includes following topics:
	  ■ cognitive theory of change (relationship between thoughts, feelings and behaviours)
	  ■ identifying automatic negative thoughts and underlying beliefs
	  ■ marshalling evidence to question and dispute automatic negative thoughts and irrational beliefs (empirical hypothesis testing)
	  ■ replacing automatic negative thoughts with more constructive interpretations, beliefs and behaviours (generating alternatives, thought-stopping, distraction techniques)
	  ■ behavioral activation strategies (graded task breakdown, time management, anti-procrastination techniques, creative problem-solving, assertiveness training)
	  ■ interpersonal skills (active listening, taking each other's perspectives, controlling emotions, passive vs assertive vs aggressive behaviours)
	  ■ stress management (relaxation training)
	  ■ generalising these coping skills to new and relevant situation
	  ◦ INDIVIDUALISED MEETING with leader early in the workshop:
	  ■ introduce leader to the participant and build rapport
	  ■ address participant's initial concerns and questions
	  ■ guide participant in identifying key challenges and stresses where skills taught in workshop could be most helpful
	  ◦ WEB-BASED SUPPLEMENT (WBS): homework and review materials from workshop, relevant reading materials and special topics that enabled students to apply basic cognitive-behavioural skills to issues of personal interest; interactive Web materials (at numerous points, participants are asked multiple choice questions to determine skill acquisition, receive feedback on whether their answers were correct and are provided with links to relevant materials when their answers were incorrect)
	  ◦ COACHING BY E-MAIL: trainers continue to stay in touch with workshop participants after end of workshop; every few weeks e-mails that contain refreshers of skills taught in the workshop, tips

Seligman 2007 *(Continued)*

and exercises to try; coaches offer feedback and further coaching if participants have any questions; in each e-mail, participants are encouraged to use the web-based resilience resources
    - TRIGGERED FACE-TO-FACE BOOSTERS: structured boosters; following topics are covered by coaches:
        - discuss and review resilience skills, using a handout that summarises the skills
        - help student identify specific ways in which he/she could apply the skills in times of stress
        - help student create a list of skills they could use in their life now
        - help student identify appropriate materials on web-based resources that are specific to their stressors
- *compliance:*
    - CLASSROOM-BASED WORKSHOP: average attendance at workshop: 84%
    - WBS: Only a few (6 of 102) participants completed web-based review materials despite frequent encouragement to use materials in coach e-mails
    - BOOSTER SESSIONS IN 6 MONTHS: Only 10 participants met BDI criteria and had a face-to-face booster with their coach in the 6 months following completion of the workshop
- *integrity of delivery:* supervision of workshop leaders by Dr Karen Reivich to ensure they were closely adhering to structured manual
- *economic information:* up to USD 400 offered to participants for completing all phases of the study; costs for dissemination: workshop leader (about USD 2000/10 – 15 participants for experienced cognitive therapists to deliver an 8-week workshop), costs to post the Web-based materials, about USD 55/hour for the coaches to send and reply to the pre-written coach e-mails, about USD 55/hour for the coaches to conduct face-to-face boosters with participants whose BDI score increases substantially, and compensation for someone to co-ordinate the delivery of the intervention
- *theoretical basis:* based largely on Beck's and colleagues' cognitive therapy for depression; see also study by Seligman 1999 on cognitive-behavioural intervention with college students at risk for depression

Control: no intervention (n = 127)

- *compliance:* not specified
- *economic information:* up to USD 400 offered to participants for completing all phases of the study

Outcomes

Outcomes collected and reported:

- depressive symptoms - BDI
- anxiety symptoms - BAI
- life satisfaction - SWLS
- happiness - Fordyce Emotions Questionnaire
- happiness percentage - Fordyce Emotions Questionnaire
- attributional style - ASQ
- MDD self-report - self-report version of the Longitudinal Interval Follow Up Evaluation (LIFE; only follow-up assessments)
- GAD self-report - self-report version of LIFE measure (only follow-up assessments)
- Major depressive episodes - Clinical interview for the DSM-IV (SCID; only at 6-month follow-up if participants met certain criteria in questionnaires at beginning of semester)
- Generalized anxiety episodes - SCID (only at 6-month follow-up if participants met certain criteria in questionnaires at beginning of semester)

Time points measured and reported: 1) pre-intervention; 2) 2. assessment (end of fall semester in which 8-week workshop took place); 3) 1. follow-up (early in spring semester after intervention took place in fall semester); 4) 2. follow-up (late in spring semester after intervention took place in fall semester)
Adverse events: not specified

Notes

Contact with authors: We contacted the authors for how many weeks/months after the end of the intervention the 2. assessment and the 1. follow-up took place (Schulman 2018 [pers comm]). We also asked whether healthcare students were included in the study, but received no response to this inquiry

Seligman 2007 *(Continued)*

Study start/end date: mid- to late-September (year not indicated) to end of spring semester (second follow-up assessment); but planned to track participants 3 years
Funding source: supported by grant MH63430 from the National Institute of Mental Health and by grant MH52270 from the National Institute of Mental Health
Declaration of interest: The Penn Resilience Training for College Students is owned by the University of Pennsylvania. The University of Pennsylvania has licensed this program to Adaptiv Learning Systems. Dr Martin Seligman owns stock in Adaptiv and could profit from the sale of this program. The other researchers who collaborated on this project do not have a financial relationship with Adaptiv

Ethical approval needed/obtained for study: not specified
Comments by study authors: workshop manual developer and trainer of workshop leaders: Dr Karen Reivich; study is replication study of Seligman 1999
Miscellaneous outcomes by the review authors: unclear if healthcare students were included in the study
Correspondence: Martin EP Seligman; University of Pennsylvania; 3720 Walnut Street, Solomon Labs, Philadelphia, PA 19104, USA; seligman@psych.upenn.edu

Tollefson 2018

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Xu 2019

Methods	
Participants	
Interventions	
Outcomes	
Notes	Result from top-up search in June 2020; will be incorporated into the review at the next update

Ye 2016

Methods	**Study design:** not specified in title (full text not available) **Study grouping:** not specified **Unit of randomisation:** not specified **Power (power & sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified

Ye 2016 *(Continued)*

Participants	**Country:** not specified **Setting:** not specified **Age:** not specified **Sample size (randomised):** not specified **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** undergraduate nursing interns **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** emotional resilience training (n not specified) • *delivery:* not specified • *providers:* not specified • *duration of treatment period and timing:* not specified • *description:* not specified • *compliance:* not specified • *integrity of delivery:* not specified • *economic information :* not specified • *theoretical basis:* not specified **Control:** not specified if there was a potential control group
Outcomes	**Outcomes collected and reported:** not specified **Time points measured and reported:** not specified **Adverse events:** not specified
Notes	**Contact with authors:** We were not able to contact the study authors on whether the study was a RCT comparing the emotional resilience training with a comparator, since we had no contact details for the authors **Study start/end date:** not specified **Funding source:** not specified **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** not specified **Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** neither abstract nor full text available for this study; based on title, the study design is unclear for this study **Correspondence:** no contact data found

Zhang 2018

Methods	**Study design:** unclear based on conference abstract; cluster random-sampling method to select students that are divided into high-resilience and low-resilience groups using college students' Resilience Scale (HARA); based on conference abstract, unclear if RCT and if wisdom education was compared to control **Study grouping:** not specified **Unit of randomisation:** not specified **Power (power & sample size calculation, level of power achieved):** not specified **Imputation of missing data:** not specified
Participants	**Country:** not specified

Zhang 2018 *(Continued)*

	Setting: not specified **Age:** not specified **Sample size (randomised):** 200 selected; 20 in low-resilience and high-resilience groups, respectively **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** male and female college students **Inclusion criteria:** not specified **Exclusion criteria:** not specified **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified
Interventions	**Intervention:** wisdom education (n not specified; unclear if RCT) • *delivery:* not specified • *providers:* not specified • *duration of treatment period and timing:* not specified • *description:* not specified • *compliance:* not specified • *integrity of delivery:* not specified • *economic information:* not specified • *theoretical basis:* not specified **Control:** not specified in conference abstract if there was a control group
Outcomes	**Outcomes collected and reported:** outcomes collected not further specified (adjustment of short-term and long-term psychological changes in frustration situation); probably resilience (college students' Resilience Scale, HARA); outcomes reported: positive regulation of wisdom education on adjustment of short-term psychological changes; adjustment of college students' long-term psychological changes exists in both positive and negative aspects of regulation **Time points measured and reported:** not specified **Adverse events:** not specified
Notes	**Contact with authors:** We contacted the authors to ask whether the study fulfilled several of our eligibility criteria, but received no response to 2 inquiries **Study start/end date:** not specified **Funding source:** supported by project of Guizhou Normal University - Construction and Application of Internet + Wisdom Campus Based on Big Data (No. 11904/0517041) **Declaration of interest:** not specified **Ethical approval needed/obtained for study:** not specified **Comments by study authors:** not relevant **Miscellaneous outcomes by the review authors:** several eligibility criteria of this review unclear for this study (RCT, inclusion of healthcare students) **Correspondence:** Hao Zhang; School of Education Science, Guizhou Normal University, Guiyang, 550001, China and Education Policy and Law Research Center, Guizhou, Normal University, Guiyang, 550001, China; 13885167180@163.com

α = alpha, significance level; ACT: Acceptance and Commitment Therapy; ASI: Anxiety Sensitivity Inventory; ASQ: Attributional Style Questionnaire; AUDIT: Alcohol Use Disorders Identification Test; β: statistical power; BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; BRS: Brief Resilience Scale; CBM: cognitive bias modification; CBM-I: cognitive bias modification-interpretation; CBT: cognitive behavioural therapy; CD-RISC: Connor-Davidson Resilience Scale; CEQ: Credibility and Expectancy Questionnaire; CES-D: Center for Epidemiology Studies Depression Scale; CG: control group; CORE: Cultivating Our Resilience; d: delta (Cohen's d, effect size); ECG: electrocardiograph; EOS: Enjoyment Orientation Scale; EPP: Easwaran's Eight-Point Program; f or f^2: Cohen's f or f^2 (effect size); FFMQ: Five-Facet Mindfulness Questionnaire; FMI: Freiburg Mindfulness Index; GAD-7: Generalised Anxiety Disorder Scale; IG: intervention group; IRB: Institutional Review Board; ISEL: Interpersonal Support Evaluation List; ISI: Insomnia Severity Index; ITT: intention-to-treat analysis; LOCF: last observation carried forward; MBI: Maslach Burnout Inventory; MBRS: mindfulness-based stress reduction; n: sample size (e.g. in

respective group); PANAS: Positive and Negative Affect Schedule; PATH: Program for Accelerated Thriving and Health; PCQ: Psychological Capital Questionnaire; PDSS: Panic Disorder Severity Scale; PHQ-9: Patient Health Questionnaire; PSS: Perceived Stress Scale; PsyCap: psychological capital; PWB: psychological well-being; RCT: randomised controlled trial; REBT: rational emotive behaviour therapy; RRT: recognition ratings task; RS: Resilience Scale; RSES: Rosenberg Self-Esteem Scale; SCS: Self-Compassion Scale; SD: standard deviation; SMD: standardised mean difference; SMS: short message service; STAI: State-Trait Anxiety Inventory; SUDS: Subjective Unit of Distress Scale; SWLS: Satisfaction with Life Scale; t: t value; TAU: treatment as usual; TSST: Tier Social Stress Test; WEMWS: Warwick-Edinburgh Mental Well-being Scale

Characteristics of ongoing studies *[ordered by study ID]*

Harrer 2019

Study name	**Public title:** Online-based self-help stress management program for distance-learning students with feedback on demand **Scientific title:** Online-based self-help stress management program for distance-learning students with feedback on demand - StudiCare
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals **Power (power sample size calculation, level of power achieved):** The trialists aim to include 200 participants, allowing for a between-trial arm group comparison against a statistically relevant effect size threshold of d = 0.40, a power (1 − β) of 80%, and an α of 0.05 (2-tailed) for the intention-to-treat (ITT) analysis. A recent meta-analytic review for internet-based stress interventions reported effect sizes of d = 0.64 for perceived stress in guided interventions but considerably smaller effect sizes for unguided programmes (d = 0.34 for depression, d = 0.32 for anxiety). Results for internet-based interventions addressing psychological distress in tertiary education are mixed, ranging from non-significant findings to moderate-sized effects in favour of the respective intervention. Thus, the trialists are aiming for an effect size of d = 0.40. **Imputation of missing data:** Analyses based on the ITT principle will be conducted, with missing data imputed using a Markov chain Monte Carlo multivariate imputation algorithm with 100 estimations per missing; complete-case analysis and ITT analysis planned
Participants	**Country:** Germany, Austria, Switzerland (recruitment) **Setting:** internet-based intervention **Age:** not specified in trial registration or study protocol **Sample size (randomised):** 200 targeted **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** students of a large German distance university with elevated levels of depression (CES-D score ≥ 16) **Inclusion criteria:** (see trial registration and study protocol; Harrer 2019): 1) distinct level of perceived study-related stress: experience elevated levels of depression measured by a score ≥ 16 on the German version of the CES-D 20-item version (Allgemeine Depressionsskala (ADS), indicating subthreshold to full-blown symptoms of depression during the last 2 weeks); 2) enrolled in a bachelor's or master's degree programme at a large German distance-learning tertiary education facility (FernUniversität in Hagen) by the beginning of the intervention; 3) motivation to participate in an online intervention targeting stress reduction; 4) are at least 18 years old; 5) have internet access; 6) willingness to provide a valid e-mail address and telephone number to the study team; 7) declare willingness to provide self-report data at all 3 assessment points (online surveys of 45 minutes duration each); 8) give informed consent

Harrer 2019 *(Continued)*

Exclusion criteria: (see trial registration and study protocol; Harrer 2019): 1) CES-D score < 16; 2) self-reported dissociative symptoms or psychosis, currently or in the past; 3) considerable risk for suicide as indicated by a score > 1 on item 9 of the German version of the BDI-II; "I feel I would be better off dead" or "I would kill myself if I had the chance"; 4) currently undergoing treatment; 5) not enrolled at distance-learning university; 6) no internet; 7) not willing to sign informed consent

Attrition (withdrawals and exclusions): not specified in trial registration or study protocol

Reasons for missing data: not specified in trial registration or study protocol

Interventions

Intervention: TAU + StudiCare Fernstudierende (n = 100 planned)

- *delivery:*
  - TAU: probably face-to-face; individual setting
  - intervention: internet-based intervention with feedback on demand; IG provided by Minddistrict (company responsible for provision and maintenance of platform); personal diary app; audio files and module summaries; if requested, motivational prompts by short message service (SMS)
- *providers:*
  - adherence-focused guidance concept with personalised feedback on demand
  - guidance in IG by specially trained student in a master's programme in psychology
  - guidance consists of 3 parts: i) monitoring adherence to the intervention, ii) sending standardised motivational messages after every module, and iii) providing feedback on demand
  - Adherence monitoring involves personal reminders for participants who had not completed a session in the designated time frame (7 days).
  - Standardised motivational messages tailored to each session will be sent when participants completed 1 of the main modules, summarising the content of the previous module and motivating trainees to stay engaged.
  - Feedback on demand will be provided through the internal messaging system of the training platform, which participants may use whenever individualised content feedback is needed. Participants will then receive feedback within 48 hours
  - If requested, participants in the IG will be able to receive automatic messages containing short, motivational prompts via SMS
- *duration of treatment period and timing:* 7 modules, each of which can be completed in 1 x 30- to 90-minute session; participants advised to work on 1 or a maximum of 2 modules a week; i.e. IG intended to last 5 - 7 weeks
- *description:*
  - TAU: general practitioner visits, counselling services, psychotherapeutic and psychiatric treatment or other forms of primary, secondary, or tertiary care
  - StudiCare Fernstudierende:
    - To tailor the intervention to distance-learning students' needs, 1 new student testimonial is introduced and will lead participants through the intervention. The testimonial represents an elder student with children. The testimonial was created to address the specific problems of non-traditional distant-learning students, such as limited time for studying, having to take care of children, or facing financial pressure
    - After modules 2 – 7, participants will be offered optional add-on mini-modules with information and exercises on student-specific topics of interest: social support, rumination and worrying, time management, procrastination, test anxiety, sleep, motivation, nutrition and exercise, dealing with writer's block, and concentration.
    - SESSION 1: introduction: psycho-education, information about stress and preview of subsequent sessions
    - SESSION 2: problem-solving: stress management strategies, systematic problem-solving using a 6-step problem-solving heuristic
    - SESSION 3: muscle and breath relaxation: information on basic principles of muscle and breath relaxation, audio exercises for daily usage
    - SESSION 4: mindfulness: coping with self-criticism, mindfulness exercises
    - SESSION 5: acceptance and tolerance: dealing with unsolvable problems, psycho-education on and exercises for acceptance and tolerance of unpleasant emotions

Harrer 2019 *(Continued)*

- SESSION 6: self-compassion: self-criticism in precarious situations, defusion of self-worth and performance, exercises for positive self-support, overcoming dysfunctional perfectionistic thought-action patterns
- SESSION 7: my master plan: recognising physiological warning signs, creating a plan for the future
- SESSION 8: booster session: further information on self-help and psychotherapy, evaluation of training transfer, recap of all sessions, repetition of previous exercises
- SESSION 2-7: 2 – 7 elective mini-modules: a) social support: communication styles, receiving and providing support; b) rumination and worrying: reflection on positive and negative aspects of worry, coping with uncertainty; c) time management: effective time scheduling, common planning fallacies, learning to prioritise; d) procrastination: identifying situations in which procrastination occurs, strategies to reduce procrastination; e) test anxiety: effective studying techniques, using paradoxical intentions, de-catastrophising blackouts; f) sleep: sleep restriction; g) motivation: finding reasons for lacking motivation, exercising delay of gratification; h) nutrition and exercise: creating an individual eating and exercise schedule, dealing with relapses; i) dealing with writer's block: reasons and mechanisms for writer's block; j) concentration: audio-based concentration exercises
- An additional booster session allowing participants to recap and rehearse previously learned strategies will be offered 2 weeks after completion of the main modules
- Therapeutic content is presented as an illustrative story of a backpacking trip around the world, with each module representing a new continent
- homework assignments after every module to practice techniques presented during the session
- To keep track of mood fluctuations and describe experiences in transferring acquired knowledge, a personal diary app is introduced in the first session and can be downloaded afterward. After every module, audio files and module summaries can be accessed, containing exercises to be worked on until the next session

- *compliance:* not specified in trial registration or study protocol
- *integrity of delivery:* not specified in trial registration or study protocol
- *economic information:* not specified in trial registration or study protocol
- *theoretical basis:*
  - based on Get.On Stress, an internet-based stress intervention for employees, which was adapted to a university student context
  - aligns with Lazarus' transactional model of stress; adheres to a 2-component structure, incorporating problem- and emotion-focused coping through emotion regulation strategies. (In problem-focused coping, cognitive behavioural strategies are applied to solve personal problems and to reduce and eliminate stressors. Emotion regulation refers to processes through which individuals monitor, evaluate, and modify emotions to reach relevant goals.)

Control: TAU + attention control (n = 100 planned)

- *delivery:*
  - TAU: probably face-to-face; individual setting
  - attention control: internet-based; psycho-educational material provided by Minddistrict (company responsible for provision and maintenance of platform)
  - in contrast to IG: psycho-education lessons largely text-based and without interactive components
- *providers:*
  - receive guidance parts: i) monitoring adherence to the intervention, and ii) sending standardised motivational messages after every module
  - no feedback on demand compared to IG
- *duration of treatment period and timing:* 7 main sessions and 1 booster session; designed to be completed within 5 - 7 weeks

Harrer 2019 *(Continued)*

- *description:*
  - TAU: general practitioner visits, counselling services, psychotherapeutic and psychiatric treatment or other forms of primary, secondary, or tertiary care
  - attention control: psycho-education:
    - psycho-education about cognitive, emotional and physical determinants, symptoms and outcomes of psychosocial stress in general and with respect to distance-learning students
    - SESSION 1: introduction: prevalence and types of stress; biological response to stress; effects of stress on emotions, thought, somatic symptoms
    - SESSION 2: causes of stress: common stressors among students; Lazarus' transactional model of stress
    - SESSION 3: Does stress have the same effect on all individuals? Short- and long-term consequences of stress; inter-individual differences in stress response
    - SESSION 4: What effect does stress have on the body? Physiological response to stressors; evolutionary background of stress reactions; stress and performance
    - SESSION 5: cognitive appraisal: common dysfunctional thoughts contributing to perceived stress; 5 steps for cognitive reappraisal
    - SESSION 6: coping and resources: typical resources and coping mechanisms for stress
    - SESSION 7: health: definition of health and sense of coherence
    - SESSION 8: booster session: recap of previous material
- *compliance:* not specified in trial registration or study protocol
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* not specified

For more details, see also study protocol

Outcomes

Outcomes collected and reported:

Primary outcome:

- depression - German version of CES-D 20: ADS

Secondary outcomes:

Mental health:

- anxiety - short version of the Spielberger STAI
- perceived stress - PSS
- concerns towards university life, worrying - Academic Worry Questionnaire
- emotional exhaustion - MBI student version
- behavioral activation, rumination and functional impairment - BADS

Academic outcomes:

- work impairment, presenteeism - Presenteeism Scale for Students (PSS) subscale for work impairment
- work impairment, loss of productivity - adaptation of the PSS' work output scale
- productivity - visual analog scale
- college self-efficacy - College Self-Efficacy Inventory

Risk and protective factors:

- emotion regulation skills/competencies - German version of the Assessment of Emotion Regulation Skills
- resilience - CD-RISC
- self-compassion - SCS
- internal/external locus of control - Multidimensional Locus of Control Scale Form C
- self-esteem - RSES

Harrer 2019 *(Continued)*

- personal beliefs about stress (e.g. controllability, harmful and positive nature of stress - Beliefs about Stress Scales' (BASS) subscales for positive, negative and controllability beliefs

Health literacy and help-seeking intentions:

- help-seeking preferences - General Help-Seeking Questionnaire for personal–emotional problems
- health literacy - German E-Health Literacy Scale
- online counselling experiences and awareness - 2 items extracted from the German Socio-Economic Panel study-Innovation Sample module "Internet-based psychotherapy"
- reasons for participating in the intervention - self-developed questionnaire

Health economic measures:

- indirect costs due to presenteeism and absenteeism - productivity loss subscale of Trimbos Institute/institute for Medical Technology Assessment Questionnaire for Costs associated with Psychiatric Illness

Additional measures:

- participant satisfaction - German version of the Client Satisfaction Questionnaire, adapted to the online context; only additional measure assessed at post-intervention
- personality - 10-item Big Five Inventory
- treatment credibility and expectancies - CEQ

According to trial registration also assessed:

- psychological flexibility - Acceptance and Action Questionnaire-II

Further variables (e.g. suicidal ideation, self-reported history of psychosis/dissociative symptoms, help-seeking intentions, internet therapy experience, e-health literary, reasons for participation, intervention credibility and expectations, sociodemographic characteristics, personality traits) only assessed at baseline (see study protocol, Harrer 2019)

Outcomes reported not specified

Time points measured and reported: 1) pre-intervention; 2) post-intervention (i.e. 7 weeks after randomisation); 3) 5-week follow-up (i.e. 3 months after randomisation); **time points reported not specified**
Adverse events: not specified

Starting date	**Study start/end date:** June 2017 (date of first enrolment); end date not specified
Contact information	**Principal investigator:** Dr Jennifer Apolinário-Hagen **Address:** FernUniversität Hagen, Universitätsstr. 33, 58097 Hagen, Germany **Email:** jennifer.apolinario-hagen@fernuni-hagen.de, stress.hagen@studicare.de **Telephone:** 02331 987 – 2272
Notes	**Contact with authors:** We contacted the authors for information on trial status, focus of the intervention on resilience and inclusion of healthcare students (Apolinário-Hagen 2019 [pers comm]) **Funding source:** funded through internal research funds of the Fern Universität in Hagen (see study protocol) **Declaration of interest:** see study protocol. David Ebert is a stakeholder of the Institute for Online Health Trainings, which aims to transfer scientific knowledge related to the present research into routine health care. The remaining authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest

Harrer 2019 *(Continued)*

	Ethical approval needed/obtained for study: approved by the University of Erlangen-Nuremberg ethics committee (Erlangen, Germany; 33_17 Bc)
	Comments by study authors: trial registration number: DRKS00011800 (assigned 27 February 2017)
	Miscellaneous outcomes by the review authors: according to trial registration, recruitment and follow-up are both complete (last update in February 2020)

NL7623

Study name	**Public title:** DEcrease STress through RESilience training for Students
	Scientific title: DEcrease STress through RESilience training for Students
Methods	**Study design:** hybrid design: longitudinal observational cohort with nested RCT
	Study grouping: parallel group (IG vs CG); sequential multiple assignment
	Unit of randomisation: individuals
	Power (power sample size calculation, level of power achieved): not specified in trial registration
	Imputation of missing data: not specified
Participants	**Country:** The Netherlands
	Setting: not specified
	Age: not specified
	Sample size (randomised): 706 targeted
	Sex: not specified
	Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline: not specified
	Population description: students at the Erasmus University Medical Centre Rotterdam, aged 16 years and older, who provide informed consent and have a score of 14 or higher on the PSS-10
	Method of recruitment: not specified
	Inclusion criteria: eligible for longitudinal cohort study: 1) all medical students, research master students, PhD students, nanobiology and clinical technology students at the Erasmus University Medical Centre (Erasmus MC) Rotterdam; 2) aged 16 years or older; 3) who give informed consent; within observational cohort, students fulfilling the following criteria are included in the nested RCT: 1) participation in the cohort study; 2) score of 14 or higher on the PSS-10
	Exclusion criteria: A student who meets any of the following criteria will be excluded from participation in the RCT, but can participate in the cohort study: 1) not insured for health care (for care provided in The Netherlands); 2) diagnosis of, or previously treated for, psychosis or mania; 3) response to at least 1 question on the Four-Dimensional Symptom Questionnaire (4DSQ) items 33 or 46 is “often” or “very often or constantly"
	Attrition (withdrawals and exclusions): not specified
	Reasons for missing data: not specified
Interventions	**Intervention:** multiple behavioural interventions (n randomised not specified)

NL7623 *(Continued)*

- *delivery:* interventions offered either in e-health format or in blended format or both; blended interventions: group intervention with weekly meetings with e-health practice at home
- *providers:* e-health format: self-guided; not specified for blended interventions and group intervention
- *duration of treatment period and timing:* 8 weeks (duration of MBSR course)
- *description:*
  - IG receives 1 of 9 active interventions, of which 4 are in e-health format and 5 in blended format):
  - The interventions are:
    - mindfulness-based stress reduction (e-health and blended)
    - yoga (blended)
    - running (blended)
    - aikido (e-health and blended)
    - music (e-health)
    - stress management training (e-health and blended)
  - evaluated in parallel and sequentially as dynamic intervention regimens
  - all active interventions encompass at least 3 components: relaxation, focused attention, and (self-)awareness
  - Participants in intervention arm are able to select and rank order 4 (out of the 8) preferred interventions and are randomised to 1 of these 4 with equal probability
  - Non-response to the intervention is followed by sequential randomised assignment to another intervention in the next period, with an increased chance of randomisation to higher-ranked preferred interventions, which is repeated once more, for a total maximum of 3 sequential interventions.
  - Participants in the intervention arm of the RCT will follow a maximum of 3 intervention periods of 8 weeks each
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* multimodal (see active interventions)

Control: active control (n randomised not specified)

- *delivery:* study web-portal; email with information
- *providers :* probably self-guided
- *duration of treatment period and timing:* not specified
- *description:*
  - psycho-education about chronic stress and the prevention of burnout, which consists of explanation of chronic stress, how burnout develops, the role of self-care, and stress management
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* not specified

Outcomes

Outcomes collected and reported:

Primary outcome

- perceived stress - PSS-10

Secondary outcomes

- mental well-being - Short WWEMWS
- symptoms of burnout - OBI - Student version
- overall quality of life and well-being - Visual Analogue Scales (VAS)
- stress-related symptoms (headaches, migraines, gastrointestinal complaints, neck pain, back pain, palpitations) - VAS

NL7623 *(Continued)*

- trouble sleeping - VAS
- symptoms from a sports injury - VAS
- healthcare utilization and medication
- alcohol consumption
- smoking
- drug use
- physical activity
- mental and physical stress-related symptoms - Four-Dimensional Symptom Questionnaire
- resilience - BRS
- current weighted average grade
- accumulated European Credit points
- BMI
- adherence
- preference for training programmes

Outcomes reported not specified

Time points measured and reported: 1) pre-intervention; 2) post-intervention (before and after each 8-week intervention period); 3) 1-year follow-up; 4) 2-year follow-up;**time points reported not specified**
Adverse events: not specified

Starting date	**Study start/end date:** February 2019 - September 2023
Contact information	**Principal investigator:** Prof. Myriam Hunink **Address:** Erasmus University Medical Center Rotterdam, Rotterdam, The Netherlands **Email:** m.hunink@erasmusmc.nl **Telephone:** +31107043489
Notes	**Contact with authors:** no correspondence required **Funding source:** Erasmus MC, Studie Voorschot Middelen **Declaration of interest:** not specified in trial registration **Ethical approval needed/obtained for study:** not specified in trial registration **Comments by study authors:** website, destress.info **Miscellaneous outcomes by the review authors:** trialregister.nl/trial/7623 (trial register number assigned 22 March 2019); according to trial registration, the recruitment status is 'recruiting'

Wild 2018

Study name	**Public title:** A study of resilience training for student paramedics **Scientific title:** Preventing PTSD, depression, and associated health problems in student paramedics: a randomised controlled trial of internet-delivered cognitive training for resilience (iCT-R)
Methods	**Study design:** RCT **Study grouping:** parallel group **Unit of randomisation:** individuals

Wild 2018 *(Continued)*

	Power (power sample size calculation, level of power achieved): Setting power at 80%, α = 0.05 and hypothesising a reduction of relative risk of 50% gives an Odds Ratio of 0.429, which requires a total sample size of 304 to show a risk reduction of 50% between internet-delivered cognitive training for resilience (iCT-R) and the alternative intervention. Thus, each condition would require 152 participants. Since we have a third condition (standard practice), the total sample size required would be 456. Allowing for a 20% rate of attrition, we will require a total sample size of 570 **Imputation of missing data:** potential method of imputation not specified; data analysis will be intention-to-treat; all participants who have been randomised will be included in analyses, including those who drop out
Participants	**Country:** UK **Setting:** online interventions **Age:** not specified in trial registration or study protocol **Sample size (randomised):** 570 targeted **Sex:** not specified **Comorbidity (mean (SD) of respective measures in indicated, if available) at baseline:** not specified **Population description:** student paramedics **Inclusion criteria:** see trial registration and study protocol (Wild 2018): 1) aged 18 and above (until 65 years); 2) training to be paramedics and in years 1, 2 or 3 of student paramedic training; 3) access to internet; 4) willing to be randomly allocated **Exclusion criteria:** see trial registration and study protocol (Wild 2018): 1) current symptoms of PTSD or MD, including suicidal ideation, requiring treatment (participants excluded if symptoms are interfering with their lives and they would like treatment; (score ≥ 10 on PHQ-9); score on PHQ-9 suicidal ideation item ≥ 1; Post-traumatic Stress Disorder Checklist for Diagnostic and Statistical Manual of Mental Disorders, 5th edition (PCL-5): ≥ 33) **Attrition (withdrawals and exclusions):** not specified **Reasons for missing data:** not specified

Interventions	**Intervention:** iCT-R: n randomised not specified)
	
	• *delivery:* supported online intervention; imagery component, practice of strategies that have been shown to prevent stress-related responses from developing, attention training and monthly top-up exercises during follow-up to consolidate training
	• *providers:* trained online coach (research assistant) provides email feedback on students' responses and, through an automated short message service (SMS) programme, sends regular brief reminders of key points and notifications to practice if-then plans
	• *duration of treatment period and timing:* main phase of course: 6 weeks with 6 sessions; monthly top-up exercises during follow-up to consolidate training
	• *description:*
	  ◦ aims to modify rumination and appraisals linked to low resilience
	  ◦ core information delivered in 6 modules (include whiteboard videos to explain concepts, audio files for practising concrete thinking, testimonies from qualified paramedics and video footage

Wild 2018 *(Continued)*

of student paramedic call-outs for use in experiential exercises; participants regularly reminded to practice concrete thinking)
    - modules:
        - it matters what you focus on: helpful and unhelpful attention
        - get out of your head with helpful thinking
        - habits and dwelling: how to change them
        - feeling with unwanted memories: then versus now
        - transforming worries and improving performance
        - beating stress and trauma: my blueprint
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* cognitive training

Control 1: attention control mind-online resilience intervention (already available intervention; n randomised not specified)

- *delivery:* online intervention; see above
- *providers:* see above; same frequency, type and duration of remote support as in iCT-R
- *duration of treatment period and timing:* 6 modules (6 weeks)
- *description:*
    - Participants receive the same frequency, type and duration of remote support as in iCT-R
    - 6 modules available online covering information and advice about stress, sleep problems, anger, depression, PTSD and mindfulness
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* not specified

Control 2: TAU/wait-list control (n randomised not specified)

- *delivery:* not specified for TAU
- *providers:* not specified; provided to students as part of university programme
- *duration of treatment period and timing:* not specified
- *description:*
    - standard practice: access to usual support offered through university, but no online modules or remote support
    - information on well-being and stress
    - participants are offered iCT-R at the end of follow-up
- *compliance:* not specified
- *integrity of delivery:* not specified
- *economic information:* not specified
- *theoretical basis:* not specified

Outcomes

Outcomes collected and reported:

Primary outcome:

- diagnoses of PTSD and MD - Structured Clinical Interview for DSM-5 – PTSD and MD modules
- PTSD and MD symptomatology - PCL-5; PHQ-9

Secondary outcomes:

- resilience - CD-RISC and RS
- rumination - RRS (brooding subscale) and dwelling subscale of RIQ
- responses to intrusive memories - RIQ
- anxiety symptoms - GAD-7

Wild 2018 *(Continued)*

- smoking and alcohol use - Smoking Behaviour Questionnaire; Alcohol Use Questionnaire
- weight and height - Weight and Height Questionnaire, unpublished; BMI
- sleep quality and duration - ISI
- psychological distress - GHQ
- well-being - WEMWS
- hormone function, levels of cortisol - assay analysis on samples collected upon awakening, 15, 30, and 60 minutes after awakening, and at 12 noon and 8 pm); radio-immunoassay analysis
- immune function, high sensitivity C-reactive protein levels - enzyme-linked immunosorbent assay in fasting serum samples collected
- quality-adjusted life years - EuroQol 5 Dimensions questionnaire
- costs associated with psychiatric illness - Trimbos/iMTA (Institute for MedicalTechnology Assessment) Questionnaire for Costs associated with Psychiatric Illness; Client Service Receipt Inventory; Health and Labour Questionnaire

Tertiary outcomes (see study protocol Wild 2018):

- neuroticism - Eysenck Personality Questionnaire neuroticism subscale
- social support - Social Support scale adapted from a brief measure of social support
- demographics - General information questionnaire
- trauma exposure - Trauma screener
- concrete thinking - concrete thinking questionnaire, adapted from a previous concrete thinking assessment
- intrusions - duration, frequency and distress linked to Intrusions Questionnaire

Outcomes reported not specified

Time points measured and reported: 1) pre-intervention; 2) post-intervention (i.e. 6 weeks); 3) 6-month follow-up (i.e. 6 months after intervention); 4) 1-year follow-up (i.e. 1 year after intervention); 5) 2-year follow-up (i.e. 2 years after intervention); diagnoses of PTSD and MD: all outcomes except 6-month follow-up; PTSD and MD symptomatology: all time points; secondary and tertiary outcomes: all time points except 6-month follow-up except for demographics (only pre-intervention, 1-year and 2-year follow-up); **time points reported not specified**

Adverse events: not specified

Starting date	**Study start/end date:** January 2016; -January 2021
Contact information	**Principal investigator:** Dr Jennifer Wild **Address:** Department of Experimental Psychology; University of Oxford; Oxford Centre for Anxiety Disorders and Trauma, Oxford OX1 1TW, United Kingdom **Email:** jennifer.wild@psy.ox.ac.uk **Telephone:** +44 1865 618 612
Notes	**Contact with authors:** no correspondence required **Funding source:** • sponsor: University of Oxford • funding: This work is funded by an MQ: Transforming Mental Health grant (number CQR01260) and supported by the NIHR Oxford Health Biomedical Research Centre.MQ had no role in the design of this study and will not have any role during its execution, analyses, interpretation of the data or decision to submit results. AE is funded by a Wellcome Trust Principal Research Fellowship (grant 200796). CP is supported by the NIHR Biomedical Research Centre at the South London and Maudsley NHS Trust and King's College London, London, UK. **Declaration of interest:** see study protocol (Wild 2018): Jennifer Wild, Anke Ehlers and their team have developed iCT-R. They do not receive any income from this work

Wild 2018 *(Continued)*

Ethical approval needed/obtained for study: Ethical approval of the research protocol was gained from The Medical Sciences Inter-Divisional Research Ethics Committee at the University of Oxford, 17 August 2017, ref: R44116/RE001

Comments by study authors: trial registration number ISRCTN16493616 (assigned 9 October 2017)

Miscellaneous outcomes by the review authors: according to trial registration, the study is no longer recruiting but the overall trial status is ongoing; intention to publish September 2021 (last updated October 2017)

Abbreviations common to all tables:
α: significance level; β: statistical power; BADS: Behavioural Activation for Depression Scale; BASS: Beliefs About Stress Scales; BDI: Beck Depression Inventory; BMI: body mass index; BRS: Brief Resilience Scale; CD-RISC: Connor-Davidson Resilience Scale; CEQ: Capability and Expectancy Questionnaire; CES-D: Center for Epidemiology Studies- Depression; CG: control group; d: delta (Cohen's d, effect size); IG: intervention group; GAD-7: Generalised Anxiety Disorder scale; GHQ: General Health Questionnaire; iCT-R: internet-delivered cognitive training for resilience; ISI: Insomnia Severity Index; ITT: intention-to-treat analysis; MBI: Maslach Burnout Inventory; MBSR: mindfulness-based stress reduction; MD: major depression; n: sample size (e.g. in respective study group); OBI: Oldenburg Burnout Inventory; PCL-5: Post-traumatic stress disorder Check List for *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition*; PHQ: Patient Health Questionnaire; PSS: Perceived Stress Scale; PSS: Presenteeism Scale for Students; PTSD: post-traumatic stress disorder; RCT: randomised controlled trial; RIQ: Response to Intrusions Scale; RRS: Ruminative Response Scale; RS: Resilience Scale; RSES: Rosenburg Self-Esteem Scale; SCS: Self-Compassion Scale; SD: standard deviation; SMS: short message service; STAI: State-Trait Anxiety Inventory; TAU: Treatment as usual; VAS: Visual Analogue Scales; vs: versus; WEMWS: Warwick-Edinburgh Mental Well-being Scale

DATA AND ANALYSES

Comparison 1. Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1.1 Resilience: post-intervention	9	561	Std. Mean Difference (IV, Random, 95% CI)	0.43 [0.07, 0.78]
1.2 Resilience: short-term follow-up (≤ 3 months)	4	209	Std. Mean Difference (IV, Random, 95% CI)	0.20 [-0.44, 0.84]
1.3 Resilience: medium-term follow-up (> 3 to ≤ 6 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.4 Anxiety: post-intervention	7	362	Std. Mean Difference (IV, Random, 95% CI)	-0.45 [-0.84, -0.06]
1.5 Anxiety: short-term follow-up (≤ 3 months)	2	91	Std. Mean Difference (IV, Random, 95% CI)	-0.88 [-1.32, -0.45]
1.6 Depression: post-intervention	6	332	Std. Mean Difference (IV, Random, 95% CI)	-0.20 [-0.52, 0.11]
1.7 Depression: short-term follow-up (≤ 3 months)	4	226	Std. Mean Difference (IV, Random, 95% CI)	-0.65 [-1.26, -0.04]
1.8 Stress or stress perception: post-intervention	7	420	Std. Mean Difference (IV, Random, 95% CI)	-0.28 [-0.48, -0.09]

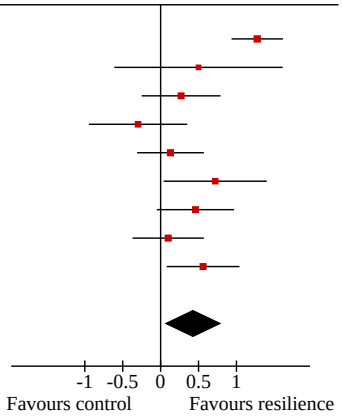
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1.9 Stress or stress perception: short-term follow-up (≤ 3 months)	2	113	Std. Mean Difference (IV, Random, 95% CI)	0.13 [-0.79, 1.06]
1.10 Stress or stress perception: medium-term follow-up (> 3 to ≤ 6 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.11 Well-being or quality of life: post-intervention	4	251	Std. Mean Difference (IV, Random, 95% CI)	0.15 [-0.14, 0.43]
1.12 Well-being or quality of life: short-term follow-up (≤ 3 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.13 Social support: post-intervention	2	121	Std. Mean Difference (IV, Random, 95% CI)	0.21 [-0.15, 0.57]
1.14 Social support: short-term follow-up (≤ 3 months)	2	92	Std. Mean Difference (IV, Random, 95% CI)	0.23 [-0.18, 0.64]
1.15 Optimism: post-intervention	2	66	Std. Mean Difference (IV, Random, 95% CI)	0.29 [-0.20, 0.78]
1.16 Self-efficacy: post-intervention	5	219	Std. Mean Difference (IV, Random, 95% CI)	0.51 [0.14, 0.88]
1.17 Self-efficacy: short-term follow-up (≤ 3 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.18 Active coping: post-intervention	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.19 Active coping: short-term follow-up (≤ 3 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.20 Self-esteem: short-term follow-up (≤ 3 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.21 Positive emotions: post-intervention	2	112	Std. Mean Difference (IV, Random, 95% CI)	0.51 [0.01, 1.01]
1.22 Positive emotions: short-term follow-up (≤ 3 months)	1		Mean Difference (IV, Random, 95% CI)	Subtotals only
1.23 Resilience: post-intervention, sensitivity analysis (fixed-effect analysis)	9	561	Std. Mean Difference (IV, Fixed, 95% CI)	0.52 [0.36, 0.69]
1.24 Anxiety: post-intervention, sensitivity analysis (fixed-effect analysis)	7	362	Std. Mean Difference (IV, Fixed, 95% CI)	-0.35 [-0.57, -0.14]
1.25 Depression: post-intervention, sensitivity analysis (fixed-effect analysis)	6	332	Std. Mean Difference (IV, Fixed, 95% CI)	-0.18 [-0.40, 0.04]
1.26 Stress or stress perception: post-intervention, sensitivity analysis (fixed-effect analysis)	7	420	Std. Mean Difference (IV, Fixed, 95% CI)	-0.28 [-0.48, -0.09]

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1.27 Well-being or quality of life: post-intervention, sensitivity analysis (fixed-effect analysis)	4	251	Std. Mean Difference (IV, Fixed, 95% CI)	0.14 [-0.10, 0.39]

Analysis 1.1. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 1: Resilience: post-intervention

Study or Subgroup	SMD	SE	Resilience Total	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Anderson 2017	1.2739	0.1728859	81	57	13.6%	1.27 [0.94 , 1.61]
Barry 2019	0.5	0.5663	5	9	6.1%	0.50 [-0.61 , 1.61]
Erogul 2014	0.27	0.2653	28	29	11.6%	0.27 [-0.25 , 0.79]
Houston 2017	-0.2975	0.3305	22	16	10.2%	-0.30 [-0.95 , 0.35]
Mathad 2017	0.13	0.2245	40	40	12.5%	0.13 [-0.31 , 0.57]
Mueller 2018	0.72	0.3469	18	18	9.9%	0.72 [0.04 , 1.40]
Peng 2014	0.46	0.2602	30	30	11.7%	0.46 [-0.05 , 0.97]
Stephens 2012	0.1	0.2398	35	35	12.2%	0.10 [-0.37 , 0.57]
Wang 2012	0.56	0.2449	33	35	12.1%	0.56 [0.08 , 1.04]
Total (95% CI)			**292**	**269**	**100.0%**	**0.43 [0.07 , 0.78]**

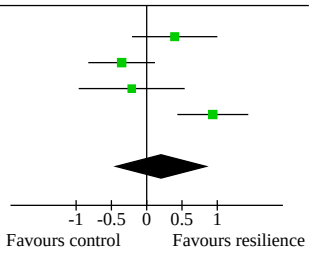
Heterogeneity: Tau² = 0.21; Chi² = 32.52, df = 8 (P < 0.0001); I² = 75%
Test for overall effect: Z = 2.36 (P = 0.02)
Test for subgroup differences: Not applicable



Analysis 1.2. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 2: Resilience: short-term follow-up (≤ 3 months)

Study or Subgroup	Resilience Mean	SD	Total	Control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Mejia-Downs 2016	78.05	9.56	22	74.43	8.28	21	24.6%	0.40 [-0.21 , 1.00]
Stephens 2012	74.72	13.39	35	79.13	11.09	35	26.9%	-0.35 [-0.83 , 0.12]
Victor 2018	60.5	8.65	16	62.42	8.92	12	22.0%	-0.21 [-0.96 , 0.54]
Wang 2012	99.8	6.9	33	92.6	8.2	35	26.4%	0.94 [0.43 , 1.44]
Total (95% CI)			**106**			**103**	**100.0%**	**0.20 [-0.44 , 0.84]**

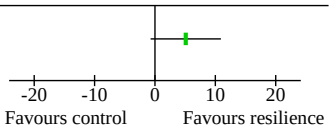
Heterogeneity: Tau² = 0.34; Chi² = 15.11, df = 3 (P = 0.002); I² = 80%
Test for overall effect: Z = 0.62 (P = 0.53)
Test for subgroup differences: Not applicable



Analysis 1.3. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 3: Resilience: medium-term follow-up (> 3 to ≤ 6 months)

Study or Subgroup	Resilience Mean	SD	Total	Control Mean	SD	Total	Mean Difference IV, Random, 95% CI
Erogul 2014	82.4	9.8	28	77.3	12.5	29	5.10 [-0.72 , 10.92]

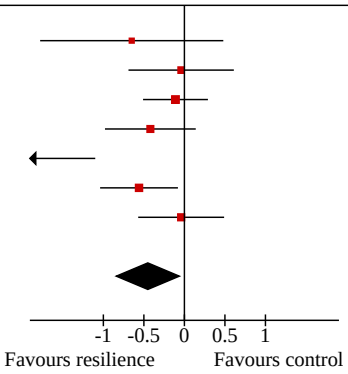
Test for subgroup differences: Not applicable



Analysis 1.4. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 4: Anxiety: post-intervention

Study or Subgroup	SMD	SE	Resilience Total	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Barry 2019	-0.65	0.5765	5	9	7.8%	-0.65 [-1.78 , 0.48]
Houston 2017	-0.04	0.3316	22	16	14.1%	-0.04 [-0.69 , 0.61]
Kötter 2016	-0.11	0.2041	67	38	18.7%	-0.11 [-0.51 , 0.29]
Recabarren 2019	-0.42	0.2857	26	25	15.7%	-0.42 [-0.98 , 0.14]
Sahranavard 2018	-2.01	0.4643	15	15	10.2%	-2.01 [-2.92 , -1.10]
Wang 2012	-0.56	0.2449	33	35	17.2%	-0.56 [-1.04 , -0.08]
Warnecke 2011	-0.04	0.2704	24	32	16.3%	-0.04 [-0.57 , 0.49]
Total (95% CI)			**192**	**170**	**100.0%**	**-0.45 [-0.84 , -0.06]**

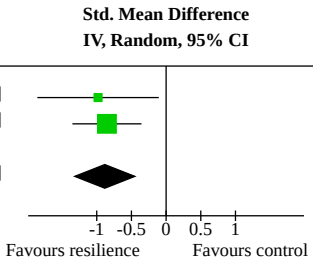
Heterogeneity: Tau² = 0.17; Chi² = 17.42, df = 6 (P = 0.008); I² = 66%
Test for overall effect: Z = 2.28 (P = 0.02)
Test for subgroup differences: Not applicable



Analysis 1.5. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 5: Anxiety: short-term follow-up (≤ 3 months)

Study or Subgroup	Resilience Mean	Resilience SD	Resilience Total	Control Mean	Control SD	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Porter 2008	0.45	0.38	12	0.95	0.59	11	24.4%	-0.98 [-1.86 , -0.11]
Wang 2012	1.7	0.31	33	2.03	0.44	35	75.6%	-0.85 [-1.35 , -0.35]
Total (95% CI)			**45**			**46**	**100.0%**	**-0.88 [-1.32 , -0.45]**

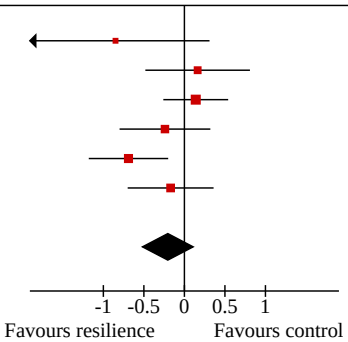
Heterogeneity: Tau² = 0.00; Chi² = 0.06, df = 1 (P = 0.80); I² = 0%
Test for overall effect: Z = 4.00 (P < 0.0001)
Test for subgroup differences: Not applicable



Analysis 1.6. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 6: Depression: post-intervention

Study or Subgroup	SMD	SE	Resilience Total	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Barry 2019	-0.85	0.5918	5	9	6.1%	-0.85 [-2.01 , 0.31]
Houston 2017	0.1634	0.3292	22	16	14.6%	0.16 [-0.48 , 0.81]
Kötter 2016	0.14	0.2041	67	38	23.8%	0.14 [-0.26 , 0.54]
Recabarren 2019	-0.24	0.2857	26	25	17.3%	-0.24 [-0.80 , 0.32]
Wang 2012	-0.69	0.25	33	35	19.9%	-0.69 [-1.18 , -0.20]
Warnecke 2011	-0.17	0.2704	24	32	18.4%	-0.17 [-0.70 , 0.36]
Total (95% CI)			**177**	**155**	**100.0%**	**-0.20 [-0.52 , 0.11]**

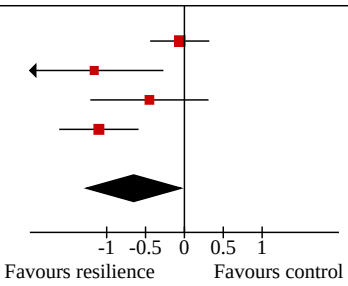
Heterogeneity: Tau² = 0.07; Chi² = 9.03, df = 5 (P = 0.11); I² = 45%
Test for overall effect: Z = 1.28 (P = 0.20)
Test for subgroup differences: Not applicable



Analysis 1.7. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 7: Depression: short-term follow-up (≤ 3 months)

Study or Subgroup	SMD	SE	Resilience Total	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Miu 2016	-0.06	0.1941	49	58	30.2%	-0.06 [-0.44 , 0.32]
Porter 2008	-1.16	0.4541	12	11	19.8%	-1.16 [-2.05 , -0.27]
Victor 2018	-0.45	0.3878	16	12	22.3%	-0.45 [-1.21 , 0.31]
Wang 2012	-1.1	0.2602	33	35	27.6%	-1.10 [-1.61 , -0.59]
Total (95% CI)			**110**	**116**	**100.0%**	**-0.65 [-1.26 , -0.04]**

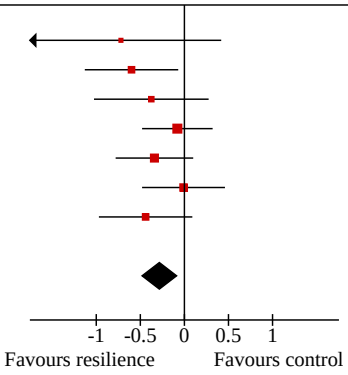
Heterogeneity: Tau² = 0.28; Chi² = 12.58, df = 3 (P = 0.006); I² = 76%
Test for overall effect: Z = 2.10 (P = 0.04)
Test for subgroup differences: Not applicable



Analysis 1.8. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 8: Stress or stress perception: post-intervention

Study or Subgroup	SMD	SE	Resilience Total	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Barry 2019	-0.72	0.5804	5	9	2.9%	-0.72 [-1.86 , 0.42]
Erogul 2014	-0.6	0.2704	28	29	13.6%	-0.60 [-1.13 , -0.07]
Houston 2017	-0.3754	0.3317	22	16	9.0%	-0.38 [-1.03 , 0.27]
Kötter 2016	-0.08	0.2041	67	38	23.9%	-0.08 [-0.48 , 0.32]
Mathad 2017	-0.34	0.2245	40	40	19.7%	-0.34 [-0.78 , 0.10]
Stephens 2012	-0.01	0.2398	35	35	17.3%	-0.01 [-0.48 , 0.46]
Warnecke 2011	-0.44	0.2704	24	32	13.6%	-0.44 [-0.97 , 0.09]
Total (95% CI)			**221**	**199**	**100.0%**	**-0.28 [-0.48 , -0.09]**

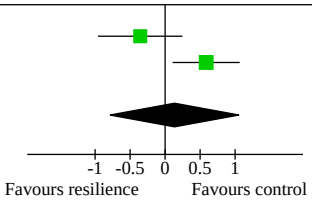
Heterogeneity: Tau² = 0.00; Chi² = 4.71, df = 6 (P = 0.58); I² = 0%
Test for overall effect: Z = 2.85 (P = 0.004)
Test for subgroup differences: Not applicable



Analysis 1.9. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 9: Stress or stress perception: short-term follow-up (≤ 3 months)

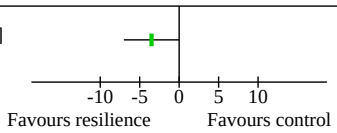
Study or Subgroup	Resilience Mean	Resilience SD	Resilience Total	Control Mean	Control SD	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Mejia-Downs 2016	11.68	5.1	22	13.6	5.51	21	48.0%	-0.36 [-0.96 , 0.25]
Stephens 2012	18.63	5.41	35	15.8	4.03	35	52.0%	0.59 [0.11 , 1.07]
Total (95% CI)			**57**			**56**	**100.0%**	**0.13 [-0.79 , 1.06]**

Heterogeneity: Tau² = 0.37; Chi² = 5.75, df = 1 (P = 0.02); I² = 83%
Test for overall effect: Z = 0.29 (P = 0.78)
Test for subgroup differences: Not applicable



Analysis 1.10. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 10: Stress or stress perception: medium-term follow-up (> 3 to ≤ 6 months)

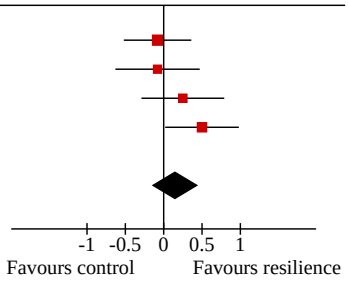
Study or Subgroup	Resilience Mean	SD	Total	Control Mean	SD	Total	Mean Difference IV, Random, 95% CI
Erogul 2014	14.9	6.6	28	18.4	6.9	29	-3.50 [-7.00 , 0.00]



Analysis 1.11. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 11: Well-being or quality of life: post-intervention

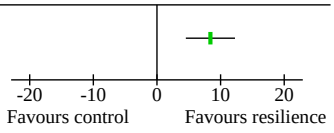
Study or Subgroup	SMD	SE	Resilience Total	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Mathad 2017	-0.08	0.2245	40	40	30.1%	-0.08 [-0.52 , 0.36]
Recabarren 2019	-0.08	0.2806	26	25	21.4%	-0.08 [-0.63 , 0.47]
Smeets 2014	0.25	0.2755	27	25	22.0%	0.25 [-0.29 , 0.79]
Wang 2012	0.5	0.2449	33	35	26.5%	0.50 [0.02 , 0.98]
Total (95% CI)			**126**	**125**	**100.0%**	**0.15 [-0.14 , 0.43]**

Heterogeneity: Tau² = 0.02; Chi² = 3.89, df = 3 (P = 0.27); I² = 23%
Test for overall effect: Z = 1.01 (P = 0.31)
Test for subgroup differences: Not applicable



Analysis 1.12. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 12: Well-being or quality of life: short-term follow-up (≤ 3 months)

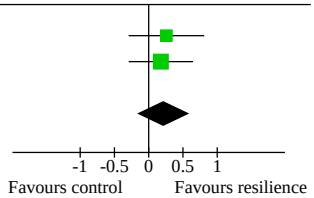
Study or Subgroup	control Mean	SD	Total	resilience Mean	SD	Total	Mean Difference IV, Random, 95% CI
Wang 2012	78	8.9	33	69.6	7.2	35	8.40 [4.54 , 12.26]



Analysis 1.13. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 13: Social support: post-intervention

Study or Subgroup	Resilience Mean	SD	Total	Control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Recabarren 2019	6.14	0.73	26	5.85	1.39	25	42.0%	0.26 [-0.29 , 0.81]
Stephens 2012	52.03	7.24	35	50.59	8.74	35	58.0%	0.18 [-0.29 , 0.65]
Total (95% CI)			**61**			**60**	**100.0%**	**0.21 [-0.15 , 0.57]**

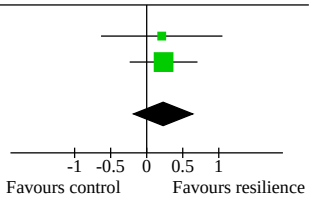
Heterogeneity: Tau² = 0.00; Chi² = 0.05, df = 1 (P = 0.83); I² = 0%
Test for overall effect: Z = 1.16 (P = 0.25)
Test for subgroup differences: Not applicable



Analysis 1.14. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 14: Social support: short-term follow-up (≤ 3 months)

Study or Subgroup	resilience intervention Mean	SD	Total	control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Porter 2008	22.45	5.26	12	21.18	6.51	10	23.8%	0.21 [-0.63 , 1.05]
Stephens 2012	53.25	8.34	35	51.33	7.86	35	76.2%	0.23 [-0.24 , 0.70]
Total (95% CI)			**47**			**45**	**100.0%**	**0.23 [-0.18 , 0.64]**

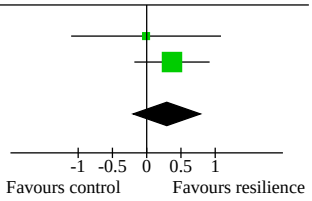
Heterogeneity: Tau² = 0.00; Chi² = 0.00, df = 1 (P = 0.96); I² = 0%
Test for overall effect: Z = 1.09 (P = 0.28)
Test for subgroup differences: Not applicable



Analysis 1.15. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 15: Optimism: post-intervention

Study or Subgroup	Resilience Mean	SD	Total	Control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Barry 2019	9.2	1.788	5	9.22	2.166	9	20.1%	-0.01 [-1.10 , 1.08]
Smeets 2014	22.19	3.77	27	20.59	4.75	25	79.9%	0.37 [-0.18 , 0.92]
Total (95% CI)			**32**			**34**	**100.0%**	**0.29 [-0.20 , 0.78]**

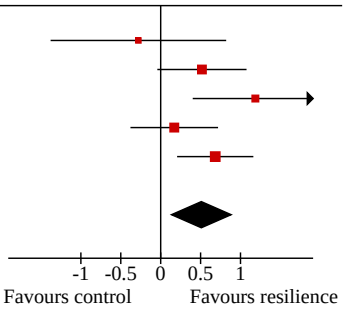
Heterogeneity: Tau² = 0.00; Chi² = 0.37, df = 1 (P = 0.54); I² = 0%
Test for overall effect: Z = 1.17 (P = 0.24)
Test for subgroup differences: Not applicable



Analysis 1.16. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 16: Self-efficacy: post-intervention

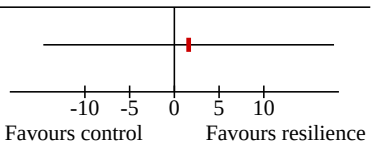
Study or Subgroup	SMD	SE	Resilience Total	Control Total	Weight	Std. Mean Difference IV, Random, 95% CI
Barry 2019	-0.2793	0.5612	5	9	9.4%	-0.28 [-1.38 , 0.82]
Recabarren 2019	0.5168	0.2851	26	25	23.6%	0.52 [-0.04 , 1.08]
Sahranavard 2018	1.1862	0.4004	15	15	15.6%	1.19 [0.40 , 1.97]
Smeets 2014	0.17	0.28	27	25	24.0%	0.17 [-0.38 , 0.72]
Waddell 2015	0.6835	0.2437	33	39	27.5%	0.68 [0.21 , 1.16]
Total (95% CI)			**106**	**113**	**100.0%**	**0.51 [0.14 , 0.88]**

Heterogeneity: Tau² = 0.07; Chi² = 6.81, df = 4 (P = 0.15); I² = 41%
Test for overall effect: Z = 2.67 (P = 0.008)
Test for subgroup differences: Not applicable



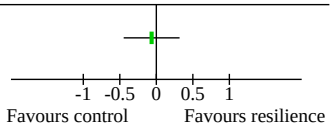
Analysis 1.17. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 17: Self-efficacy: short-term follow-up (≤ 3 months)

Study or Subgroup	MD	SE	Resilience Total	Control Total	Mean Difference IV, Random, 95% CI
Waddell 2005	1.6	8.29	10	10	1.60 [-14.65 , 17.85]



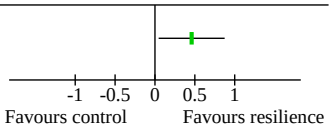
Analysis 1.18. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 18: Active coping: post-intervention

Study or Subgroup	Resilience Mean	SD	Total	Control Mean	SD	Total	Mean Difference IV, Random, 95% CI
Houston 2017	3.0606	0.50012	22	3.125	0.65405	16	-0.06 [-0.45 , 0.32]



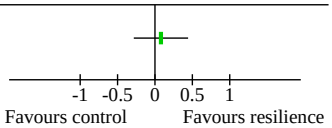
Analysis 1.19. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 19: Active coping: short-term follow-up (≤ 3 months)

Study or Subgroup	Resilience Mean	SD	Total	Control Mean	SD	Total	Mean Difference IV, Random, 95% CI
Porter 2008	1.78	0.43	12	1.32	0.54	10	0.46 [0.05 , 0.87]



Analysis 1.20. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 20: Self-esteem: short-term follow-up (≤ 3 months)

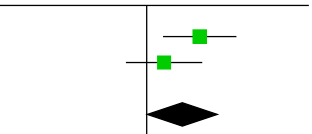
Study or Subgroup	Resilience Mean	SD	Total	Control Mean	SD	Total	Mean Difference IV, Random, 95% CI
Victor 2018	2.42	0.45	16	2.34	0.51	12	0.08 [-0.28 , 0.44]



Analysis 1.21. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 21: Positive emotions: post-intervention

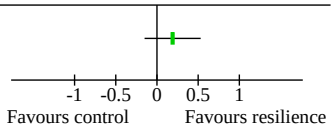
Study or Subgroup	Resilience Mean	SD	Total	Control Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Peng 2014	35.52	6.7349	30	30.675	5.83	30	51.1%	0.76 [0.23 , 1.28]
Smeets 2014	26.26	4.97	27	25.05	4.58	25	48.9%	0.25 [-0.30 , 0.80]
Total (95% CI)			**57**			**55**	**100.0%**	**0.51 [0.01 , 1.01]**

Heterogeneity: Tau² = 0.06; Chi² = 1.74, df = 1 (P = 0.19); I² = 43%
Test for overall effect: Z = 2.00 (P = 0.05)
Test for subgroup differences: Not applicable



Analysis 1.22. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 22: Positive emotions: short-term follow-up (≤ 3 months)

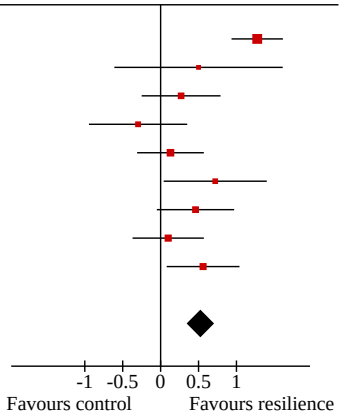
Study or Subgroup	Resilience Mean	Resilience SD	Resilience Total	Control Mean	Control SD	Control Total	Mean Difference IV, Random, 95% CI
Mejia-Downs 2016	3.2	0.47	22	3.01	0.65	21	0.19 [-0.15 , 0.53]



Analysis 1.23. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 23: Resilience: post-intervention, sensitivity analysis (fixed-effect analysis)

Study or Subgroup	SMD	SE	Resilience Total	Control Total	Weight	Std. Mean Difference IV, Fixed, 95% CI
Anderson 2017	1.2739	0.1728859	81	57	24.4%	1.27 [0.94 , 1.61]
Barry 2019	0.5	0.5663	5	9	2.3%	0.50 [-0.61 , 1.61]
Erogul 2014	0.27	0.2653	28	29	10.4%	0.27 [-0.25 , 0.79]
Houston 2017	-0.2975	0.3305	22	16	6.7%	-0.30 [-0.95 , 0.35]
Mathad 2017	0.13	0.2245	40	40	14.5%	0.13 [-0.31 , 0.57]
Mueller 2018	0.72	0.3469	18	18	6.1%	0.72 [0.04 , 1.40]
Peng 2014	0.46	0.2602	30	30	10.8%	0.46 [-0.05 , 0.97]
Stephens 2012	0.1	0.2398	35	35	12.7%	0.10 [-0.37 , 0.57]
Wang 2012	0.56	0.2449	33	35	12.2%	0.56 [0.08 , 1.04]
Total (95% CI)			**292**	**269**	**100.0%**	**0.52 [0.36 , 0.69]**

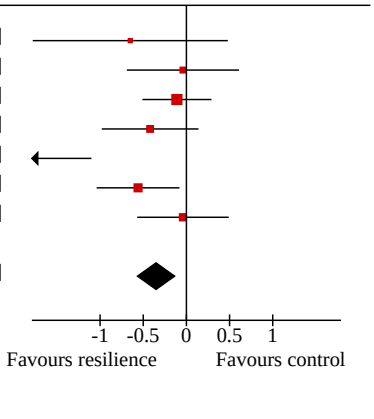
Heterogeneity: Chi² = 32.52, df = 8 (P < 0.0001); I² = 75%
Test for overall effect: Z = 6.13 (P < 0.00001)
Test for subgroup differences: Not applicable



Analysis 1.24. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 24: Anxiety: post-intervention, sensitivity analysis (fixed-effect analysis)

Study or Subgroup	SMD	SE	Resilience Total	Control Total	Weight	Std. Mean Difference IV, Fixed, 95% CI
Barry 2019	-0.65	0.5765	5	9	3.6%	-0.65 [-1.78 , 0.48]
Houston 2017	-0.04	0.3316	22	16	10.9%	-0.04 [-0.69 , 0.61]
Kötter 2016	-0.11	0.2041	67	38	28.8%	-0.11 [-0.51 , 0.29]
Recabarren 2019	-0.42	0.2857	26	25	14.7%	-0.42 [-0.98 , 0.14]
Sahranavard 2018	-2.01	0.4643	15	15	5.6%	-2.01 [-2.92 , -1.10]
Wang 2012	-0.56	0.2449	33	35	20.0%	-0.56 [-1.04 , -0.08]
Warnecke 2011	-0.04	0.2704	24	32	16.4%	-0.04 [-0.57 , 0.49]
Total (95% CI)			**192**	**170**	**100.0%**	**-0.35 [-0.57 , -0.14]**

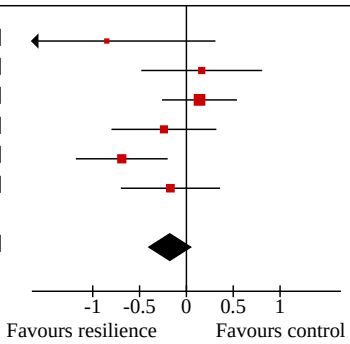
Heterogeneity: Chi² = 17.42, df = 6 (P = 0.008); I² = 66%
Test for overall effect: Z = 3.21 (P = 0.001)
Test for subgroup differences: Not applicable



Analysis 1.25. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 25: Depression: post-intervention, sensitivity analysis (fixed-effect analysis)

Study or Subgroup	SMD	SE	Resilience Total	Control Total	Weight	Std. Mean Difference IV, Fixed, 95% CI
Barry 2019	-0.85	0.5918	5	9	3.7%	-0.85 [-2.01 , 0.31]
Houston 2017	0.1634	0.3292	22	16	11.8%	0.16 [-0.48 , 0.81]
Kötter 2016	0.14	0.2041	67	38	30.8%	0.14 [-0.26 , 0.54]
Recabarren 2019	-0.24	0.2857	26	25	15.7%	-0.24 [-0.80 , 0.32]
Wang 2012	-0.69	0.25	33	35	20.5%	-0.69 [-1.18 , -0.20]
Warnecke 2011	-0.17	0.2704	24	32	17.5%	-0.17 [-0.70 , 0.36]
Total (95% CI)			**177**	**155**	**100.0%**	**-0.18 [-0.40 , 0.04]**

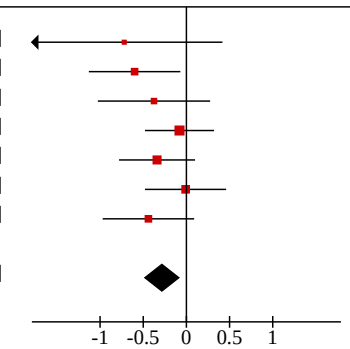
Heterogeneity: Chi² = 9.03, df = 5 (P = 0.11); I² = 45%
Test for overall effect: Z = 1.57 (P = 0.12)
Test for subgroup differences: Not applicable



Analysis 1.26. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 26: Stress or stress perception: post-intervention, sensitivity analysis (fixed-effect analysis)

Study or Subgroup	SMD	SE	Resilience Total	Control Total	Weight	Std. Mean Difference IV, Fixed, 95% CI
Barry 2019	-0.72	0.5804	5	9	2.9%	-0.72 [-1.86 , 0.42]
Erogul 2014	-0.6	0.2704	28	29	13.6%	-0.60 [-1.13 , -0.07]
Houston 2017	-0.3754	0.3317	22	16	9.0%	-0.38 [-1.03 , 0.27]
Kötter 2016	-0.08	0.2041	67	38	23.9%	-0.08 [-0.48 , 0.32]
Mathad 2017	-0.34	0.2245	40	40	19.7%	-0.34 [-0.78 , 0.10]
Stephens 2012	-0.01	0.2398	35	35	17.3%	-0.01 [-0.48 , 0.46]
Warnecke 2011	-0.44	0.2704	24	32	13.6%	-0.44 [-0.97 , 0.09]
Total (95% CI)			**221**	**199**	**100.0%**	**-0.28 [-0.48 , -0.09]**

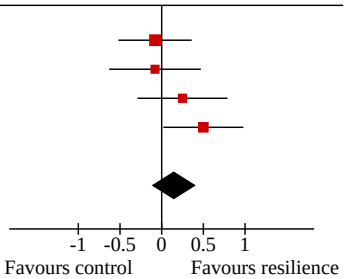
Heterogeneity: Chi² = 4.71, df = 6 (P = 0.58); I² = 0%
Test for overall effect: Z = 2.85 (P = 0.004)
Test for subgroup differences: Not applicable



Analysis 1.27. Comparison 1: Resilience interventions versus control conditions in healthcare students: primary and secondary outcomes, Outcome 27: Well-being or quality of life: post-intervention, sensitivity analysis (fixed-effect analysis)

Study or Subgroup	SMD	SE	Resilience Total	Control Total	Weight	Std. Mean Difference IV, Fixed, 95% CI
Mathad 2017	-0.08	0.2245	40	40	31.8%	-0.08 [-0.52 , 0.36]
Recabarren 2019	-0.08	0.2806	26	25	20.4%	-0.08 [-0.63 , 0.47]
Smeets 2014	0.25	0.2755	27	25	21.1%	0.25 [-0.29 , 0.79]
Wang 2012	0.5	0.2449	33	35	26.7%	0.50 [0.02 , 0.98]
Total (95% CI)			**126**	**125**	**100.0%**	**0.14 [-0.10 , 0.39]**

Heterogeneity: Chi² = 3.89, df = 3 (P = 0.27); I² = 23%
Test for overall effect: Z = 1.14 (P = 0.25)
Test for subgroup differences: Not applicable



ADDITIONAL TABLES

Table 1. Unused methods table

Method	Approach planned for analysis	Reason for non-use
Measures of treatment effect	**Dichotomous data** We had planned to analyse dichotomous outcomes by calculating the risk ratio (RR) of a successful outcome (i.e. improvement in relevant variables) for each trial. We had intended to express uncertainty in each result using 95% confidence intervals (CIs).	No study provided relevant dichotomous data for any of the primary or secondary outcomes included in this review.
Unit of analysis issues	**Cluster-randomised trials** In cluster-randomised trials, if the clustering is ignored and the unit of analysis is different from the unit of allocation ('unit-of-analysis error') (Whiting-O'Keefe 1984), P values may be artificially small and may result in false-positive conclusions (Higgins 2019c). Had we encountered such cases, we would have accounted for the clustering in the data and followed the recommendations given in the literature (Higgins 2019c; White 2005). For those cluster-randomised trials that did not report correct standard errors, we would have tried to recover correct standard errors by applying the usual formula for the variance inflation factor 1 + (M - 1) ICC, where M is the average cluster size and ICC the intra-cluster correlation coefficient (Higgins 2019c). If it had not been possible to extract ICC values from the study, we would have used the ICC of all cluster-randomised trials in our review that investigated the same primary outcome scale in a similar setting. If this was not available, we would have used the average ICC of all other cluster-randomised trials in our review. If no such studies were available, we would have used ICC = 0.05 as a mildly conservative guess for the primary analysis, and conducted a sensitivity analysis using ICC = 0.10. We had also planned to conduct sensitivity analyses based on the unit of randomisation as well as the ICC estimate in cluster-randomised trials (see Sensitivity analysis).	No cluster-RCT was identified and included in this review.
	Multiple treatment groups Had multiple groups in a study been relevant, we would have accounted for the correlation between the effect sizes from multi-arm studies in a pair-wise meta-analysis (Higgins 2019c). We would have treated each comparison between a control group and a treatment group as an independent study. We would have multiplied the standard errors of the effect estimates by an adjustment factor to account for correlation between effect estimates. In so doing, we would have acknowledged heterogeneity between different treatment groups.	For studies with multiple treatment groups, we considered only one intervention group to be relevant for the review and meta-analyses, based on the independent judgement of two review authors. Thus, in a pair-wise meta-analysis, we did not have to account for the correlation between the effect sizes for multi-arm studies.
	[…] If there is an adequate evidence base, we will consider performing a network meta-analysis (see Data synthesis).	The evidence base was insufficient to conduct a network meta-analysis.
Dealing with missing data	If standard deviations could neither be recovered from reported results nor obtained from the authors, we would have considered single imputation by means of pooled within-treatment standard deviations from all other studies, provided that fewer than five studies had missing standard deviations. If more than five studies had missing standard deviations, we would have performed multiple imputation on the basis of the hierarchical model fitted to the non-missing standard deviations.	We found no studies using the same scale that had missing standard deviations. Missing standard deviations could always be recovered from alternative

Table 1. Unused methods table *(Continued)*

		statistical values or be obtained from the study authors.
Data synthesis	Had a trial reported more than one resilience scale, we planned to use the scale with better psychometric qualities (as specified in Appendix 3 in Helmreich 2017), to calculate effect sizes.	All studies measuring resilience only used one resilience scale.
	If a study provided data from two instruments used equally in the included RCTs, two review authors (AK, IH) would have identified the appropriate measure through discussion (compare Storebø 2020).	This did not occur in this review.
	Network meta-analyses (NMAs) would have been merely exploratory and would only have been conducted if the review results had a sufficient and adequate evidence base. Network meta-analyses offer the possibility of comparing multiple treatments simultaneously (Caldwell 2005). They combine both direct (head-to-head) and indirect evidence (Caldwell 2005; Mills 2012), by using direct comparisons of interventions within RCTs, as well as indirect comparisons across trials, on the basis of a common reference group (e.g. an identical control group) (Li 2011). A network meta-analysis on resilience-training programmes does not exist. According to Mills 2012, Linde 2016 and the *Cochrane Handbook* (Chaimani 2019), there are three important conditions for the conduct of NMAs: transitivity, homogeneity, consistency. Had an NMA been possible, i.e. if the three conditions had been fulfilled, we would have conducted an analysis - with expert statistical support as suggested by Cochrane (Chaimani 2019) - using a frequentist approach in R (Rücker 2020; Viechtbauer 2010). For sensitivity analyses, we had planned to fit the same models using the restricted maximum likelihood method (Piepho 2012; Piepho 2014; Rücker 2020). We had intended to consider categorising resilience training into seven groups, based on the underlying training concept: (1) cognitive behavioural therapy, (2) acceptance and commitment therapy, (3) mindfulness-based therapy, (4) attention and interpretation therapy, (5) problem-solving therapy, (6) stress inoculation therapy and (7) multimodal resilience training. We may have included additional groups after conducting the full literature search. Reference groups that might have been included in the NMA were: attention control, wait-list, treatment as usual or no intervention. We had planned to investigate inconsistency and flow of evidence in accordance with recommendations in the literature (e.g. Chaimani 2019; Dias 2010; König 2013; Krahn 2013; Krahn 2014; Lu 2006; Lumley 2002; Rücker 2020; Salanti 2008; White 2012b).	The evidence base was insufficient to conduct a network meta-analysis.
Summary of findings	Depending on the assessment of heterogeneity and possible effect modifiers (see Subgroup analysis and investigation of heterogeneity), we would have created several 'Summary of findings' tables; for example, the clinical status of study populations or the comparator group.	We were not able to investigate potential effect modifiers for the primary outcomes in subgroup analyses and therefore created no additional 'Summary of findings' tables.
Subgroup analysis and investigation of heterogeneity	Where we detected substantial heterogeneity, we had planned to examine characteristics of studies that may be associated with this diversity (Deeks 2019). The selection of potential effect modifiers was based on experiences from previous reviews (Leppin 2014; Robertson 2015; Vanhove 2016). We had intended to perform the following subgroup analyses on our primary outcomes, if we identified 10 or more studies during the review process (Deeks 2019):	For the primary outcomes at each time point, we identified fewer than 10 studies in a pair-wise meta-analysis.

Table 1. Unused methods table *(Continued)*

	• setting of resilience interventions (group setting vs individual setting vs combined setting); • delivery format of resilience interventions (face-to-face vs online vs bibliotherapy vs combined delivery vs mobile-based vs delivery not specified); • theoretical foundation of resilience-training programmes (CBT vs ACT vs mindfulness-based therapy vs AIT vs problem-solving training vs stress inoculation vs multimodal resilience training vs coaching vs positive psychology vs nonspecific resilience training); • comparator group in intervention studies (attention control vs wait-list control vs TAU vs no intervention vs active control vs control group not further specified); and • intensity of resilience interventions (low intensity vs moderate intensity vs high intensity).	
Sensitivity analysis	Comparable with the planned subgroup analyses, we had planned to perform sensitivity analyses if more than 10 RCTs were included in a meta-analysis. We had intended to restrict the sensitivity analyses to the primary outcomes. For intervention studies assessing resilience with resilience scales, we had planned to perform a sensitivity analysis on the basis of the underlying concept (state versus trait) in these measures, and to limit the analysis to scales assessing resilience as an outcome of an intervention. To examine the impact of the risk of bias of included trials, we had intended to limit the studies included in the sensitivity analysis to those whose risk of bias was rated as low or unclear, and to exclude studies assessed at high risk of bias; for studies with low or unclear risk of bias, we had planned to conduct subgroup analyses. We had also intended to consider the restriction to registered studies. We had planned to identify registration, both by recording whether we found a study in a trial registry and by noting whether the study author claimed to have registered it. We had planned to perform sensitivity analyses by limiting analysis to those studies with low levels of missing data (less than 10% missing primary outcome). We had intended to limit the analysis to studies where missing data had been imputed or accounted for by fitting a model for longitudinal data, or where the proportion of missing primary outcome data was less than 10%. We had also intended to perform sensitivity analyses based on the ICC estimate in cluster-randomised trials that had not adjusted for clustering, by excluding cluster-RCTs where standard errors had not been corrected or corrected only on the basis of an externally-estimated ICC. In an additional sensitivity analysis, we had planned to replace all externally-estimated ICCs less than 0.10 by 0.10. Finally, we had intended to conduct a sensitivity analysis based on the unit of randomisation, by limiting the analysis to individually randomised trials.	For the primary outcomes at each time point, we identified fewer than 10 studies in a pair-wise meta-analysis.

This table provides details of analyses that had been planned and described in the protocol (Helmreich 2017), including revisions made at review stage, but were not used as they were not required or not feasible.
ACT: acceptance and commitment therapy; AIT: attention and interpretation therapy; CBT: cognitive-behavioural therapy; RCT(s): randomised controlled trial(s); TAU: treatment as usual; vs: versus

Table 2. Primary outcomes: scales used

Outcomes	Number of studies	Studies and instruments
Resilience	17	• Anderson 2017: Resilience Scale-25 (Wagnild 2009)

Table 2. Primary outcomes: scales used *(Continued)*

		• Barry 2019: resilience subscale of Psychological Capital Questionnaire (PCQ) (Luthans 2004) • Chen 2018a: scale not specified in conference abstract • Delaney 2016: Brief Resilience Scale (Smith 2008) • Erogul 2014: Resilience Scale-14 (Wagnild 1993) • Houston 2017: Connor-Davidson Resilience Scale (CD-RISC) (Connor 2003) • Kelleher 2018: scale not specified in conference abstract • Mathad 2017: CD-RISC-10 (Campbell-Sills 2007; Connor 2003) • Mejia-Downs 2016: CD-RISC (Connor 2003) • Mueller 2018: 12-item Grit scale (Duckworth 2007) • Peng 2014: CD-RISC (Connor 2003; Yu 2007) • Samouei 2015: resilience subscale of PCQ (Luthans 2007) • Stephens 2012: CD-RISC (Connor 2003) • Venieris 2017: Resilience Scale for Adults (Friborg 2003) • Victor 2018: Resilience Scale-11 (Schumacher 2005) • Wang 2012: Resilience Scale for Chinese Adolescents (Hu 2008) • ISRCTN64217625: CD-RISC (Connor 2003)
Anxiety	9	• Barry 2019: anxiety subscale of Depression Anxiety and Stress Scale (DASS) (Lovibond 1993) • Goldstein 2019: anxiety subscale of Mood and Anxiety Symptom Questionnaire (MASQ) (no citation provided in poster or abstracts) • Houston 2017: Generalized Anxiety Disorder - 7-item scale (Spitzer 2006) • Kötter 2016: anxiety subscale of Hospital Anxiety and Depression Scale (HADS-D) (Herrmann-Lingen 2011; Zigmond 1983) • Porter 2008: anxiety dimension of Symptom Checklist - 90 - Revised (SCL-90-R) (Derogatis 1994) • Recabarren 2019: State Trait Anxiety Inventory (Schweitzer 1990; Spielberger 1983) • Sahranavard 2018: Beck Anxiety Inventory (Beck 1987) • Wang 2012: anxiety dimension of Symptom Checklist - 90 (SCL-90) (Xu 2008) • Warnecke 2011: anxiety subscale of DASS (Lovibond 1995)
Depression	10	• Barry 2019: depression subscale of DASS (Lovibond 1993) • Goldstein 2019: depression subscale of MASQ (no citation provided in poster or abstracts) • Houston 2017: Centers for Epidemiological Studies–Depression Scale (Radloff 1977) • Kötter 2016: depression subscale of HADS-D (Herrmann-Lingen 2011; Zigmond 1983) • Miu 2016: Beck Depression Inventory - II (BDI-II) (Beck 1996) • Porter 2008 [a]: **depression dimension of SCL-90-R** (Derogatis 1994); and burnout subscales (emotional exhaustion, depersonalization, personal accomplishment) of Maslach Burnout Inventory (Maslach 1996) • Recabarren 2019: BDI-II (Beck 1996) • Victor 2018: BDI-II (Hautzinger 2006) • Wang 2012: depression dimension of SCL-90 (Xu 2008) • Warnecke 2011: depression subscale of DASS (Lovibond 1995)
Stress or stress perception	13	• Barry 2019 [b]: stress subscale of DASS (Lovibond 1993); and**Perceived Stress Scale-10 (PSS-10)** (Cohen 1983b; Cohen 1988a) • Chen 2018a: stress - scale not specified in conference abstract • Delaney 2016: PSS-10 (Chiang 2012; Ratanasiripong 2012) • Erogul 2014: PSS (Cohen 2012)

Table 2. Primary outcomes: scales used *(Continued)*

		• Goldstein 2019: Perceived Stress Scale (no citation provided in poster or abstracts) • Houston 2017: PSS-14 (Cohen 1983b) • Kelleher 2018: stress - scale not specified in conference abstract • Kötter 2016: Perceived Medical School Stress - German version (Kötter 2013) • Mathad 2017: PSS-10 (Cohen 1983b) • Mejia-Downs 2016: PSS (Cohen 1983b) • Stephens 2012: PSS (Cohen 1988a) • Venieris 2017: Graduate Stress Inventory - Revised (Rocha-Singh 1994) • Warnecke 2011: PSS-10 (Cohen 1983b; Cohen 1988a)
Well-being or quality of life	6	• Goldstein 2019: Satisfaction with Life Scale (no citation provided in poster or abstracts) • Mathad 2017: Satisfaction with Life Scale (SWL) (Diener 1985) • Recabarren 2019: global value from World Health Organization Quality of Life (WHO 1996) • Smeets 2014: SWL (Diener 1985) • Venieris 2017: Steen Happiness Index (Seligman 2005) • Wang 2012: General Well-Being Schedule (Wang 1999)

[a]For depression, we preferred depression scales over burnout scales if both measures were reported.
[b]Concerning Barry 2019, we included the values for the PSS-10 in the pooled analysis, as this measure was used more often among the included studies.

Table 3. Secondary outcomes: scales used

Outcomes	Number of studies	Studies and instruments
Social support (perceived)	4	• Mejia-Downs 2016: Social Provisions Scale (Cutrona 1987) • Porter 2008: Peer Support Crisis Support Questionnaire (only 6 of 14 items used) (Joseph 1992; Lowery 2005) • Recabarren 2019: Multidimensional Scale of Perceived Social Support (Zimet 1988) • Stephens 2012: Sense of Support Scale (Dolbier 2000)
Optimism	4	• Barry 2019: optimism subscale of Psychological Capital Questionnaire (PCQ) (Luthans 2004) • Mejia-Downs 2016: Life Orientation Test - Revised (LOT-R) (Scheier 1994) • Samouei 2015: optimism subscale of PCQ (Luthans 2007) • Smeets 2014: LOT-R (Scheier 1994)
Self-efficacy	7	• Barry 2019: efficacy subscale of PCQ (Luthans 2004) • Recabarren 2019: General Self-Efficacy Scale (GSES) (Schwarzer 1995) • Sahranavard 2018: GSES (Schwarzer 1995) • Samouei 2015: efficacy subscale of PCQ (Luthans 2007) • Smeets 2014: GSES (Schwarzer 1995) • Waddell 2005: Career Decision-Making Self-Efficacy Scale - Short Form (CDMSES-SF) (Betz 1996; Taylor 1983) • Waddell 2015: CDMSES-SF (Betz 1996; Taylor 1983)
Active coping	2	• Houston 2017: taking action, newly created subscale for the respective sample using original items of the Brief Coping Orientations to Problems Experience scale (Carver 1997)

Table 3. Secondary outcomes: scales used *(Continued)*

		• Porter 2008: planful problem-solving subscale of Ways of Coping Questionnaire (Folkman 1988)
Self-esteem	2	• Goldstein 2019: Rosenberg Self-Esteem Scale (no citation provided in poster or abstracts) • Victor 2018: Rosenberg Self-Esteem Scale (Ferring 1996)
Hardiness	1	• Sahranavard 2018: Ahvaz Hardiness Inventory (Kiamarthi 1998)
Positive emotions	6	• Akbari 2017: Oxford Happiness Questionnaire (Alipour 1993; Hills 2002) • Geschwind 2015: modified Differential Emotions Scale (mDES) (Fredrickson 2003) • Mejia-Downs 2016: mDES (Fredrickson 2003) • Peng 2014: positive affect subscale of Positive and Negative Affect Schedule (PANAS) (Watson 1988) • Sahranavard 2018: positive affect subscale of PANAS (Watson 1988) • Smeets 2014: positive affect subscale of PANAS (Watson 1988)

APPENDICES

Appendix 1. Glossary of relevant terms in this review

Acceptance and commitment therapy: form of psychotherapy (third wave of cognitive behaviour therapy) that uses acceptance and mindfulness strategies (e.g. being in contact with present moment) and commitment and behaviour-change skills (e.g. values, committed action) in order to increase psychological flexibility

Active control (in this review): alternative treatment (no standard care; for example, treatment developed specifically for the treatment study) that does not control for the amount of time and attention in the intervention group, and is not attention control in a narrow sense

Adverse event: an adverse outcome that occurs during or after the use of an intervention but is not necessarily caused by it

Allied healthcare professionals: healthcare staff working in allied health professions distinct from medical care (e.g. psychologists, social workers, counsellors, physical therapists, occupational therapists, speech therapists, medical assistants, medical technicians)

Allied healthcare students: students in training for allied health professions, as distinct from direct medical care (e.g. psychology, physical therapy, social work, counselling, occupational therapy, speech therapy, medical assistant or medical technician students)

Arm (e.g. intervention arm, control arm): group of participants allocated to the intervention or control group

Attention and interpretation therapy: mindfulness-based approach to reduce stress and increase resilience that teaches to delay judgements and to focus the attention on the novelty of the world as well as higher-order principles (e.g. acceptance, gratitude)

Attention control: alternative treatment in the control group that mimics the amount of time and attention received (e.g. by the trainer) in the intervention group

Attrition: loss of participants during the course of a study (also referred to as loss to follow-up)

Attrition bias: systematic differences between comparison groups in withdrawals or exclusions of participants from the results of a study (e.g. number or reasons, or both)

Available-case analysis: analysis in which data are analysed for every participant for whom the outcome was obtained; subset may be defined after considering exposure to treatment, availability of measurements

Baseline characteristics: values of demographic, clinical and other variables collected for each participant at the beginning of a study, before the intervention is administered

Baseline comparability: data on the potential (statistical) differences between the study groups in baseline characteristics

Bias: a systematic error or deviation in results or inferences from the truth

Bibliotherapy: resilience intervention is delivered via a self-help book/self-help materials

Blinding: process of preventing those involved in a trial from knowing to which comparison group a particular participant belongs. The risk of bias is minimised when as few people as possible know who is receiving the experimental intervention and who the control intervention. Participants, outcome assessors, and analysts are all candidates for being blinded

Cluster randomised trial: a trial in which clusters of individuals (e.g. clinics, geographical areas), rather than individuals themselves, are randomised to different arms

Coaching: resilience intervention uses a coaching approach (e.g. executive coaching, life coaching); individual problems of one or several clients are discussed with a coach; coaching approaches often include goal setting

Cochrane Handbook for Systematic Reviews of Interventions **(formerly Cochrane Reviewers' Handbook):** document containing guidance and advice on how to prepare and maintain Cochrane reviews

Cognitive-behavioural therapy/training (CBT): form of psychotherapy that is based on the assumption that mental health problems (e.g. depression) result from dysfunctional thinking and therefore aims to modify cognitive processes (e.g. identify and challenge dysfunctional thoughts in order to find functional ones)

Combined setting: resilience interventions delivered as combination of group and individual setting

Combined theoretical foundation/combination: resilience interventions that are based on two or more explicit theoretical foundations, such as CBT and ACT or CBT and mindfulness

Comorbidity: presence of one or more diseases or conditions other than those of primary interest

Concealment of allocation: process used to ensure that the person deciding to enter a participant into a randomised controlled trial does not know the comparison group into which that individual will be allocated. This is distinct from blinding, and is aimed at preventing selection bias. Some attempts at concealing allocation are more prone to manipulation than others, and the method of allocation concealment is used as an assessment of the quality of a trial

Conference abstract: short summary of presentations at conferences, which may be published

Confidence interval: a measure of the uncertainty around the main finding of a statistical analysis. Estimates of an effect, such as the standardised mean difference comparing an experimental intervention with a control, are usually presented as a point estimate and a 95% confidence interval. This means that if someone were to keep repeating a study in other samples from the same population, 95% of the confidence intervals from those studies would contain the true value of the unknown quantity. Wider intervals indicate lower precision; narrow intervals, greater precision

Conflict of interest: personal, financial, or other interests that could have influenced a person's contributions to a study

Control group/control: comparison group that receives no intervention, identical training after waiting period or an alternative intervention

Degrees of freedom: concept that refers to the number of independent contributions to a sampling distribution (such as Chi^2 distribution)

Detection bias: systematic difference between comparison groups in how outcomes are ascertained, diagnosed or verified

Dichotomous data: data that can take one of two possible values, such as depressive/non-depressive (depending on cut-off for clinically relevant mental disorder)

Effect size: 1. generic term for the estimate of effect of treatment for a study; 2. dimensionless measure of effect used for continuous data when different scales (e.g. for measuring resilience) are used to measure an outcome

Estimate of effect: observed relationship between an intervention and an outcome expressed as standardised mean difference in this review

Face-to-face: resilience intervention delivered via face-to-face contact between trainer and one or several participants

F test: statistical hypothesis test derived from the F distribution; typically used to compare continuous data between more than two groups

False positive: a falsely drawn positive conclusion

Fixed-effect model (in meta-analysis): model that calculates a pooled effect estimate using the assumption that all observed variation between studies is caused by the play of chance; studies assumed to be measuring the same overall effect

Follow-up: observation over a period of time of study/trial participants to measure outcomes under investigation; in this review: short-term: three months or less; medium-term: more than three to six months; and long-term follow-up: more than six months

Forest plot: graphical representation of the individual results of each study included in a meta-analysis together with the combined meta-analysis result; plot also allows readers to see the heterogeneity among the results of the studies. The results of individual studies are shown as squares centred on each study's point estimate. A horizontal line runs through each square to show each study's confidence interval (in this review: 95% confidence interval). The overall estimate from the meta-analysis and its confidence interval are shown at the bottom, represented as a diamond. The centre of the diamond represents the pooled point estimate, and its horizontal tips represent the confidence interval.

Funnel plot: graphical display of some measure of study precision plotted against effect size that can be used to investigate whether there is a link between study size and treatment effect; one possible cause of an observed association is reporting bias

Grey literature: kind of material that is not published in easily accessible journals or databases (e.g. conference proceedings that include the abstracts of the research presented at conferences, unpublished theses, etc.)

Group setting: resilience intervention delivered in group of several participants

Hardiness: a (modifiable) personality characteristic ('a hardy person') that consists of three elements (challenge, commitment and control); partly used as synonym of resilience; in this review, hardiness is viewed as one of several resilience factors which partially determines resilience as outcome

Healthcare professionals: healthcare staff delivering direct medical care (e.g. nurses, physicians, hospital personnel)

Healthcare students: students in training for health professions delivering direct medical care (e.g. medical, nursing, midwifery or paramedic students)

Heterogeneity: 1. used in a general sense to describe the variation in, or diversity of, participants, interventions, and measurement of outcomes across a set of studies; 2. used specifically, as statistical heterogeneity, to describe the degree of variation in the effect estimates from a set of studies

Heterogeneous: used to describe a set of studies or participants with sizeable heterogeneity

Homogeneous: 1. used in a general sense to mean that the participants, interventions, and measurement of outcomes are similar across a set of studies; 2. used specifically to describe the effect estimates from a set of studies where they do not vary more than would be expected by chance

Individual setting: resilience interventions delivered in one-on-one setting

Intention to treat analysis: a strategy for analysing data from a randomised controlled trial; all participants are included in the arm to which they were allocated, whether or not they received (or completed) the intervention given to that arm. Intention-to-treat analysis prevents bias caused by the loss of participants, which may disrupt the baseline equivalence established by randomisation and which may reflect non-adherence to the protocol

Inter-rater reliability: degree of stability exhibited when a measurement is repeated under identical conditions by different raters; reliability refers to the degree to which the results obtained by a measurement procedure can be replicated. Lack of inter-rater reliability may arise from divergences between observers or instability of the attribute being measured

Interaction: situation in which the effect of one independent variable on the outcome is affected by the value of a second independent variable

Intervention: the process of intervening on people in an experimental study (in this review: by resilience-training programmes)

Intervention group: a group of participants in a study receiving a particular intervention (in this review: resilience intervention)

Laboratory delivery: resilience intervention is provided in the laboratory (under standardised conditions)

Mean: an average value, calculated by adding all the observations and dividing by the number of observations

Mean difference: difference between two estimated means (e.g. used in this review to present the results for single studies that could not be combined in meta-analysis together with other studies)

MeSH headings (Medical Subject Headings): terms used by the United States National Library of Medicine to index articles in Index Medicus and MEDLINE. The MeSH system has a tree structure in which broad subject terms branch into a series of progressively narrower subject terms.

Meta-analysis: use of statistical techniques in a systematic review to integrate the results of included studies

Mindfulness-based training: intervention that aims to foster mindfulness (i.e. non-judging awareness of the present moment and its accompanying mental phenomena, like body sensations, thoughts and emotions), by teaching formal and informal mindfulness practices (e.g. body scan, breathing awareness) (e.g. mindfulness-based stress reduction, MBSR)

Mixed samples: studies with samples including healthcare professionals and participants from the non-healthcare sector (e.g. ambulance personnel and firefighters)

Multimodal delivery: intervention is delivered by a combination of different formats (e.g. face-to-face and online)

No intervention control: control group that received no intervention

Online- or mobile-based delivery: resilience intervention is delivered online/internet-based or via smartphones (e.g. smartphone application)

Outcome: a component of a participant's clinical and functional status after an intervention has been applied, which is used to assess the effectiveness of an intervention

P value: the probability (ranging from zero to one) that the results observed in a study (or results more extreme) could have occurred by chance if in reality the null hypothesis was true. In a meta-analysis, the P value for the overall effect assesses the overall statistical significance of the difference between the intervention groups, whilst the P value for the heterogeneity statistic assesses the statistical significance of differences between the effects observed in each study.

Parallel group trial: a trial that compares two groups of people concurrently, one of which receives the intervention of interest and one of which is a control group; some parallel trials have more than two comparison groups

Participant: an individual who is studied in a trial

Per protocol analysis: an analysis of the subset of participants from a randomised controlled trial who completed the trial or complied with the protocol sufficiently (e.g. specific dose of treatment) to ensure that their data would be likely to exhibit the effect of treatment; this subset may be defined after considering exposure to treatment and absence of major protocol violations. The per protocol analysis strategy may be subject to bias as the reasons for non-compliance may be related to treatment.

Performance bias: systematic differences between intervention groups in care provided apart from the intervention being evaluated; for example, if participants know they are in the control group, they might act differently, and if intervention providers are aware of the group a particular participant is in, they might act differently. Blinding of study participants (both the recipients and providers of intervention) is used to protect against performance bias.

Positive psychology: scientific study of character strengths and positive aspects of human life (e.g. happiness) that allow individuals to thrive; interventions based on positive psychology aim to foster these factors

Post-traumatic growth (also stress-related growth): often used synonymously with resilience; however, in contrast to resilience (i.e. maintaining or restoring mental health after a stressor), post-traumatic or stress-related growth refers to increasing the level of functioning compared to that prior to the stressor

Post-test/post-intervention: the assessment immediately after the end of treatment (in this review: within one week after the end of training)

Precision: a measure of the likelihood of random errors in the results of the meta-analysis; the greater the precision, the less random error. Confidence intervals around the estimate of effect from each study are one way of expressing precision, with a narrower confidence interval meaning more precision.

Primary outcome: the outcome of greatest importance

Primary study: 'original research' in which data are collected

Problem-solving training: closely related to CBT; training based on problem-solving theory (e.g. to foster a positive problem orientation and to teach structured problem-solving)

Random allocation: method that uses the play of chance to assign participants to comparison groups in a trial, e.g. by using a random numbers table or a computer-generated random sequence. Random allocation implies that each individual or unit being entered into a trial has the same chance of receiving each of the possible interventions. It also implies that the probability that an individual will receive a particular intervention is independent of the probability that any other individual will receive the same intervention.

Random-effects model (in meta-analysis): a statistical model in which both within-study sampling error (variance) and between-studies variation are included in the assessment of the uncertainty (confidence interval) of the results of a meta-analysis; when there is heterogeneity among the results of the included studies beyond chance, random-effects models will give wider confidence intervals than fixed-effect models

Randomisation: the process of randomly allocating participants into one of the arms of a controlled trial. There are two components to randomisation: the generation of a random sequence; and its implementation, ideally in a way so that those entering participants into a study are not aware of the sequence (concealment of allocation).

Randomised controlled trial: study in which two or more conditions, possibly including a control intervention or no intervention, are compared by being randomly allocated to participants

Reporting bias: bias caused by only a subset of all the relevant data being available. The publication of research can depend on the nature and direction of the study results. Studies in which an intervention is not found to be effective are sometimes not published. In addition, a published report might present a biased set of results (e.g. only outcomes or subgroups where a statistically significant difference was found).

Resilience: maintenance or fast recovery of mental health during or after substantial adversities; different definitions exist, however, there is a consensus about two essentials: 1. exposure to substantial stressors or adversities; 2. successful coping with these adversities

Resilience factor: psychological or social factors associated to resilience, e.g. optimism

Search strategy: 1. the methods used to identify trials within the review's scope (including searching electronic databases, trial registers, personal contact with researchers/study authors and checking reference lists); 2. the combination of terms used to identify studies in an electronic database such as MEDLINE

Secondary outcome: an outcome used to evaluate additional effects of the intervention deemed a priori as being less important than the primary outcomes

Selection bias: systematic differences between comparison groups in prognosis or responsiveness to treatment; random allocation with adequate concealment of allocation protects against selection bias. Other means of selecting who receives the intervention are more prone to bias because decisions may be related to prognosis or responsiveness to treatment

Sensitivity analysis: analysis used to determine how sensitive the results of the systematic review are to changes in how it was done; sensitivity analyses are used to assess how robust the results are to uncertain decisions or assumptions about the data and the methods that were used.

Single blind: single masked

Standard deviation: measure of the spread or dispersion of a set of observations, calculated as the average difference from the mean value in the sample

Standard error: standard deviation of the sampling distribution of a statistic; measurements taken from a sample of the population will vary from sample to sample. The standard error is a measure of the variation in the sample statistic over all possible samples of the same size. The standard error decreases as the sample size increases.

Standardised mean difference: difference between two estimated means divided by an estimate of the standard deviation; used to combine results from studies using different ways of measuring the same concept, e.g. resilience or mental health. By expressing the effects as a standardised value, the results can be combined since they have no units.

Stress inoculation: form of CBT; psychotherapeutic method to prepare participants to deal with stressors successfully and to achieve coping strategies by exposing them to milder forms of stress

Subgroup analysis: an analysis in which the intervention effect is evaluated in a defined subset of the participants/interventions in a trial, or in complementary subsets, such as by intervention setting or delivery format

Telephone delivery: resilience intervention that are provided via the telephone (e.g. calls between trainer and participant)

Training intensity: intensity of intervention as indicated by the number of sessions or the number of hours (i.e. duration); in this review: low intensity: total duration of ≤ five hours or ≤ three sessions; moderate intensity: > 5 hours to ≤ 12 hours or > 3 to ≤ 12 sessions; high intensity: > 12 hours or > 12 sessions

Treatment as usual (TAU): the control group receives a (established) standard treatment (synonyms: standard care, usual care)

t test: a statistical hypothesis test derived from the t distribution; used to compare continuous data in two groups

Trialist: refers to a person conducting or publishing a controlled trial

Type I error (also false positive): conclusion that a treatment works, when it actually does not work; the risk of a Type I error is often called alpha. In a statistical test, it describes the chance of rejecting the null hypothesis when it is in fact true.

Unspecific theoretical foundation/unspecific training programmes: resilience interventions fostering one or several resilience factors but without specifying any explicit theoretical foundation or where the underlying framework cannot be assigned to a certain theoretical approach

Unspecified/not specified setting, delivery, training intensity or comparator: no information on the respective intervention characteristic or the comparator are available and could not be received by the study authors

Variable: a factor that differs among and between groups of people, e.g. patient characteristics such as age, sex, and smoking, or measurements such as blood pressure or depression score; there can also be treatment or condition variables (e.g. length of treatment dose) and outcome variables

Wait-list control: control group receiving the training after a waiting period

Footnotes

This glossary is based, in part, on the glossary of the Cochrane Community (Cochrane Community 2020).

Appendix 2. Evidence rating of modifiable resilience factors

Although an immense number of factors have been discussed in the literature, only a set of psychosocial factors has been scientifically validated as being appropriate determinants of resilience by cross-sectional and longitudinal (frequently observational) studies in different populations (e.g. patients affected by physical diseases like cancer, diabetes, spinal cord injury, coronary heart disease, etc.; different caregiver groups; individuals after trauma exposure). Upon closer examination, only some of the discussed resilience factors may be viewed as well-evidenced factors that have also been found to be protective factors in systematic reviews and meta-analyses (level 1). These factors are most likely to be related to adult resilience, as they were proven in different populations facing various adversities and stressors. However, it has to be kept in mind that the chosen factors represent the current state of knowledge on psychosocial resilience-promoting factors, and that other factors, which are not yet well researched, could also contribute to resilience.

Level of evidence and criteria	Resilience factors
Level 1: strong evidence (SRs and MAs) • Factor has been studied for its association with resilience (i.e. mental health or well-being or psychological adaptation despite (acute or chronic) stressors, life events or traumas) in observational (cross-sectional or longitudinal) studies in adults • There is evidence from systematic reviews (SRs) AND meta-analyses (MAs)	
Level 1a: there is evidence for this factor from several SRs AND several MAs (both across different populations)	• **Active coping (e.g. problem-solving, planning)** o 2 MAs: Kvillemo 2014; Moskowitz 2009 o 4 SRs: Bjørkløf 2013; Kneebone 2003; Senra 2015; Van Kessel 2013 o Cross-sectional studies: e.g. Al-Yagon 2009; Dörfel 2008; Lechner 2007; Luo 2015; Marty 2010; Wang 2014 o Longitudinal studies: e.g. Butler 2009; Silver 2002 • **Self-efficacy** o 2 MAs: Jackson 2014; Lee 2013 o 9 SRs: Allart 2013; Dias 2015; Korpershoek 2011; Luszczynska 2009; Morris 2013; Peter 2012; Stewart 2011; Van Kessel 2013; Van Leeuwen 2012 o Cross-sectional studies: e.g. Barry 2003; Northouse 2002; Orengo 2001; Schwarzer 2008; Wright 2008 o Longitudinal studies: e.g. DeRoon-Cassini 2010; Guest 2015; Hartley 2008

(Continued)

	• **Optimism or positive attributional style** ○ 4 MAs: Helgeson 2006; Lee 2013; Prati 2009; Shand 2015 ○ 5 SRs: Dias 2015; Duits 1997; Peter 2012; Stewart 2011; Van Kessel 2013 ○ Cross-sectional studies: e.g. Martin-Krumm 2003; Sumer 2005 ○ Longitudinal studies: e.g. Ahmad 2010; Carver 2010; Fresco 2006; Grote 2007; Kivimäki 2005; Myhren 2010; Segovia 2012 • **Social support** ○ 4 MAs: Lee 2013; Ozer 2003; Prati 2009; Shand 2015 ○ 11 SRs: Allart 2013; Casale 2013; Dias 2015; Duits 1997; McCann 2013; Morris 2013; Paterson 2013; Pragodpol 2013; Senra 2015; Stewart 2011; Van Kessel 2013 ○ Cross-sectional studies: e.g. Ahern 2004; Fuller-Iglesias 2008; Kaspersen 2003; Schumm 2006 ○ Longitudinal studies: e.g. Bartone 1989; Dyrbye 2010; Johnson 2009; Koenen 2003; Solomon 1988 • **Cognitive flexibility (e.g. positive reappraisal, acceptance of negative situations and emotions)** [a] ○ 6 MAs: Helgeson 2006; Kvillemo 2014; McIntosh 2012; Moskowitz 2009; Prati 2009; Shand 2015 ○ 11 SRs: Allart 2013; Bjørkløf 2013; Dias 2015; Guardino 2014; Kneebone 2003; Morris 2013; Nowlan 2015; Peter 2012; Senra 2015; Stewart 2011; Van Leeuwen 2012 ○ Cross-sectional studies: e.g. Bailey 2013; Farber 2003; Johnson 2015; Min 2013 ○ Longitudinal studies: e.g. Park 2008; Silver 2002; Wade 2001 • **Religiosity or spirituality or religious coping (e.g. frequent religious attendance)** [a] ○ 7 MAs: Ano 2005; Helgeson 2006; McIntosh 2012; Moskowitz 2009; Prati 2009; Salsman 2015; Shand 2015 ○ 7 SRs: Bjørkløf 2013; Guardino 2014; McCann 2013; Peter 2012; Senra 2015; Stewart 2011; Visser 2010 ○ Cross-sectional studies: e.g. Cruz 2016; Tsai 2015 ○ Longitudinal studies: e.g. Hebert 2007; Kasen 2014; Koenig 2007; Walsh 2002
Level 1b: there is evidence for this factor from several SRs AND a single MA (both across different populations)	• **Positive emotions or positive affect** ○ 1 MA: Lee 2013 ○ 2 SRs: Van Kessel 2013; Van Leeuwen 2012 ○ Cross-sectional studies: e.g. Cohen 2006; Gloria 2016; Ong 2006 ○ Longitudinal studies: e.g. Fredrickson 2003; Geschwind 2010; Quale 2010; Strand 2006; Zautra 2005 • **Hardiness** ○ 1 MA: Eschleman 2010 ○ 4 SRs: Brooks 2003; Dias 2015; McCann 2013; Stewart 2011 ○ Cross-sectional studies: e.g. Alexander 2001; Andrew 2008; Bernas 2000; Farber 2000; Hystad 2011; Judkins 2005a; King 1998; Natvik 2011; Waysman 2001; Weiss 2002 ○ Longitudinal studies: e.g. Dolan 2006; Bartone 1989 • **Self-esteem** ○ 1 MA: Lee 2013 ○ 4 SRs: Allart 2013; Peter 2012; Stewart 2011; Van Leeuwen 2012 ○ Cross-sectional studies: e.g. Besser 2014; Fernández-Lansac 2012; Hayter 2014 ○ Longitudinal studies: e.g. Bookwala 2014
Level 1c: there is evidence for this factor from several SRs (across different populations) AND a single MA (in the same population)	• **Meaning in life or purpose in life** ○ 1 MA: Winger 2016 ○ 5 SRs: Allart 2013; Peter 2012; Van Kessel 2013; Van Leeuwen 2012; Visser 2010) ○ Cross-sectional studies: e.g. Alim 2008; Bauer-Wu 2005; Blackburn 2015; Feder 2013; Lyon 2001; Owens 2009; Pietrzak 2013; Schaefer 2013; Smith 2009; Tsai 2015 ○ Longitudinal studies: e.g. Krause 2007; Tsai 2016

(Continued)

	• **Sense of coherence** ○ 1 MA: Winger 2016 ○ 7 SRs: Allart 2013; Bjørkløf 2013; Eriksson 2006; Peter 2012; Pragodpol 2013; Van Kessel 2013; Van Leeuwen 2012) ○ Cross-sectional studies: e.g. Al-Yagon 2009; Cohen 2003; Forstmeier 2009 ○ Longitudinal studies: e.g. Frommberger 1999; Schnyder 2008
Level 2: moderate evidence (only SRs or single MA) • Factor has been studied for its association with resilience (i.e. mental health or well-being or psychological adaptation despite (acute or chronic) stressors, life events or traumas) in observational (cross-sectional or longitudinal) studies in adults • There is evidence from SR OR a single MA	
Level 2a: there is evidence for this factor from several SRs (across different populations) OR there is no evidence from SRs, but from a MA (across different populations)	• **(Internal) Locus of control** ○ 6 SRs: Bjørkløf 2013; Dias 2015; Saksvik 2011; Senra 2015; Stewart 2011; Van Leeuwen 2012 ○ Cross-sectional studies: e.g. Kilic 2013; Sattler 2014; Solomon 1988 ○ Longitudinal studies: e.g. Karstoft 2015; Lawler 1992; Milte 2015; White 2012a • **Coping flexibility** ○ 1 MA: Cheng 2014 ○ Cross-sectional studies: e.g. Atal 2016; Bonanno 2011; Burton 2012; Park 2015 ○ Longitudinal studies: e.g. Bonanno 2004; Galatzer-Levy 2012
Level 2b: there is evidence for this factor from several SRs (in the same population)	• **Hope** ○ 2 SRs: Peter 2012; Van Leeuwen 2012 ○ Cross-sectional studies: e.g. Besser 2014; Hernandez 2013; Ong 2006; Truitt 2012 ○ Longitudinal studies: e.g. Ho 2010
Level 2c: there is evidence for this factor from a single SR (in the same population)	• **Humour** ○ 1 SR: McCann 2013 ○ Cross-sectional studies: e.g. Abel 2002a; Abel 2002b ○ Longitudinal studies: e.g. Kuiper 1992; Nezu 1988
Level 3: weak evidence (no SR or MA) • Expert opinion without explicit critical appraisal • Factor has not been studied sufficiently for its association with resilience (i.e. mental health or well-being or psychological adaptation despite (acute or chronic) stressors, life events or traumas) in adults • Factor is only mentioned in unsystematic narrative reviews or discussion papers, or both	
	• **Altruism** ○ Narrative reviews or discussion papers: Haglund 2007; Southwick 2005; Wu 2013

MA: Meta-analysis; **SR:** Systematic review.

Footnotes

Results of systematic reviews and meta-analyses based on a literature search for potentially modifiable resilience factors in MEDLINE (search strategy: respective resilience factor.tw. AND (review or meta-analy$).tw.; search limited to "All adults (19 plus years)" and 1990 to 2016).

[a]Cognitive flexibility and religiosity or spirituality are multidimensional concepts resulting in highly ambiguous operationalisations. Cognitive flexibility comprises several concepts, such as positive reappraisal and acceptance (Southwick 2005). Religiosity or spirituality combines affective, behavioural and cognitive dimensions, each measured differently (Ano 2005; Pargament 2000; Salsman 2015).

Appendix 3. Examples of training methods to address resilience factors

Evidence-based resilience factor	Examples of training methods to address the resilience factor
Meaning in life or purpose in life	Introduce the benefits of purpose in life; support individuals in identifying important sources of meaning (e.g. social relationships, work) as well as in setting priorities and guiding values for their life (e.g. Sood 2011)
Sense of coherence (comprehensibility, meaningfulness, manageability)	Promote the understanding of external life challenges, personal beliefs and emotions; encourage participants to reflect on personal (internal or external) resources and to use them more frequently (e.g. Tan 2016)
Positive emotions or positive affect	Psycho-education on emotions; mindfulness techniques; support individuals in identifying pleasant activities to enhance positive emotions (e.g. Jennings 2013)
Hardiness (challenge, commitment, control)	Situational reconstruction (i.e. imagination of stressful circumstances); focusing (i.e. reflection on bodily sensations of emotional upset) (e.g. Maddi 1998; Maddi 2009)
Self-esteem	Support participants in identifying personal strengths
Active coping (e.g. problem-solving, planning)	Introduce the problem-solving model and familiarise participants with the use of active coping strategies in stressful situations (e.g. making action plans) (e.g. Abbott 2009; Bekki 2013; Sahler 2013)
Self-efficacy	Support participants in identifying personal strengths and other sources of self-efficacy (e.g. social connections); support individuals in realising previous successes (e.g. coping with negative situations)
Optimism or positive attributional style	Teach participants to adopt a more positive attributional style for stressful (i.e. external, unstable, specific) and pleasant events (i.e. internal, stable, global); encourage individuals to gain a brighter outlook for the future by enhancing their attention for and the discovery of positive aspects in their lives (e.g. Carver 2010; Sadow 1993)
Social support	Encourage the individual's reflection on his or her current network (i.e. magnitude of social network, positive or negative aspects in social relationships); enhance the individual's support network by providing them with communication techniques (e.g. Kent 2011; Schachman 2004; Sood 2011; Steinhardt 2008)
Cognitive flexibility (e.g. positive reappraisal, acceptance of negative situations and emotions)	Positive reappraisal: introduction of ABC (Activating event, Belief, Consequence) Technique of Irrational Beliefs (Ellis 1957) of cognitive therapy; train participants in identifying and challenging maladaptive thoughts and replacing them by more positive ones (e.g. Abbott 2009; Farchi 2010; Songprakun 2012; Steinhardt 2008) Acceptance: relaxation or mindfulness techniques
Religiosity or spirituality or religious coping (e.g. frequent religious attendance)	Spiritual exercises like meditation or yoga; psycho-education on coping strategies like regular praying or participating in religious community activities (e.g. worship) (e.g. Sood 2011)

Appendix 4. Previous systematic reviews and meta-analyses and their methodological weaknesses

There are a number of systematic reviews and meta-analyses of various forms of interventions to foster healthcare students' mental health e.g. Buddeberg-Fischer 2006; Dawson 2019; Dobkin 2013; Foster 2015; Frei 2010; Gao 2019; Griffiths 2019; Jones 2000; Lovell 2018; Shiralkar 2013; Turner 2017; Williams 2015.

Systematic reviews and meta-analyses on resilience interventions in clinical and non-clinical adult populations

Category	Details of previous reviews/meta-analyses
Number of reviews and meta-analyses	• 13 systematic reviews: Bauer 2018; Macedo 2014; Massey 2019; Milne 2016; Pallavicini 2016; Petriwskyj 2016; Reyes 2018; Robertson 2015; Skeffington 2013; Tams 2016 [a]; Townshend 2016; Van Kessel 2014; Wainwright 2019 • 6 meta-analyses, with only 4 being relevant due to meta-analyses for psychological outcomes (Joyce 2018; Kunzler 2020; Leppin 2014; Vanhove 2016). Deady 2017 [a] conducted a meta-analysis on psychological symptoms but included primary studies that did not explicitly mention resilience, while Pesantes 2015 conducted no pooled analysis for psychological outcomes
Methodological characteristics	*Eligibility critieria:* heterogeneous eligibility criteria (e.g. by study design) and definitions of resilience training (e.g. the aim of fostering resilience was not always stated in the included primary studies)
	Search strategy: Some reviews used rather simple, limited search strategies to identify relevant studies (e.g. only resilience/hardiness combined with training terms in, for example, Joyce 2018; Robertson 2015; restriction to English language), which may bias the search results
	Review protocol/registration: A review protocol or PROSPERO registration was available for 5 publications only (Bauer 2018; Kunzler 2020; Leppin 2014; Townshend 2016; Wainwright 2019)
	Review according to guidelines: Most reviews report having been conducted according to the PRISMA or alternative guidelines, such as the guidance for undertaking reviews in healthcare (CRD 2009; e.g. Milne 2016; Van Kessel 2014) or Cochrane guidelines (Higgins 2019a; e.g. Kunzler 2020)
	Quality assessment of included studies: Most reviews performed a quality assessment of the primary studies (the exceptions being Milne 2016; Pallavicini 2016; Reyes 2018; Skeffington 2013; Vanhove 2016, who only judged publication bias; we were also unable to verify if Tams 2016 conducted a quality assessment because we were unable to retrieve the full text). For studies included in several reviews, the reported risk of bias also differed between publications (e.g. detection bias for Abbott 2009 differed between Leppin 2014 and Robertson 2015)

Footnotes

[a] Deady 2017 and Tams 2016 searched for 'resilience' and related constructs, but did not formulate specific eligibility criteria for resilience-training programmes.

Systematic reviews and meta-analyses on resilience interventions in healthcare students

Category	Details of previous reviews/meta-analyses
Number of reviews and meta-analyses	• 5 systematic reviews: Gilmartin 2017; McGowan 2016; Pezaro 2017 [a]; Rogers 2016; Sanderson 2017 • Of these, Sanderson 2017, did not merely aim to identify resilience interventions but had other review questions also (e.g. concerning concepts or measures of resilience); thus, the number of resilience intervention studies was limited in this publication (no RCTs) • 1 meta-analysis: Lo 2018 [a], which largely included studies without an explicit focus on resilience (e.g. resilience was not mentioned in the publication)
Methodological characteristics	*Eligibility criteria:* • The 6 publications either investigated healthcare students such as medical students (Lo 2018; McGowan 2016; Sanderson 2017) or combinations of healthcare students and healthcare professionals, i.e. with completed training (Gilmartin 2017: nurses, physicians, student nurses, and med-

(Continued)

ical trainees; Pezaro 2017: midwives and student midwives; Rogers 2016: healthcare professionals and students)

- Each publication used different inclusion and exclusion criteria for studies with respect to interventions and study design (e.g. only RCTs in Lo 2018 versus various study designs in McGowan 2016)
- While some reviews included training programmes with the stated intention to enhance resilience (McGowan 2016: interventions defined "as those relating to the experience and development of resilience", p 2274), the eligibility criteria for the types of intervention have not been described in detail in other publications (e.g. reviews not focusing solely on interventions, Sanderson 2017)

Search strategy:

- Each review varied in the breadth of the search strategy, as well as the extent of reporting the strategy used. For example, while some reviews searched for resilience and associated terms (e.g. coping behaviour; Pezaro 2017) or used specific intervention terms (e.g. stress management, mindfulness; Gilmartin 2017), others have used a narrow search (e.g. resilience combined with one term for healthcare students; McGowan 2016)
- Most previous reviews were restricted to English-language publications, and grey literature was not always considered

Review protocol/registration: Aside from Gilmartin 2017 and Pezaro 2017, most of these reviews did not have a published protocol or protocol registration, which reduces transparency and comparability in the reviews' procedures and potentially restricts the evidence found

Review according to guidelines: 1 review did not specify whether it had been conducted according to guidelines, such as PRISMA or Cochrane guidelines, or other validated frameworks (Rogers 2016)

Quality assessment of included studies:

- The assessment and reporting of risk of bias and quality of the included studies differed between reviews, as they often relied on different guidelines depending on the study design considered (e.g. Downs and Black Checklist; Downs 1998)
- Sanderson 2017 performed no formal 'Risk of bias' assessment

RCT: Randomised controlled trial

Footnotes

[a] Lo 2018 and Pezaro 2017 searched for resilience and identified resilience intervention studies for healthcare students but did not initially focus on identifying such programmes (e.g. no respective eligibility criteria).

Appendix 5. Potential instruments for the measurement of psychological resilience based on previous reviews (Leppin 2014; Macedo 2014; Robertson 2015; Vanhove 2016) and additional literature searches[a]

N°	Measure	Theory and item selection	Internal consistency	Validity	Rating
1	Resilience Scale (RS-25) (Wagnild 1993)[b]	+	+++	+++	6#
2	Brief Resilience Scale (BRS) (Smith 2008)	+	+++	+++	6#
3	Ego Resiliency (Klohnen 1996)[b]	+	++	+++	5#

(Continued)

4	Connor-Davidson Resilience Scale (CD-RISC) (Connor 2003)	+	++	+++	5#
5	Resilience Scale for Adults (RSA_{33}) (Friborg 2005)	+	++	+++	5#
6	Trauma Resilience Scale (TRS_{37}) (Madsen 2010)	+	+++	++	5#
7	Ego-Resiliency Scale (ER89) (Block 1996)[b]	-	++	+++	5#
8	Resilience Scale (RS-14) (Wagnild 2009)[b]	+	+++	+	4#
9	Resilience Scale for Adults (RSA_{37}) (Friborg 2003)	+	++	++	4#
10	Resilience at Work Scale (Winwood 2013)	+	++	++	4#
11	Workplace Resilience Inventory (WRI) (McLarnon 2013)	+	++	++	4#
12	Multidimensional Trauma Recovery and Resiliency Scale (MTRR) (Harvey 2003)	+	+++	+	4#
13	Resiliency Attitudes and Skills Profile (RASP) (Hurtes 2001)	+	+++	+	4#
14	Resilience Appraisals Scale (RAS) (Johnson 2010)	-	+++	+	4#
15	Revised Ego Resiliency 89 Scale (ER89-R) (Alessandri 2007)[b]	+	++	+	3#
16	Ego Resiliency (Bromley 2006)[b]	+	++	+	3#
17	Connor-Davidson Resilience Scale (CD-RISC-10) (Campbell-Sills 2007)	+	++	+	3#
18	Resilience Scale for Adults (RSA_{45}) (Hjemdal 2001)	+	+++	-	3#
19	Brief Resilient Coping Scale (BRCS) (Sinclair 2004)	+	+	++	3#
20	Trauma Resilience Scale (TRS_{48}) (Madsen 2010)	+	+++	-	3#
21	Child and Youth Resilience Measure - 28 (CYRM-28) (Liebenberg 2012; Ungar 2008)	+	+++	-	3#
22	Post-traumatic Growth Inventory (PTGI) (Tedeschi 1996)[c]	+	++	+	3#
23	Adolescent Resilience Scale (Oshio 2002; Oshio 2003)	-	++	+	3#

(Continued)

24	Resilience and Reintegration (20 items drawn from Spirit Core Scale) (Waite 2004)	-	+++	-	3#
25	Psychological resilience (Windle 2008)	+	++	-	2#
26	Child and Youth Resilience Measure - 12 (CYRM-12) (Liebenberg 2013)	+	++	-	2#
27	Resilience scale (Bekki 2013)	+	++	-	2#
28	Perceived Resilience (Van der Kleij 2011)	-	++	-	2#
29	Romanian Scale of Resilience to Occupational Stress (SROS) (Aniţei 2012)	-	-	-	0#

Footnotes

The resilience scales are organised hierarchically according to psychometric quality criteria.

Theory & item selection: - (#): no description of theory or item selection process available; and + (#): description of theory or item selection process available.

Internal consistency (Cronbach's alpha): - (0): no information; + (1): α < 0.70; ++ (2): α ≥ 0.70; and +++ (3): α > 0.90.

Validity (convergent/divergent or criterion validity): - (0): no information; + (1): correlations (r) with construct-related measures or criteria available, all correlations < 0.50 or resilience measure only correlated with original instrument/long-form or no correlations but alternative results reported (e.g. odds ratio); ++ (2): correlations (r) with construct-related measures or criteria available, ≤ 50% of correlations ≥ 0.50; and +++ (3): correlations (r) with construct-related measures or criteria available, > 50% of correlations ≥ 0.50.

[a] At the time of prespecifying these measures, and the publication of our protocol (Helmreich 2017), the systematic review of Joyce 2018 had not yet been published and was not considered in the development of this appendix.
[b]Scales assessing resilience as personality characteristic.
[c]Scale assessing post-traumatic growth.

Appendix 6. Possible assessment instruments for the measurement of mental health and well-being based on intervention studies included in previous reviews and meta-analyses (Leppin 2014; Macedo 2014; Robertson 2015; Vanhove 2016)[a]

- **Anxiety**
  - Depression Anxiety and Stress Scales (DASS-21) (Lovibond 1995)
  - Smith Anxiety Scale (SAS) (Smith 2007)
  - Beck Anxiety Inventory (BAI) (Beck 1993)
  - State-Trait Anxiety Inventory (STAI) (Spielberger 1970)
- **Depression**
  - Depression Anxiety and Stress Scales (DASS-21) (Lovibond 1995)
  - Center for Epidemiological Studies - Depression Scale (CES-D) (Radloff 1977)
  - Maslach Burnout Inventory (MBI) (Maslach 1997)
  - Oldenburg Burnout Inventory (Demerouti 2010)
  - Beck Depression Inventory (BDI) (Beck 1961)
  - Beck Depression Inventory - II (BDI-II) (Beck 1996)
  - Visual Analogue Scale - Fatigue (VAS-Fatigue) (Wolfe 2004)
  - Patient Health Questionnaire for Depression (PHQ-D) (Spitzer 1999)
  - Hospital Anxiety and Depression Scale (HADS) (Zigmond 1983)
  - Time Urgency Scale (TUS) (Landy 1991)

- **Stress or stress perception**
  - Depression Anxiety and Stress Scales (DASS-21) (Lovibond 1995)
  - Perceived Stress Scale (PSS) (Cohen 1988a)
  - Personal Stress Scale (PSS) (self-developed) (Petree 2012)
  - Subjective Units of Distress (SUDS) (Wolpe 1958)
  - Visual Analogue Scale (VAS) (Arnetz 1985; Hasson 2005)
  - Stress and Perception of Control Scale (SPOCS) (unpublished instrument) (Rose 2013)
- **Well-being or life satisfaction or quality of life or vitality or vigour**
  - Well-being
    - Ryff's Scales of Psychological Well-Being (Ryff 1989)
    - Workplace Well-being Index (WWBI) (Page 2005)
  - Life satisfaction:
    - Satisfaction with Life Scale (Diener 1985)
  - (Health-related) Quality of life (QOL):
    - Linear Analog Self-Assessment Scale (QOL-LASA) (Locke 2007)
    - Medical Outcomes Study (MOS) 36-item short-form health survey (SF-36) (Ware 1994)
    - World Health Organization Quality of Life – BREF (WHOQOL-BREF) (WHOQOL Group 1998)
  - Vitality
    - Subscale of the MOS 36-item short-form health survey (SF-36) (Ware 1994)
  - Vigour
    - Work Vigour subscale of the Utrecht Work Engagement scale (Schaufeli 2002)

[a]At the time of prespecifying these measures, and the publication of the protocol (Helmreich 2017), the systematic review of Joyce 2018 had not yet been published and was not considered in the development of this appendix.

Appendix 7. Possible assessment instruments for the measurement of resilience factors based on intervention studies included in previous reviews and meta-analyses (Leppin 2014; Macedo 2014; Robertson 2015; Vanhove 2016)[a]

- **Social support**
  - Interpersonal Support Evaluation List - 12 (ISEL-12) (Cohen 1983a)
  - Personal Resources Questionnaire (PRQ-85) (Brandt 1981)
  - Social Provisions Scale (Cutrona 1987)
  - Subscale Interpersonal relations of the Health-Promoting Lifestyle Profile II (Walker 1987)
  - Interpersonal Relationship Inventory (IPR) (Tilden 1990)
  - Support questionnaire (Cushway 1996)
  - MOS Social Support Survey (Sherbourne 1991)
  - Total of four scales devised by Moos (1979) for perceived social support (Maddi 1998)
- **Optimism**
  - Life Orientation Test - Revised (LOT-R) (Scheier 1994)
- **Self-efficacy**
  - Coping self-efficacy (CSE) (Chesney 2003)
  - Self-efficacy scale (Sherer 1982)
  - Teachers' Sense of Efficacy Questionnaire (TSES) (Tschannen-Moran 2001)
  - New General Self-Efficacy Scale (NGSE) (Chen 2004)
  - Coping Efficacy Scale (self-developed) (Bekki 2013)
- **Active coping**
  - Brief Coping Orientations to Problems Experienced scale (Brief COPE) (Carver 1997)
  - Ways of Coping Questionnaire (WOC) (Folkman 1988)
  - Coping Styles Questionnaire (CSQ) (Williams 1997)
  - Coping Styles (self-developed) (Bekki 2013)
- **Self-esteem**
  - Rosenberg Self-Esteem Scale (RSES) (Rosenberg 1965)
  - Self-Esteem Rating Scale (SERS) (Nugent 1993)

- **Hardiness**
  - HardiSurvey III - R (Maddi 2001)
  - Personal Views Survey (Maddi 1987)
  - Hardiness Scale or College Student Hardiness Measure (CSHM) (Atri 2007a; Atri 2007b; Kanekar 2010)
  - Cognitive Hardiness Scale (Nowack 1990)
- **Positive emotions or positive affect**
  - Positive and Negative Affect Schedule (PANAS) (Watson 1988)
  - Positive and Negative Affect Schedule Expanded Form (PANAS-X) (Watson 1994)
  - Authentic Happiness Inventory (AHI; unpublished measure) (Abbott 2009)

[a]At the time of prespecifying these measures, and the publication of our protocol (Helmreich 2017), the systematic review of Joyce 2018 had not yet been published and was not considered in the development of this appendix.

Appendix 8. Search strategies up to 2016

In order to get a comprehensive understanding of the evidence in the field of psychological resilience interventions, and to identify training programmes that can really be assumed to enhance resilience in adults based on scientific findings, we performed a literature search that combined and complemented the search approaches from previous reviews and meta-analyses.

In contrast to the search strategy of Joyce 2018, Leppin 2014, Robertson 2015 and Vanhove 2016, who used very narrow search terms (e.g. ‘resilience programme’ or 'hardiness training’), we also searched for broader intervention terms. These broader search terms were based on the search performed by Macedo 2014, but were also supplemented by new terms (e.g. ‘acceptance and commitment therapy’, ‘stress management’, ‘mindfulness’).

We searched the databases below in October 2016 using search strategies based on the original inclusion criteria for this review.

Cochrane Central Register of Controlled Trials (CENTRAL), in the Cochrane Library

Searched 27 October 2016 [5168 records]

#1 [mh "Resilience, Psychological"]
#2 [mh "social adjustment"]
#3 [mh "Adaptation, Psychological"]
#4 ("post-traumatic growth" or "posttraumatic growth" or "stress-related growth")
#5 (positiv* near/1 (adapt* or adjust*))
#6 (psychol* near/1 (adapt* or adjust*))
#7 (resilien* or hardiness*)
#8 (cope or coping)
#9 ((withstand* or overcom* or resist* or recover* or thriv* or adapt* or adjust* or bounc* back) near/5 (stress* or trauma* or adversit*))
#10 {or #1-#9}
#11 [mh psychotherapy]
#12 MeSH descriptor: [Stress, Psychological] this term only and with qualifier(s): [Therapy - TH]
#13 (psychotherap* or psycho next therap*)
#14 (behav* near/3 (intervention* or program* or therap*))
#15 ((cognit* or cognitive next behavior* or CBT) near/3 (intervention* or program* or therap*))
#16 (psycho* near/3 (intervention* or program* or therap*))
#17 relaxation
#18 mindful*
#19 (counsel*ing or coaching)
#20 (third next wave next (psycho* or therap*))
#21 cognit* next restructur*
#22 positive next psychology
#23 (refram* or re next fram* or reapprais*)
#24 (stress near/1 (inoculation or manag* or reduc* or resist*))
#25 (anxiety near/3 manage*)
#26 "acceptance and commitment "
#27 [mh "Combined Modality Therapy"]
#28 (multimodal* or multi next modal* or combined modal*)
#29 [mh "Health promotion"]
#30 (health near/3 (educat* or promot*))
#31 {or #11-#30}
#32 #10 and #31, Publication Year from 1990 to 2016, in Trials

MEDLINE Ovid

Searched 28 October 2016 [6723 records]

1 Resilience, Psychological/
2 social adjustment/
3 Adaptation, Psychological/
4 (post-traumatic growth or posttraumatic growth or stress-related growth).tw,kf.
5 (positiv$ adj1 (adapt$ or adjust$)).tw,kf.
6 (psychol$ adj1 (adapt$ or adjust$)).tw,kf.
7 (resilien$ or hardiness$).tw,kf.
8 (cope or coping).tw,kf.
9 ((withstand$ or overcom$ or resist$ or recover$ or thriv$ or adapt$ or adjust$ or bounc$ back) adj5 (stress$ or trauma$ or adversit$)).tw,kf.
10 or/1-9
11 exp psychotherapy/
12 Stress, Psychological/th
13 (psychotherap$ or psycho-therap$).tw,kf.
14 (behav$ adj3 (intervention$ or program$ or therap$)).tw,kf.
15 ((cognit$ or cognitive behavior$ or CBT) adj3 (intervention$ or program$ or therap$)).tw,kf.
16 (psycho$ adj3 (intervention$ or program$ or therap$)).tw,kf.
17 relaxation.tw,kf.
18 mindful$.tw,kf.
19 (counsel?ing or coaching).tw,kf.
20 (third wave adj (psycho$ or therap$)).tw,kf.
21 cognit$ restructur$.tw,kf.
22 positive psychology.tw,kf.
23 (reframe$ or re-fram$ or reapprais$).tw,kf.
24 (stress adj1 (inoculation or manag$ or reduc$ or resist$)).tw,kf.
25 (anxiety adj3 manage$).tw,kf.
26 "acceptance and commitment ".tw,kf.
27 Combined Modality Therapy/
28 (multimodal or multi-modal or combined modal$).tw,kf.
29 exp Health promotion/
30 (health adj3 (educat$ or promot$)).tw,kf.
31 or/11-30
32 10 and 31
33 (resilien$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw,kf.
34 (hardiness$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw,kf.
35 or/32-34
36 randomized controlled trial.pt.
37 controlled clinical trial.pt.
38 randomi#ed.ab.
39 placebo$.ab.
40 drug therapy.fs.
41 randomly.ab.
42 trial.ab.
43 groups.ab.
44 or/36-43
45 exp animals/ not humans.sh.
46 44 not 45
47 35 and 46
48 limit 47 to yr="1990 -Current"

Embase Ovid

Searched 26 October 2016 [6709 records]

1 exp coping behavior/
2 psychological adjustment/
3 social adaptation/
4 "personal resource"/
5 (post-traumatic growth or posttraumatic growth or stress-related growth).tw,kw.

6 (positiv$ adj1 (adapt$ or adjust$)).tw,kw.
7 (psychol$ adj1 (adapt$ or adjust$)).tw,kw.
8 (resilien$ or hardiness$).tw,kw.
9 (cope or coping).tw,kw.
10 ((withstand$ or overcom$ or resist$ or recover$ or thriv$ or adapt$ or adjust$ or bounc$ back) adj5 (stress$ or trauma$ or advers $)).tw,kw.
11 or/1-10
12 exp psychotherapy/
13 posttraumatic stress disorder/th [Therapy]
14 mental stress/th [Therapy]
15 (psychotherap$ or psycho-therap$).tw,kw.
16 (behav$ adj3 (intervention$ or program$ or therap$)).tw,kw.
17 ((cognit$ or cognitive behavior$ or CBT) adj3 (intervention$ or program$ or therap$)).tw,kw.
18 (psycho$ adj3 (intervention$ or program$ or therap$)).tw,kw.
19 mindful$.tw,kw.
20 exp counseling/
21 (counsel?ing or coaching).tw,kw.
22 mindfulness/
23 mindful$.tw,kw.
24 (third wave adj (psycho$ or therap$)).tw,kw.
25 cognit$ restructur$.tw,kw.
26 positive psychology.tw,kw.
27 (reframe$ or re-fram$ or reapprais$).tw,kw.
28 (stress adj1 (inoculation or manag$ or reduc$ or resist$)).tw,kw.
29 (anxiety adj3 manage$).tw,kw.
30 "acceptance and commitment ".tw,kw.
31 (multimodal$ or multi-modal$ or combined modal$).tw,kw.
32 exp health promotion/
33 (health adj3 (educat$ or promot$)).tw,kw.
34 or/12-33
35 11 and 34
36 (resilien$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw,kw.
37 (hardiness$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw,kw.
38 or/35-37
39 Randomized controlled trial/
40 controlled clinical trial/
41 Single blind procedure/
42 Double blind procedure/
43 triple blind procedure/
44 Crossover procedure/
45 (crossover or cross-over).tw.
46 ((singl$ or doubl$ or tripl$ or trebl$) adj1 (blind$ or mask$)).tw.
47 Placebo/
48 placebo.tw.
49 prospective.tw.
50 factorial$.tw.
51 random$.tw.
52 assign$.ab.
53 allocat$.tw.
54 volunteer$.ab.
55 or/39-54
56 38 and 55
57 limit 56 to yr="1990 -Current"
58 exp animals/ or exp invertebrate/ or animal experiment/ or animal model/ or animal tissue/ or animal cell/ or nonhuman/
59 human/ or normal human/ or human cell/ (18144770)
60 58 and 59
61 58 not 60
62 57 not 61

PsycINFO Ovid

Searched 27 October 2016 [5005 records]

1 "resilience (psychological)"/
2 "adaptability (personality)"/
3 emotional adjustment/
4 coping behavior/
5 posttraumatic growth/
6 protective factors/
7 (post-traumatic growth or posttraumatic growth or stress-related growth).tw.
8 (positiv$ adj1 (adapt$ or adjust$)).tw.
9 (psychol$ adj1 (adapt$ or adjust$)).tw.
10 (resilien$ or hardiness$).tw.
11 (cope or coping).tw.
12 ((withstand$ or overcom$ or resist$ or recover$ or thriv$ or adapt$ or adjust$ or bounc$ back) adj3 (stress$ or trauma$ or advers$)).tw.
13 or/1-12
14 exp psychotherapy/
15 exp cognitive techniques/
16 psychotherapeutic techniques/
17 relaxation therapy/
18 mindfulness/
19 stress management/
20 (psychotherap$ or psycho-therap$).tw.
21 (behav$ adj3 (intervention$ or program$ or therap$)).tw.
22 ((cognit$ or cognitive behavior$ or CBT) adj3 (intervention$ or program$ or therap$)).tw.
23 (psycho$ adj3 (intervention$ or program$ or therap$)).tw.
24 relaxation.tw.
25 mindful$.tw.
26 (counsel?ing or coaching).tw.
27 (third wave adj (psycho$ or therap$)).tw.
28 cognit$ restructur$.tw.
29 positive psychology.tw.
30 (reframe$ or re-frame$ or reapprais$).tw.
31 (stress adj1 (inoculation or manag$ or reduc$ or resist$)).tw.
32 (anxiety adj3 manage$).tw.
33 "acceptance and commitment".tw.
34 multimodal treatment approach/
35 (multimodal$ or multi-modal$ or combined modal$).tw.
36 health promotion/
37 (health adj3 (educat$ or promot$)).tw.
38 or/14-37
39 13 and 38
40 (resilien$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw.
41 (hardiness$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw.
42 or/39-41
43 clinical trials/
44 longitudinal studies/
45 exp program evaluation/
46 treatment effectiveness evaluation/
47 random$.tw.
48 (allocat$ or assign$).tw.
49 ((clinic$ or control$) adj trial$).tw.
50 ((control$ or experiment$ or intervention$) adj3 group$).tw.
51 ((singl$ or doubl$ or trebl$ or tripl$) adj3 (blind$ or mask$)).tw.
52 (crossover$ or "cross over$").tw.
53 (placebo$ or (usual adj1 treatment$) or wait$ list).tw.
54 prospectiv$.tw.
55 (crossover or cross-over).tw.
56 ((singl$ or doubl$ or tripl$ or trebl$) adj1 (blind$ or mask$)).tw.
57 ((effectiveness or evaluat$) adj3 (stud$ or research$)).tw.

58 or/43-57
59 42 and 58
60 limit 59 to yr="1990 -Current"

CINAHL EBSCOhost

Searched 28 October 2016 [1355 records]

1 (MH "Hardiness")
2 (MH "Social Adjustment")
3 (MH "Adaptation, Psychological")
4 TI ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth") OR AB ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth")
5 TI (positiv* N1 (adapt* OR adjust*)) OR AB (positiv* N1 (adapt* OR adjust*))
6 TI (psychol* N1 (adapt* OR adjust*)) OR AB (psychol* N1 (adapt* OR adjust*))
7 TI (resilien* OR hardiness*) OR AB (resilien* OR hardiness*)
8 (MH "Coping")
9 TI (cope OR coping) OR AB (cope OR coping)
10 TI ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*)) OR AB ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*))
11 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10
12 (MH "Psychotherapy+")
13 (MH "Stress, Psychological/TH")
14 TI (psychotherap* OR psychotherap*) OR AB (psychotherap* OR psychotherap*)
15 TI (behav* N3 (intervention* OR program* OR therap*)) OR AB (behav* N3 (intervention* OR program* OR therap*))
16 TI ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*)) OR AB ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*))
17 TI (psycho* N3 (intervention* OR program* OR therap*)) OR AB (psycho* N3 (intervention* OR program* OR therap*))
18 TI relaxation OR AB relaxation
19 TI mindful* OR AB mindful*
20 TI (counsel?ing OR coaching) OR AB (counsel?ing OR coaching)
21 TI ("third wave" N1 (psycho* OR therap*)) OR AB ("third wave" N1 (psycho* OR therap*))
22 TI "cognit* restructur*" OR AB "cognit* restructur*"
23 TI "positive psychology" OR AB "positive psychology"
24 TI (reframe* OR reframe* OR reapprais*) OR AB (reframe* OR reframe* OR reapprais*)
25 TI (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR AB (stress N1 (inoculation OR manag* OR reduc* OR resist*))
26 TI (anxiety N3 manage*) OR AB (anxiety N3 manage*)
27 TI "acceptance and commitment" OR AB "acceptance and commitment"
28 (MH "Combined Modality Therapy")
29 TI (multimodal OR multimodal OR "combined modal*") OR AB (multimodal OR multimodal OR "combined modal*")
30 (MH "Health Promotion+")
31 TI (health N3 (educat* OR promot*)) OR AB (health N3 (educat* OR promot*))
32 S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31
33 S11 AND S32
34 TI (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
35 TI (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
36 S33 S34 OR S35
37 PT randomized controlled trial
38 TI "randomi?ed control* trial*" OR AB "randomi?ed control* trial*"
39 TI "control* clinical trial*" OR AB "control* clinical trial*"
40 AB randomi?ed
41 AB placebo*
42 AB randomly
43 AB trial
44 S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43
45 S36 AND S44
46 S36 AND S44, Limiters Published Date: 1990010120161031

PSYNDEX EBSCOhost

Searched 27 October 2016 [156 records]

1 DE "Resilience (Psychological)"
2 DE "Emotional Adjustment" OR DE "Social Adjustment"
3 DE "Posttraumatic Growth"
4 TI ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth") OR AB ("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR SU ("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")
5 TI (positiv* N1 (adapt* OR adjust*)) OR AB (positiv* N1 (adapt* OR adjust*)) OR SU (positiv* N1 (adapt* OR adjust*))
6 TI (psychol* N1 (adapt* OR adjust*)) OR AB (psychol* N1 (adapt* OR adjust*)) OR SU (psychol* N1 (adapt* OR adjust*))
7 TI (resilien* OR hardiness*) OR AB (resilien* OR hardiness*) OR SU (resilien* OR hardiness*)
8 DE "Coping Behavior"
9 TI (cope OR coping) OR AB (cope OR coping) OR SU (cope OR coping)
10 TI ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*)) OR AB ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*)) OR SU ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*))
11 DE "Psychological Stress"
12 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11
13 DE "Psychotherapy" OR DE "Adlerian Psychotherapy" OR DE "Adolescent Psychotherapy" OR DE "Affirmative Therapy" OR DE "Analytical Psychotherapy" OR DE "Autogenic Training" OR DE "Behavior Therapy" OR DE "Brief Psychotherapy" OR DE "Brief Relational Therapy" OR DE "Child Psychotherapy" OR DE "Client Centered Therapy" OR DE "Cognitive Behavior Therapy" OR DE "Conversion Therapy" OR DE "Eclectic Psychotherapy" OR DE "Emotion Focused Therapy" OR DE "Existential Therapy" OR DE "Experiential Psychotherapy" OR DE "Expressive Psychotherapy" OR DE "Eye Movement Desensitization Therapy" OR DE "Feminist Therapy" OR DE "Geriatric Psychotherapy" OR DE "Gestalt Therapy" OR DE "Group Psychotherapy" OR DE "Guided Imagery" OR DE "Humanistic Psychotherapy" OR DE "Hypnotherapy" OR DE "Individual Psychotherapy" OR DE "Insight Therapy" OR DE "Integrative Psychotherapy" OR DE "Interpersonal Psychotherapy" OR DE "Logotherapy" OR DE "Narrative Therapy" OR DE "Network Therapy" OR DE "Persuasion Therapy" OR DE "Primal Therapy" OR DE "Psychoanalysis" OR DE "Psychodrama" OR DE "Psychodynamic Psychotherapy" OR DE "Psychotherapeutic Counseling" OR DE "Rational Emotive Behavior Therapy" OR DE "Reality Therapy" OR DE "Relationship Therapy" OR DE "Solution Focused Therapy" OR DE "Supportive Psychotherapy" OR DE "Transactional Analysis" OR DE Individualpsychologische Therapie" OR DE "Jugendlichenpsychotherapie" OR DE "Affirmative Therapie" OR DE "Analytische Psychotherapie (C. G. Jung)" OR DE "Autogenes Training" OR DE "Verhaltenstherapie" OR DE "Kurzpsychotherapie" OR DE "Beziehungsorientierte Kurzpsychotherapie" OR DE "Kinderpsychotherapie" OR DE "Klientenzentrierte Psychotherapie" OR DE "Kognitive Verhaltenstherapie" OR DE "Konversionstherapie (Homosexualität)" OR DE "Eklektische Psychotherapie" OR DE "Emotionsfokussierte Therapie" OR DE "Existenzialtherapie" OR DE "Erfahrungsorientierte Psychotherapie" OR DE "Expressive Psychotherapie" OR DE "Augenbewegungsdesensibilisierung" OR DE "Feministische Therapie" OR DE "Geriatrische Psychotherapie" OR DE "Gestalttherapie" OR DE "Gruppenpsychotherapie" OR DE "Geleitete Fantasievorstellung" OR DE "Humanistische Psychotherapie" OR DE "Hypnotherapie" OR DE "Einzelpsychotherapie" OR DE "Einsichtstherapie" OR DE "Integrative Psychotherapie" OR DE "Interpersonelle Psychotherapie" OR DE "Logotherapie" OR DE "Narrative Therapie" OR DE "Netzwerktherapie" OR DE "Persuasionstherapie" OR DE "Primärtherapie" OR DE "Psychoanalytische Therapie" OR DE "Psychodrama" OR DE "Psychodynamische Psychotherapie" OR DE "Psychotherapeutische Beratung" OR DE "Rational-Emotive Verhaltenstherapie" OR DE "Realitätstherapie" OR DE "Relationship Therapy" OR DE "Lösungsorientierte Therapie" OR DE "Unterstützende Psychotherapie" OR DE "Transaktionsanalyse"
14 TI (psychotherap* OR psycho-therap*) OR AB (psychotherap* OR psycho-therap*) OR SU (psychotherap* OR psychotherap*)
15 TI (behav* N3 (intervention* OR program* OR therap*)) OR AB (behav* N3 (intervention* OR program* OR therap*))
16 TI ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*)) OR AB ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*)) OR SU ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*))
17 TI (psycho* N3 (intervention* OR program* OR therap*)) OR AB (psycho* N3 (intervention* OR program* OR therap*)) OR SU (psycho* N3 (intervention* OR program* OR therap*))
18 TI relaxation OR AB relaxation OR SU relaxation
19 TI mindful* OR AB mindful* OR SU mindful*
20 TI (counsel?ing OR coaching) OR AB (counsel?ing OR coaching) OR SU (counsel?ing OR coaching)
21 TI ("third wave" N1 (psycho* OR therap*)) OR AB ("third wave" N1 (psycho* OR therap*)) OR SU ("third wave" N1 (psycho* OR therap*))
22 TI "cognit* restructur*" OR AB "cognit* restructur*" OR SU "cognit* restructur*"
23 TI "positive psychology" OR AB "positive psychology" OR SU "positive psychology"
24 TI (reframe* OR re-fram* OR reapprais*) OR AB (reframe* OR re-fram* OR reapprais*) OR SU (reframe* OR re-fram* OR reapprais*)
25 TI (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR AB (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR SU (stress N1 (inoculation OR manag* OR reduc* OR resist*))
26 TI (anxiety N3 manage*) OR AB (anxiety N3 manage*) OR SU (anxiety N3 manage*)
27 TI "acceptance and commitment" OR AB "acceptance and commitment" OR SU "acceptance and commitment"
28 TI (multimodal OR multi-modal OR "combined modal*") OR AB (multimodal OR multi-modal OR "combined modal*") OR SU (multimodal OR multi-modal OR "combined modal*")

29 DE "Health Promotion"
30 TI (health N3 (educat* OR promot*)) OR AB (health N3 (educat* OR promot*)) OR SU (health N3 (educat* OR promot*))
31 S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30
32 S12 AND S31
33 TI (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR SU (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
34 TI (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR SU (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
35 S32 OR S33 OR S34
36 TI "randomi?ed control* trial*" OR AB "randomi?ed control* trial*"
37 TI "control* clinical trial*" OR AB "control* clinical trial*"
38 AB randomi?ed
39 AB placebo*
40 AB randomly
41 AB trial
42 S36 OR S37 OR S38 OR S39 OR S40 OR S41
43 S35 AND S42

Web of Science Core Collection (SCI, SSCI, CPCI-S, CPCI-SSH)

Searched 1990 to 2 November 2016 [2812 records]

# 19 #17 AND #16 Refined by: WEB OF SCIENCE CATEGORIES: (PSYCHIATRY OR PUBLIC ENVIRONMENTAL OCCUPATIONAL HEALTH OR PSYCHOLOGY CLINICAL OR PSYCHOLOGY MULTIDISCIPLINARY OR PSYCHOLOGY OR PSYCHOLOGY DEVELOPMENTAL OR NURSING OR SOCIAL WORK OR EDUCATION EDUCATIONAL RESEARCH)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 18 #17 AND #16
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 17 TS=(random* or trial* or assign* or control* or group* or placebo* or blind* or prospectiv* or longitudinal* or meta-analys* or systematic review*)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 16 #14 or #15
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 15 TS=((resilience or hardiness) near/3 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 14 #13 AND #6
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 13 #12 OR #11 OR #10 OR #9 OR #8 OR #7
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 12 TS=(health near/3 (educat* or promot*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 11 TS= ((multimodal* or "multi modal*" or "combined modal*") NEAR/3 (treat* or therap* or intervention* or program*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 10 TS=("acceptance and commitment")
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 9 TS=((anxiety near/1 manag*) or relaxation or mindful* or counsel*ing or coaching or "third wave" or refram* or "re fram*" or "cognitive restructur*" or "positive psychology")
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 8 TS=(stress near/3 (inoculat* or manag* or reduc* or resist*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 7TS=((psychotherap* or "psycho therap*") or CBT or mindful* or (behav* near/3 (intervention* or program* or therap*)) OR ((cognit* or "cognitive behavior*" or CBT) near/3 (intervention* or program* or therap*)) OR (psycho* near/3 (intervention* or program* or therap*)))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 6 #5 OR #4 OR #3 OR #2 OR #1
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 5 TS= ((withstand* or overcom* or resist* or recover* or thriv* or adapt* or adjust* or "bounc* back") near/1 (stress* or trauma* or advers*))

Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 4 TS=(psychol* near/1 (adapt* or adjust*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 3 TS=(positiv* near/1 (adapt* or adjust*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 2 TS=("post traumatic growth" or "posttraumatic growth" or "stress related growth")
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
# 1TS=(resilien* or hardiness*)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016

International Bibliography of the Social Sciences ProQuest

Searched 3 November 2016 [593 records]

((MAINSUBJECT.EXACT("Coping") OR TI(resilien* OR hardiness) OR AB(resilien* OR hardiness)) OR (TI((psychol* OR social) NEAR/1 (adapt* OR adjust*)) OR AB((psychol* OR social) NEAR/1 (adapt* OR adjust*))) OR (TI(positiv* NEAR/1 (adapt* OR adjust*)) OR AB(positiv* NEAR/1 (adapt* OR adjust*))) OR (TI("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR AB ("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (TI(cope OR coping) OR AB(cope OR coping)) OR (TI((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") NEAR/5 (stress* OR trauma* OR adversit*)) OR AB((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") NEAR/5 (stress* OR trauma* OR adversit*)))) AND ((MAINSUBJECT.EXACT("Psychotherapy") OR MAINSUBJECT.EXACT("Cognitive therapy") OR MAINSUBJECT.EXACT("Group therapy") OR TI(psychotherap* OR psycho-therap*) OR AB(psychotherap* OR psycho-therap*) OR TI(behav* NEAR/3 (intervention* OR program* OR therap*)) OR AB(behav* NEAR/3 (intervention* OR program* OR therap*)) OR TI(cognit* OR "cognitive behavior*" OR CBT) OR AB(cognit* OR "cognitive behavior*" OR CBT) OR TI(psycho* NEAR/3 (intervention* OR program* OR therap*)) OR AB(psycho* NEAR/3 (intervention* OR program* OR therap*)) OR TI(relaxation OR mindful* OR counsel?ing OR coaching OR "third wave") OR AB(relaxation OR mindful* OR counsel?ing OR coaching OR "third wave") OR TI(cognit* NEAR/1 restructur*) OR AB(cognit* NEAR/1 restructur*) OR TI("positive psychology") OR AB("positive psychology")) AND yr(1960-2019)) AND (MAINSUBJECT.EXACT("Clinical trials") OR (TI(control* OR group OR random* OR placebo* OR longitudinal OR prospective* OR blind* OR trial*) OR AB(control* OR group OR random* OR placebo* OR longitudinal OR prospective* OR blind* OR trial*))) Limited to 1990 to 2016

Applied Social Sciences Index & Abstracts ProQuest

Searched 28 October 2016 [634 records]

1 SU.EXACT("Resilience")
2 SU.EXACT("Hardiness")
3 SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")
4 SU.EXACT("Adaptation")
5 ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")
6 ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*)))
7 ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*)))
8 ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)
9 ti(cope OR coping) OR ab(cope OR coping)
10 ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))
11 SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")
12 SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress"
OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")
13 SU.EXACT("Psychotherapy")
14 ti((psychotherap* OR psychotherap*)) OR ab((psychotherap* OR psychotherap*))
15 ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*)))

16 ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))
17 ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*)))
18 ti(relaxation) OR ab(relaxation)
19 ti(mindful*) OR ab(mindful*)
20 ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching)
21 ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1 (psycho* OR therap*)))
22 ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*))
23 ti(("positive psychology")) OR ab(("positive psychology"))
24 ti((reframe* OR re-frame* OR reapprais*)) OR ab((reframe* OR re-frame* OR reapprais*))
25 ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))
26 ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*))
27 ti("acceptance and commitment") OR ab("acceptance and commitment")
28 ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*"))
29 SU.EXACT("Health promotion" OR "Mental health promotion")
30 ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*)))
31 SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation)) OR (ti(mindful*) OR ab(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1 (psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology"))) OR
(ti((reframe* OR re-frame* OR reapprais*)) OR ab((reframe* OR re-frame* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*))) OR (ti("acceptance and
commitment") OR ab("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*"))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))))
32 (SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress"
OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")) AND (SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation)) OR (ti(mindful*) OR ab(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1 (psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology"))) OR (ti((reframe* OR re-frame* OR reapprais*)) OR ab((reframe* OR re-frame* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*"))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*)))))
33 ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
34 ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
35 (SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR

thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress"
OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")) AND (SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation)) OR (ti(mindful*) OR ab(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1 (psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology"))) OR (ti((reframe* OR re-fram* OR reapprais*)) OR ab((reframe* OR re-fram* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*"))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
36 ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)
37 ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)
38 ti(randomi?ed) OR ab(randomi?ed)
39 ti(placebo*) OR ab(placebo*)
40 ti(randomly) OR ab(randomly)
41 ti(trial) OR ab(trial)
42 (ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial))
43 ((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress"
OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")) AND (SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation)) OR (ti(mindful*) OR ab(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1 (psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology"))) OR (ti((reframe* OR re-fram* OR reapprais*)) OR ab((reframe* OR re-fram* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*"))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))

44 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress"
OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")) AND (SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation)) OR (ti(mindful*) OR ab(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1 (psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology"))) OR (ti((reframe* OR re-fram* OR reapprais*)) OR ab((reframe* OR re-fram* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*"))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial))) AND pd(19900101-20161231)

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Searched 28 October 2016 [989 records]

1 SU.EXACT("Resilience")
2 SU.EXACT("Hardiness")
3 SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")
4 SU.EXACT("Adaptation")
5 ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR diskw("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")
6 ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*))) OR diskw((positiv* N/1 (adapt* OR adjust*)))
7 ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*))) OR diskw((psychol* N/1 (adapt* OR adjust*)))
8 ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*) OR diskw(resilien* OR hardiness*)
9 ti(cope OR coping) OR ab(cope OR coping) OR diskw(cope OR coping)
10 ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR diskw((withstand* OR overcom* OR resist* OR recover* OR OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))
11 SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")
12 SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR
"stress-related growth") OR diskw("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*))) OR diskw((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*))) OR diskw((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*) OR diskw(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping) OR diskw(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR diskw((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back")

N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")
13 SU.EXACT("Psychotherapy")
14 ti((psychotherap* OR psychotherap*)) OR ab((psychotherap* OR psychotherap*))
15 ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*))) OR diskw((behav* N/3 (intervention* OR program* OR therap*)))
16 ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR diskw(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))
17 ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 intervention* OR program* OR therap*))) OR diskw((psycho* N/3 (intervention* OR program* OR therap*)))
18 ti(relaxation) OR ab(relaxation) OR diskw(relaxation)
19 ti(mindful*) OR ab(mindful*) OR diskw(mindful*)
20 ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching) OR diskw(counsel?ing OR coaching
21 ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1(psycho* OR therap*))) OR diskw(("third wave" N/1(psycho* OR therap*)))
22 ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*)) OR diskw((cognit* N/1 restructur*))
23 ti(("positive psychology")) OR ab(("positive psychology")) OR diskw(("positive psychology"))
24 ti((reframe* OR re-frame* OR reapprais*)) OR ab((reframe* OR re-frame* OR reapprais*)) OR diskw((reframe* OR re-frame* OR reapprais*))
25 ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR diskw((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))
26 ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*)) OR diskw((anxiety N/3 manage*))
27 ti("acceptance and commitment") OR ab("acceptance and commitment") OR diskw("acceptance and commitment")
28 ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*")) OR diskw((multimodal OR multimodal OR "combined modal*"))
29 SU.EXACT("Health promotion" OR "Mental health promotion")
30 ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))) OR diskw((health N/3 (educat* OR promot*)))
31 SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*))) OR diskw((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR diskw(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*))) OR diskw((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation) OR diskw(relaxation)) OR (ti(mindful*) OR ab(mindful*) OR diskw(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching) OR diskw(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1(psycho* OR therap*))) OR diskw(("third wave" N/1(psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*)) OR diskw((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology")) OR diskw(("positive psychology"))) OR (ti((reframe* OR re-frame* OR reapprais*)) OR ab((reframe* OR re-frame* OR reapprais*)) OR diskw((reframe* OR re-frame* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR diskw((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*)) OR diskw((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment") OR diskw("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*")) OR diskw((multimodal OR multimodal OR "combined modal*"))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))) OR diskw((health N/3 (educat* OR promot*))))
32 (SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR diskw("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*))) OR diskw((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*))) OR diskw((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*) OR diskw(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping) OR diskw(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR diskw((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")) AND (SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*))) OR diskw((behav* N/3 (intervention* OR program* OR therap*))))

OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR diskw(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*))) OR diskw((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation) OR diskw(relaxation)) OR (ti(mindful*) OR ab(mindful*) OR diskw(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching) OR diskw(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1(psycho* OR therap*))) OR diskw(("third wave" N/1(psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*)) OR diskw((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology")) OR diskw(("positive psychology"))) OR (ti((reframe* OR re-frame* OR reapprais*)) OR ab((reframe* OR re-frame* OR reapprais*)) OR diskw((reframe* OR re-frame* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR diskw((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*)) OR diskw((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment") OR diskw("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*")) OR diskw((multimodal OR multimodal OR "combined modal*"))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))) OR diskw((health N/3 (educat* OR promot*)))))

33 ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR diskw((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))

34 ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR diskw((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))

35 (SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR
"stress-related growth") OR diskw("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*))) OR diskw((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*))) OR diskw((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*) OR diskw(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping) OR diskw(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR diskw((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")) AND (SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psychotherap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*))) OR diskw((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR diskw(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*))) OR diskw((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation) OR diskw(relaxation)) OR (ti(mindful*) OR ab(mindful*) OR diskw(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching) OR diskw(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1(psycho* OR therap*))) OR diskw(("third wave" N/1(psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*)) OR diskw((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology")) OR diskw(("positive psychology"))) OR (ti((reframe* OR re-frame* OR reapprais*)) OR ab((reframe* OR re-frame* OR reapprais*)) OR diskw((reframe* OR re-frame* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR diskw((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*)) OR diskw((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment") OR diskw("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*")) OR diskw((multimodal OR multimodal OR "combined modal*"))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))) OR diskw((health N/3 (educat* OR promot*))))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR diskw((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((hardiness* N/5 (train* OR program* OR intervention* OR promot*

OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR diskw((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
36 ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)
37 ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)
38 ti(randomi?ed) OR ab(randomi?ed)
39 ti(placebo*) OR ab(placebo*)
40 ti(randomly) OR ab(randomly)
41 ti(trial) OR ab(trial)
42 (ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial))
43 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR diskw("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*))) OR diskw((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*))) OR diskw((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*) OR diskw(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping) OR diskw(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR diskw((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")) AND (SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*))) OR diskw((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR diskw(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*))) OR diskw((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation) OR diskw(relaxation)) OR (ti(mindful*) OR ab(mindful*) OR diskw(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching) OR diskw(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1(psycho* OR therap*))) OR diskw(("third wave" N/1(psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*)) OR diskw((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology")) OR diskw(("positive psychology"))) OR (ti((reframe* OR re-fram* OR reapprais*)) OR ab((reframe* OR re-fram* OR reapprais*)) OR diskw((reframe* OR re-fram* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR diskw((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*)) OR diskw((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment") OR diskw("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*")) OR diskw((multimodal OR multimodal OR "combined modal*"))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))) OR diskw((health N/3 (educat* OR promot*))))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR diskw((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR diskw((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))
44 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (SU.EXACT("Social adjustment") OR SU.EXACT("Psychosocial adjustment")) OR SU.EXACT("Adaptation") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR diskw("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti((positiv* N/1 (adapt* OR adjust*))) OR ab((positiv* N/1 (adapt* OR adjust*))) OR diskw((positiv* N/1 (adapt* OR adjust*)))) OR (ti((psychol* N/1 (adapt* OR adjust*))) OR ab((psychol* N/1 (adapt* OR adjust*))) OR diskw((psychol* N/1 (adapt* OR adjust*)))) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*) OR diskw(resilien* OR hardiness*)) OR (ti(cope OR coping) OR ab(cope OR coping) OR diskw(cope OR coping)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR diskw((withstand* OR overcom* OR resist* OR recover* OR thriv*

OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))) OR SU.EXACT("Anticipatory stress" OR "behavioural stress" OR "Burnout" OR "Critical incident stress" OR "Daily stress" OR "Economic stress" OR "Family stress" OR "Life stress" OR "Marital stress" OR "Maternal stress" OR "Nervous breakdown" OR "Occupational stress" OR "Parental stress" OR "Postnatal stress" OR "Role stress" OR "School stress" OR "Secondary stressors" OR "Social stress" OR "Stress" OR "Traumatic stress")) AND (SU.EXACT("Psychotherapy") OR (ti((psychotherap* OR psycho-therap*)) OR ab((psychotherap* OR psychotherap*))) OR (ti((behav* N/3 (intervention* OR program* OR therap*))) OR ab((behav* N/3 (intervention* OR program* OR therap*))) OR diskw((behav* N/3 (intervention* OR program* OR therap*)))) OR (ti(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR ab(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*))) OR diskw(((cognit* OR "cognitive behavior*" OR CBT) N/3 (intervention* OR program* OR therap*)))) OR (ti((psycho* N/3 (intervention* OR program* OR therap*))) OR ab((psycho* N/3 (intervention* OR program* OR therap*))) OR diskw((psycho* N/3 (intervention* OR program* OR therap*)))) OR (ti(relaxation) OR ab(relaxation) OR diskw(relaxation)) OR (ti(mindful*) OR ab(mindful*) OR diskw(mindful*)) OR (ti(counsel?ing OR coaching) OR ab(counsel?ing OR coaching) OR diskw(counsel?ing OR coaching)) OR (ti(("third wave" N/1 (psycho* OR therap*))) OR ab(("third wave" N/1(psycho* OR therap*))) OR diskw(("third wave" N/1(psycho* OR therap*)))) OR (ti((cognit* N/1 restructur*)) OR ab((cognit* N/1 restructur*)) OR diskw((cognit* N/1 restructur*))) OR (ti(("positive psychology")) OR ab(("positive psychology")) OR diskw(("positive psychology"))) OR (ti((refram* OR re-fram* OR reapprais*)) OR ab((refram* OR re-fram* OR reapprais*)) OR diskw((refram* OR re-fram* OR reapprais*))) OR (ti((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR ab((stress N/1 (inoculation OR manag* OR reduc* OR resist*))) OR diskw((stress N/1 (inoculation OR manag* OR reduc* OR resist*)))) OR (ti((anxiety N/3 manage*)) OR ab((anxiety N/3 manage*)) OR diskw((anxiety N/3 manage*))) OR (ti("acceptance and commitment") OR ab("acceptance and commitment") OR diskw("acceptance and commitment")) OR (ti((multimodal OR multi-modal OR "combined modal*")) OR ab((multimodal OR multi-modal OR "combined modal*")) OR diskw((multimodal OR multimodal OR "combined modal*"))) OR SU.EXACT("Health promotion" OR "Mental health promotion") OR (ti((health N/3 (educat* OR promot*))) OR ab((health N/3 (educat* OR promot*))) OR diskw((health N/3 (educat* OR promot*))))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR diskw((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ab((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR diskw((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial))) AND pd(19900101-20161231)

Cochrane Database of Systematic Reviews (CDSR), part of the Cochrane Library

Searched 27 October 2016 [57 records]

#1(resilien* or hardiness*):ti,ab
#2(post next traumatic growth or posttraumatic growth or stress next related growth)
#3(positiv* near/1 (adapt* or adjust*)):ti,ab
#4(psychol* near/1 (adapt* or adjust*)):ti,ab
#5{or #1-#4}
#6(behav* or psycho* or cbt or cognit* or mindful* or reframe* or re next fram*):ti,ab
#7(stress near/3 (inoculat* or manag* or reduc* or resist*)):ti,ab
#8(anxiety near/3 manag*):ti,ab
#9"acceptance and commitment":ti,ab
#10(multimodal* or multi next modal* or combined next modal*):ti,ab
#11(health near/3 (educat* or promot*)):ti,ab
#12{or #6-#11} Publication Year from 1990 to 2016, in Cochrane Reviews (Reviews and Protocols)
#13#5 and #12

Database of Abstracts of Reviews of Effects (DARE), part of the Cochrane Library

Searched 27 October 2016 [3 records]

#1(resilien* or hardiness*):ti,ab
#2(post next traumatic growth or posttraumatic growth or stress next related growth)
#3(positiv* near/1 (adapt* or adjust*)):ti,ab
#4(psychol* near/1 (adapt* or adjust*)):ti,ab
#5{or #1-#4}
#6(behav* or psycho* or cbt or cognit* or mindful* or reframe* or re next fram*):ti,ab
#7(stress near/3 (inoculat* or manag* or reduc* or resist*)):ti,ab
#8(anxiety near/3 manag*):ti,ab
#9"acceptance and commitment":ti,ab

#10(multimodal* or multi next modal* or combined next modal*):ti,ab
#11(health near/3 (educat* or promot*)):ti,ab
#12{or #6-#11} Publication Year from 1990 to 2016, in Other Reviews
#13#5 and #12

Epistemonikos (www.epistemonikos.org)

Searched 28 October 2016 [173 records]

1 (title:(resilien* OR hardiness*) OR abstract:(resilien* OR hardiness*))
2 (title:("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR abstract:("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth"))
3 (title:("positive adaptation" OR "positive adjustment") OR abstract:("positive adaptation" OR "positive adjustment"))
4 (title:("psychological adaptation" OR "psychological adjustment") OR abstract:("psychological adaptation" OR "psychological adjustment"))
5 OR/#1-#4
6 #5; Publication year (Custom year range): 1990 – 2016; Publication type: Systematic Review; Systematic review question: All; Cochrane review: All; Type of meta-analysis: All

ERIC EBSCOhost

Searched 28 October 2016 [206 records]

1 DE "Resilience (Psychology)"
2 DE "Social Adjustment" OR DE "Emotional Adjustment"
3 TI ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth") OR AB ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth")
4 TI (positiv* N1 (adapt* OR adjust*)) OR AB (positiv* N1 (adapt* OR adjust*))
5 TI (psychol* N1 (adapt* OR adjust*)) OR AB (psychol* N1 (adapt* OR adjust*))
6 TI (resilien* OR hardiness*) OR AB (resilien* OR hardiness*) OR SU (resilien*
7 TI (cope OR coping) OR AB (cope OR coping) OR SU (cope OR coping)
8 TI ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*)) OR AB ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*))
9 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8
10 DE "Psychotherapy" OR DE "Milieu Therapy" OR DE "Relaxation Training"
11 TI (psychotherap* OR psychotherap*) OR AB (psychotherap* OR psychotherap*) OR SU (psychotherap* OR psychotherap*)
12 TI (behav* N3 (intervention* OR program* OR therap*)) OR AB (behav* N3 (intervention* OR program* OR therap*))
13 TI ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*)) OR AB ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*))
14 TI (psycho* N3 (intervention* OR program* OR therap*)) OR AB (psycho* N3 (intervention* OR program* OR therap*))
15 TI relaxation OR AB relaxation OR SU relaxation
16 TI mindful* OR AB mindful*
17 TI (counsel?ing OR coaching) OR AB (counsel?ing OR coaching) OR SU (counsel?ing OR coaching)
18 TI ("third wave" N1 (psycho* OR therap*)) OR AB ("third wave" N1 (psycho* OR therap*))
19 TI "cognit* restructur*" OR AB "cognit* restructur*" OR SU "cognit* restructur*"
20 TI "positive psychology" OR AB "positive psychology"
21 TI (reframe* OR reframe* OR reapprais*) OR AB (reframe* OR reframe* OR reapprais*)
22 TI (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR AB (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR SU (stress N1 (inoculation OR manag* OR reduc* OR resist*))
23 TI (anxiety N3 manage*) OR AB (anxiety N3 manage*)
24 TI "acceptance and commitment" OR AB "acceptance and commitment"
25 TI (multimodal OR multimodal OR "combined modal*") OR AB (multimodal OR multimodal OR "combined modal*")
26 TI (health N3 (educat* OR promot*)) OR AB (health N3 (educat* OR promot*)) OR SU (health N3 (educat* OR promot*))
27 S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26
28 S9 AND S27
29 TI (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
30 TI (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
31 S28 OR S29 OR S30
32 TI "randomi?ed control* trial*" OR AB "randomi? ed control* trial*"

33 TI "control* clinical trial*" OR AB "control* clinical trial*"
34 AB randomi?ed
35 AB placebo*
36 AB randomly
37 AB trial
38 S32 OR S33 OR S34 OR S35 OR S36 OR S37
39 S31 AND S38
40 S31 AND S38, Limiters Date Published:1990010120161031

Current Controlled Trials (ISRCTN registry; www.isrctn.com)

Searched 24 November 2016 [47 records]

Text search:
(((resilience OR hardiness OR "posttraumatic growth" OR stress OR trauma) AND (psychotherap OR relaxation OR mindfulness OR coaching OR "positive psychology" OR reappraisal OR "stress inoculation" OR "stress management" OR multimodal OR "health promotion")) OR ((resilience OR hardiness) AND (training OR program OR intervention OR promot OR prevent OR enhanc OR learn OR teach OR educat OR increas or develop OR manag OR therap OR protocol OR treat)))

ClinicalTrials.gov (clinicaltrials.gov)

Searched 24 November 2016 [675 records]

title = resilience OR hardiness OR posttraumatic growth OR stress OR trauma condition = resilience OR hardiness OR posttraumatic growth OR stress OR trauma intervention = resilience training OR hardiness training OR psychotherapy OR relaxation OR mindfulness OR coaching OR positive psychology OR reappraisal OR stress inoculation OR stress management OR multimodal OR health promotion Limitation: 01/01/1990 – 03/11/2016

WHO ICTRP (apps.who.int/trialsearch)

Searched 24 November 2016 [879 records]

title = resilience OR hardiness OR posttraumatic growth OR stress OR trauma
condition = resilience OR hardiness OR posttraumatic growth OR stress OR trauma
intervention = resilience training OR hardiness training OR psychotherapy OR relaxation OR mindfulness OR coaching OR positive psychology OR reappraisal OR stress inoculation OR stress management OR multimodal OR health promotion
Recruitment status: ALL
Limitation: 01/01/1990 – 03/11/2016

Appendix 9. Search strategies 2016 onwards

Cochrane Central Register of Controlled Trials (CENTRAL), in the Cochrane Library

Searched 26 June 2019 [218 records]

#1[mh "Resilience, Psychological"]
#2[mh "social adjustment"]
#3[mh "Adaptation, Psychological"]
#4("post-traumatic growth" or "posttraumatic growth" or "stress-related growth")
#5(positiv* near/1 (adapt* or adjust*))
#6(psychol* near/1 (adapt* or adjust*))
#7(resilien* or hardiness*)
#8(cope or coping)
#9((withstand* or overcom* or resist* or recover* or thriv* or adapt* or adjust* or bounc* back) near/5 (stress* or trauma* or adversit*))
#10{or #1-#9}
#11[mh psychotherapy]
#12MeSH descriptor: [Stress, Psychological] this term only and with qualifier(s): [therapy - TH]
#13(psychotherap* or psycho next therap*)
#14(behav* near/3 (intervention* or program* or therap*))
#15((cognit* or cognitive next behavior* or CBT) near/3 (intervention* or program* or therap*))
#16(psycho* near/3 (intervention* or program* or therap*))
#17relaxation
#18mindful*
#19(counsel*ing or coaching)
#20(third next wave next (psycho* or therap*))
#21cognit* next restructur*
#22positive next psychology

#23(reflam* or re next fram* or reapprais*)
#24(stress near/1 (inoculation or manag* or reduc* or resist*))
#25(anxiety near/3 manage*)
#26"acceptance and commitment"
#27[mh "Combined Modality Therapy"]
#28(multimodal* or multi next modal* or combined modal*)
#29[mh "Health promotion"]
#30(health near/3 (educat* or promot*))
#31{or #11-#30}
#32MeSH descriptor: [Health Personnel] explode all trees
#33(health* NEAR/3 (personnel or profession* or worker* or practitioner* or provider* or staff))
#34(medical NEAR/3 (personnel or profession* or worker* or practitioner* or provider* or staff))
#35(care* NEAR/1 (personnel or profession* or worker* or practitioner* or provider* or staff))
#36(doctor* or physician* or general practitioner* or ("primary care" NEAR/2 practitioner*) or surgeon*)
#37(nurse* or nursing)
#38((hospital or ambulance) NEAR/1 (staff or personnel))
#39((intensive NEAR/2 care) or ICU)
#40((allied NEXT health*) NEAR/2 (personnel* or profession* or worker* or practitioner* or provider* or staff))
#41(psychologist* or psychotherapist* or psychiatrist* or mental NEXT health NEXT clinician* or mental NEXT health NEXT profession* or mental NEXT health NEXT worker* or social NEXT worker*)
#42(paramedic* or para NEXT medic* or ambulance)
#43(first or emergency or disaster) NEAR/1 (response or responder*)
#44(professional NEAR/1 (caregiver* or care-giver*))
#45(anesthetist* or anaesthetist* or audiologist* or dental NEXT hygienist* or dentist* or dietitian* or midwi*e* or nutritionist* or pathologist* or physiologist* or physiotherapist* or therapist or osteopath* or sonographer* or radiographer* or radiotherapist* or ((radiology or radiation) NEAR/1 (technician* or technologist* or assistant* or scientist*)) or ((anesthesia or anesthesiologist) NEAR/1 (technician* or assistant*)) or (surgical NEAR/1 (technician* or technologist*)) or orthotist* or orthoptist* or podiatrist* or perfusionist*)
#46(counsellor* or counselor*)
#47((clinical or medical*) NEAR/1 (technician* or technologist* or assistant* or scientist*))
#48(public NEXT health NEXT service* or public NEXT health NEXT agenc*)
#49(secondary NEXT trauma* or (work* NEAR/2 trauma NEXT survivor*))
#50((nursing or medical or midwifery or premedical or paramedic or psychology or physical NEXT therapy or occupational NEXT therapy) NEAR/2 student*)
#51college NEXT student*
#52{OR #32 -#51}
#53#10 and #31 with Publication Year from 1990 to 2016, in Trials [Note: Final line 2016]
#54#10 and #31 AND #52 with Publication Year from 2016 to 2019, in Trials [Note: Final line 2019]

MEDLINE Ovid

Searched 25 June 2019 [725 records]

1 Resilience, Psychological/
2 social adjustment/
3 Adaptation, Psychological/
4 (post-traumatic growth or posttraumatic growth or stress-related growth).tw,kf.
5 (positiv$ adj1 (adapt$ or adjust$)).tw,kf.
6 (psychol$ adj1 (adapt$ or adjust$)).tw,kf.
7 (resilien$ or hardiness$).tw,kf.
8 (cope or coping).tw,kf.
9 ((withstand$ or overcom$ or resist$ or recover$ or thriv$ or adapt$ or adjust$ or bounc$ back) adj5 (stress$ or trauma$ or adversit$)).tw,kf.
10 or/1-9
11 exp psychotherapy/
12 Stress, Psychological/th
13 (psychotherap$ or psycho-therap$).tw,kf.
14 (behav$ adj3 (intervention$ or program$ or therap$)).tw,kf.
15 ((cognit$ or cognitive behavior$ or CBT) adj3 (intervention$ or program$ or therap$)).tw,kf.
16 (psycho$ adj3 (intervention$ or program$ or therap$)).tw,kf.
17 relaxation.tw,kf.
18 mindful$.tw,kf.
19 (counsel?ing or coaching).tw,kf.
20 (third wave adj (psycho$ or therap$)).tw,kf.
21 cognit$ restructur$.tw,kf.

22 positive psychology.tw,kf.
23 (reframe$ or re-fram$ or reapprais$).tw,kf.
24 (stress adj1 (inoculation or manag$ or reduc$ or resist$)).tw,kf.
25 (anxiety adj3 manage$).tw,kf.
26 "acceptance and commitment ".tw,kf.
27 Combined Modality Therapy/
28 (multimodal or multi-modal or combined modal$).tw,kf.
29 exp Health promotion/
30 (health adj3 (educat$ or promot$)).tw,kf.
31 or/11-30
32 10 and 31
33 (resilien$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw,kf.
34 (hardiness$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw,kf.
35 or/32-34
36 randomized controlled trial.pt.
37 controlled clinical trial.pt.
38 randomi#ed.ab.
39 placebo$.ab.
40 drug therapy.fs.
41 randomly.ab.
42 trial.ab.
43 groups.ab.
44 or/36-43
45 exp animals/ not humans.sh.
46 44 not 45
47 35 and 46
48 Health personnel/
49 (health$ adj3 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)).tw,kf.
50 ((medical care adj3 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)) or (medical adj3 (personnel or profession $ or worker$ or practitioner$ or provider$ or staff))).tw,kf.
51 (care adj1 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)).tw,kf.
52 (doctor$ or physician$ or general practitioner$ or (primary care adj2 practitioner$) or surgeon$).tw,kf.
53 (nurse$ or (nursing adj3 assistant$) or (nursing adj3 staff)).tw,kf.
54 nursing.tw,kf.
55 ((hospital or ambulance) adj1 personnel).tw,kf.
56 ((intensive adj2 care) or ICU or (intensive adj2 care adj2 unit adj3 personnel$)).tw,kf.
57 ((allied health$) adj2 (personnel or profession$ or worker$ or practitioner* or provider$ or staff)).tw,kf.
58 (psychologist$ or psychotherapist$ or psychiatrist$ or (mental health adj2 clinician$) or (mental health adj2 profession$) or (mental health adj2 worker$)).tw,kf.
59 (social worker$).tw,kf.
60 (paramedic$ or ambulance or medic$ or ((first or emergency or disaster) adj1 (response or responder$))).tw,kf.
61 (professional adj1 (caregiver$ or care-giver$)).tw,kf.
62 ((physical therapist$) or physiotherapist$ or occupational therapist$ or recreational therapist$ or music therapist$ or art therapist$ or dietitian$ or nutritionist$ or ((speech and language) adj1 therapist$) or speech pathologist$ or audiologist$ or exercise physiologist$ or osteopath$ or sonographer$ or radiographer$ or radiotherapist$ or ((radiology or radiation) adj1 (therapist$ or technician$ or technologist $ or assistant$ or scientist$)) or respiratory therapist$ or ((anesthesia or anesthesiologist) adj1 (technician$ or assistant$)) or dental hygienist$ or (surgical adj1 (technician$ or technologist$)) or orthotist$ or orthoptist$ or podiatrist$ or perfusionist$).tw,kf.
63 counsel?or$.tw,kf.
64 ((clinical or clinical laboratory or medical$ or medical$ laboratory) adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw,kf.
65 ((human or health) adj1 service adj3 profession$).tw,kf.
66 (public health adj2 (service or agency)).tw,kf.
67 (secondary traumati?ation or (work$ adj2 (trauma survivor$))).tw,kf.
68 ((nursing or medical or premedical or paramedic or psychology or physical therapy or occupational therapy) adj2 student$).tw,kf.
69 (college adj2 student$).tw,kf.
70 ((nurs$ adj1 (graduate$ or education)) or (medic$ adj1 train$) or (student adj1 nurse$)).tw,kf.
71 or/48-70
72 47 and 71
73 limit 72 to yr="1990 -Current"
74 limit 73 to yr="2016 -Current"

Embase Ovid

Searched 25 June 2019 [991 records]

1 exp coping behavior/
2 psychological adjustment/
3 Psychological resilience/ [Annotation: New Emtree term in 2017]
4 social adaptation/
5 "personal resource"/
6 (post-traumatic growth or posttraumatic growth or stress-related growth).tw,kw.
7 (positiv$ adj1 (adapt$ or adjust$)).tw,kw.
8 (psychol$ adj1 (adapt$ or adjust$)).tw,kw.
9 (resilien$ or hardiness$).tw,kw.
10 (cope or coping).tw,kw.
11 ((withstand$ or overcom$ or resist$ or recover$ or thriv$ or adapt$ or adjust$ or bounc$ back) adj5 (stress$ or trauma$ or advers$)).tw,kw.
12 or/1-11
13 exp psychotherapy/
14 posttraumatic stress disorder/th [Therapy]
15 mental stress/th [Therapy]
16 (psychotherap$ or psycho-therap$).tw,kw.
17 (behav$ adj3 (intervention$ or program$ or therap$)).tw,kw.
18 ((cognit$ or cognitive behavior$ or CBT) adj3 (intervention$ or program$ or therap$)).tw,kw.
19 (psycho$ adj3 (intervention$ or program$ or therap$)).tw,kw.
20 mindful$.tw,kw.
21 exp counseling/
22 (counsel?ing or coaching).tw,kw.
23 mindfulness/
24 mindful$.tw,kw.
25 (third wave adj (psycho$ or therap$)).tw,kw.
26 cognit$ restructur$.tw,kw.
27 positive psychology.tw,kw.
28 (reframe$ or re-frame$ or reapprais$).tw,kw.
29 (stress adj1 (inoculation or manag$ or reduc$ or resist$)).tw,kw.
30 (anxiety adj3 manage$).tw,kw.
31 "acceptance and commitment ".tw,kw.
32 (multimodal$ or multi-modal$ or combined modal$).tw,kw.
33 exp health promotion/
34 (health adj3 (educat$ or promot$)).tw,kw.
35 or/13-34
36 12 and 35
37 (resilien$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw,kw.
38 (hardiness$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw,kw.
39 or/36-38
40 exp health care personnel/
41 (health$ adj3 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)).tw,kw.
42 (medical adj3 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)).tw,kw.
43 (care adj1 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)).tw,kw.
44 (doctor$ or physician$ or general practitioner$ or (primary care adj2 practitioner$) or surgeon$).tw,kw.
45 (nurse$1 or nursing).tw,kw.
46 ((hospital or ambulance) adj1 personnel).tw,kw.
47 ((intensive adj2 care) or ICU).tw,kw.
48 (allied health$ adj2 (personnel$ or profession$ or worker$ or practitioner$ or provider$ or staff)).tw,kw.
49 (psychologist$ or psychotherapist$ or psychiatrist$ or mental health clinician$ or mental health profession$ or mental health worker$).tw,kw.
50 social worker$.tw,kw.
51 (paramedic$ or ambulance or medic$).tw,kw.
52 ((first or emergency or disaster) adj1 (response or responder$)).tw,kw.
53 (professional adj (caregiver$ or care-giver$)).tw,kw.
54 (physical therapist$ or physiotherapist$ or occupational therapist$ or recreational therapist$ or music therapist$ or art therapist$ or dietitian$ or nutritionist$ or ((speech and language) adj1 therapist$) or speech pathologist$ or audiologist$ or exercise physiologist$ or

osteopath$ or sonographer$ or radiographer$ or radiotherapist$ or ((radiology or radiation) adj1 (therapist$ or technician$ or technologist$ or assistant$ or scientist$)) or respiratory therapist$ or ((anesthesia or anesthesiologist) adj1 (technician$ or assistant$)) or dental hygienist$ or (surgical adj1 (technician$ or technologist$)) or orthotist$ or orthoptist$ or podiatrist$ or perfusionist$).tw,kw.
55 counsel?or$.tw,kw.
56 (clinical adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw,kw.
57 (clinical laboratory adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw,kw.
58 (medical$ adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw,kw.
59 (medical$ laboratory adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw,kw.
60 (public health service$ or public health agenc$).tw,kw.
61 (secondary traumati?ation or (work$ adj2 trauma survivor$)).tw,kw.
62 ((nursing or medical or premedical or paramedic or psychology or physical therapy or occupational therapy) adj2 student$).tw,kw.
63 college student$.tw,kw.
64 ((nurs$ adj1 graduate$) or (nurs$ adj1 education) or (medic$ adj1 train$)).tw,kw.
65 or/40-64
66 39 and 65
67 Randomized controlled trial/
68 controlled clinical trial/
69 Single blind procedure/
70 Double blind procedure/
71 triple blind procedure/
72 Crossover procedure/
73 (crossover or cross-over).tw.
74 ((singl$ or doubl$ or tripl$ or trebl$) adj1 (blind$ or mask$)).tw.
75 Placebo/
76 placebo.tw.
77 prospective.tw.
78 factorial$.tw.
79 random$.tw.
80 assign$.ab.
81 allocat$.tw.
82 volunteer$.ab.
83 or/67-82
84 66 and 83
85 limit 84 to yr="2016 -Current"

PsycINFO Ovid

Searched 26 June 2019 [454 records]

All years searched in 2019 to correct for possible error in the 2016 search

1 "resilience (psychological)"/
2 "adaptability (personality)"/
3 emotional adjustment/
4 coping behavior/
5 posttraumatic growth/
6 protective factors/
7 (post-traumatic growth or posttraumatic growth or stress-related growth).tw.
8 (positiv$ adj1 (adapt$ or adjust$)).tw.
9 (psychol$ adj1 (adapt$ or adjust$)).tw.
10 (resilien$ or hardiness$).tw.
11 (cope or coping).tw.
12 ((withstand$ or overcom$ or resist$ or recover$ or thriv$ or adapt$ or adjust$ or bounc$ back) adj3 (stress$ or trauma$ or advers$)).tw.
13 or/1-12
14 exp psychotherapy/)
15 exp cognitive techniques/
16 psychotherapeutic techniques/
17 relaxation therapy/
18 mindfulness/
19 stress management/
20 (psychotherap$ or psycho-therap$).tw.
21 (behav$ adj3 (intervention$ or program$ or therap$)).tw.
22 ((cognit$ or cognitive behavior$ or CBT) adj3 (intervention$ or program$ or therap$)).tw.

23 (psycho$ adj3 (intervention$ or program$ or therap$)).tw.
24 relaxation.tw.
25 mindful$.tw.
26 (counsel?ing or coaching).tw.
27 (third wave adj (psycho$ or therap$)).tw.
28 cognit$ restructur$.tw.
29 positive psychology.tw.
30 (refram$ or re-fram$ or reapprais$).tw.
31 (stress adj1 (inoculation or manag$ or reduc$ or resist$)).tw.
32 (anxiety adj3 manage$).tw.
33 "acceptance and commitment".tw.
34 multimodal treatment approach/
35 (multimodal$ or multi-modal$ or combined modal$).tw.
36 health promotion/
37 (health adj3 (educat$ or promot$)).tw.
38 or/14-37
39 13 and 38
40 (resilien$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw.
41 (hardiness$ adj5 (train$ or program$ or intervention$ or promot$ or prevent$ or enhanc$ or learn$ or teach$ or educat$ or increas$ or develop$ or manag$ or therap$ or protocol$ or treat$)).tw.
42 or/39-41
43 exp health personnel/
44 exp therapists/
45 exp clinicians/
46 exp counselors/
47 home care personnel/
48 professional measures/
49 rescue workers/
50 exp social workers/
51 (health$ adj3 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)).tw.
52 (medical adj3 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)).tw.
53 (care adj1 (personnel or profession$ or worker$ or practitioner$ or provider$ or staff)).tw.
54 (doctor$ or physician$ or general practitioner$ or (primary care adj2 practitioner$) or surgeon$).tw.
55 (nurse$1 or nursing).tw.
56 ((hospital or ambulance) adj1 personnel).tw.
57 ((intensive adj2 care) or ICU).tw.
58 (allied health$ adj2 (personnel$ or profession$ or worker$ or practitioner$ or provider$ or staff)).tw.
59 (psychologist$ or psychotherapist$ or psychiatrist$ or mental health clinician$ or mental health profession$ or mental health worker $).tw.
60 social worker$.tw.
61 (paramedic$ or ambulance or medic$).tw.
62 ((first or emergency or disaster) adj1 (response or responder$)).tw.
63 (professional adj (carer$ or caregiver$ or care-giver$)).tw.
64 (physical therapist$ or physiotherapist$ or occupational therapist$ or recreational therapist$ or music therapist$ or art therapist$ or dietitian$ or nutritionist$ or ((speech and language) adj1 therapist$) or speech pathologist$ or audiologist$ or exercise physiologist$ or midwi?e$ or osteopath$ or sonographer$ or radiographer$ or radiotherapist$ or ((radiology or radiation) adj1 (therapist$ or technician$ or technologist$ or assistant$ or scientist$)) or respiratory therapist$ or ((anesthesia or anesthesiologist) adj1 (technician$ or assistant$)) or dental hygienist$ or (surgical adj1 (technician$ or technologist$)) or orthotist$ or orthoptist$ or podiatrist$ or perfusionist$).tw.
65 counsel?or$.tw.
66 (clinical adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw.
67 (clinical laboratory adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw.
68 (medical$ adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw.
69 (medical$ laboratory adj1 (technician$ or technologist$ or assistant$ or scientist$)).tw.
70 (public health service$ or public health agenc$).tw.
71 (secondary trauma$ or (work$ adj2 trauma survivor$)).tw.
72 ((nursing or medical or premedical or paramedic or psychology or physical therapy or occupational therapy) adj2 student$).tw.
73 ((nursing or medical or midwifery or premedical or paramedic or psychology or physical therapy or occupational therapy) adj2 student $).tw.
74 college student$.tw. (154347)
75 ((nurs$ adj1 graduate$) or (nurs$ adj1 education) or (medic$ adj1 train$)).tw. (7743)
76 or/43-75

77 42 and 76
78 clinical trials/
79 longitudinal studies/
80 exp program evaluation/
81 treatment effectiveness evaluation/
82 random$.tw.
83 (allocat$ or assign$).tw.
84 ((clinic$ or control$) adj trial$).tw.
85 ((control$ or experiment$ or intervention$) adj3 group$).tw.
86 ((singl$ or doubl$ or trebl$ or tripl$) adj3 (blind$ or mask$)).tw.
87 (crossover$ or "cross over$").tw.
88 (placebo$ or (usual adj1 treatment$) or wait$ list).tw.
89 prospectiv$.tw.
90 (crossover or cross-over).tw.
91 ((singl$ or doubl$ or tripl$ or trebl$) adj1 (blind$ or mask$)).tw.
92 ((effectiveness or evaluat$) adj3 (stud$ or research$)).tw.
93 or/78-92
94 77 and 93
95 limit 94 to yr="2016 -Current"

CINAHL EBSCOhost

Searched 24 June 2019 [476 records]

1 (MH "Hardiness")
2 (MH "Social Adjustment")
3 (MH "Adaptation, Psychological")
4 TI ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth") OR AB ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth")
5 TI (positiv* N1 (adapt* OR adjust*)) OR AB (positiv* N1 (adapt* OR adjust*))
6 TI (psychol* N1 (adapt* OR adjust*)) OR AB (psychol* N1 (adapt* OR adjust*))
7 TI (resilien* OR hardiness*) OR AB (resilien* OR hardiness*)
8 (MH "Coping")
9 TI (cope OR coping) OR AB (cope OR coping)
10 TI ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*)) OR AB ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*))
11 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10
12 (MH "Psychotherapy+")
13 (MH "Stress, Psychological/TH")
14 TI (psychotherap* OR psychotherap*) OR AB (psychotherap* OR psychotherap*)
15 TI (behav* N3 (intervention* OR program* OR therap*)) OR AB (behav* N3 (intervention* OR program* OR therap*))
16 TI ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*)) OR AB ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*))
17 TI (psycho* N3 (intervention* OR program* OR therap*)) OR AB (psycho* N3 (intervention* OR program* OR therap*))
18 TI relaxation OR AB relaxation
19 TI mindful* OR AB mindful*
20 TI (counsel?ing OR coaching) OR AB (counsel?ing OR coaching)
21 TI ("third wave" N1 (psycho* OR therap*)) OR AB ("third wave" N1 (psycho* OR therap*))
22 TI "cognit* restructur*" OR AB "cognit* restructur*"
23 TI "positive psychology" OR AB "positive psychology"
24 TI (refram* OR refram* OR reapprais*) OR AB (refram* OR refram* OR reapprais*)
25 TI (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR AB (stress N1 (inoculation OR manag* OR reduc* OR resist*))
26 TI (anxiety N3 manage*) OR AB (anxiety N3 manage*)
27 TI "acceptance and commitment" OR AB "acceptance and commitment"
28 (MH "Combined Modality Therapy")
29 TI (multimodal OR multimodal OR "combined modal*") OR AB (multimodal OR multimodal OR "combined modal*")
30 (MH "Health Promotion+")
31 TI (health N3 (educat* OR promot*)) OR AB (health N3 (educat* OR promot*))
32 S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31
33 S11 AND S32

34 TI (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
35 TI (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
36 S33 OR S34 OR S35
37 MH randomized controlled trials
38 MH double-blind studies
39 MH single-blind studies
40 MH random assignment
41 MH pretest-posttest design
42 MH cluster sample
43 TI (randomised OR randomized)
44 AB (random*)
45 TI (trial)
46 MH (sample size) AND AB (assigned OR allocated OR control)
47 MH (placebos)
48 PT (randomized controlled trial)
49 AB (control W5 group)
50 MH (crossover design) OR MH (comparative studies)
51 AB (cluster W3 RCT)
52 MH animals+
53 MH (animal studies)
54 TI (animal model*)
55 S52 OR S53 OR S54
56 MH (human)
57 S55 NOT S56
58 S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51
59 S58 NOT S57
60 S36 AND S59
61 (MH "Health Personnel") OR (MH "Health professional")
62 TI (health* N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)) OR AB (health* N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)) OR SU (health* N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))
63 TI (“medical care” N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR AB (“medical care” N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR SU (“medical care” N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR TI (medical N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR AB (medical N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR SU (medical N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))
64 TI (care N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR AB (care N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR SU (care N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))
65 TI (doctor* OR physician* OR "general practitioner" OR ("primary care" N2 practitioner*) OR surgeon*) OR AB (doctor* OR physician* OR "general practitioner" OR ("primary care" N2 practitioner*) or surgeon*) OR SU (doctor* OR physician* OR "general practitioner" OR ("primary care" N2 practitioner*) or surgeon*)
66 TI (nurse* OR (nursing N1 assistant*) OR (nursing N1 staff)) OR AB (nurse* OR (nursing N1 assistant*) OR (nursing N1 staff)) OR SU (nurse* OR (nursing N1 assistant*) OR (nursing N1 staff))
67 (MH "nursing")
68 TI nursing OR AB nursing OR SU nursing
69 TI ((hospital OR ambulance) N1 personnel) OR AB ((hospital OR ambulance) N1 personnel) OR SU ((hospital OR ambulance) N1 personnel)
70 TI ((intensive N1 care) OR ICU OR (intensive N1 care N1 unit N1 personnel*)) OR AB ((intensive N1 care) OR ICU OR (intensive N1 care N1 unit N1 personnel*)) OR SU ((intensive N1 care) OR ICU OR (intensive N1 care N1 unit N1 personnel*))
71 TI ((allied N1 health) N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)) OR AB ((allied N1 health) N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)) OR SU ((allied N1 health) N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))
72 TI (psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”) OR AB (psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”) OR SU (psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”)
73 TI (social N1 worker*) OR AB (social N1 worker*) OR SU (social N1 worker*)

74 TI (paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N1 responder*)) OR AB (paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N1 responder*)) OR SU (paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N1 responder*))
75 TI (professional N1 caregiver*) OR AB (professional N1 caregiver*) OR SU (professional N1 caregiver*)
76 TI ((physical N1 therapist*) OR physiotherapist* OR (occupational N1 therapist*) OR (recreational N1 therapist*) OR (music N1 therapist*) OR (art N1 therapist*) OR dietitian* OR nutritionist* OR ((speech and language) N1 therapist*) OR (speech N1 pathologist*) OR audiologist* OR (exercise N1 physiologist*) OR osteopath* OR (sonographer* OR radiographer* OR radiotherapist*) OR ((radiology OR radiation) N1 (therapist* OR technician* OR technologist* OR assistant* OR scientist*)) OR (respiratory N1 therapist*) OR ((anesthesia OR anesthesiologist) N1 (technician* OR assistant*)) OR (dental N1 hygienist*) OR (surgical N1 (technician* OR technologist*)) OR orthotist* OR orthoptist* OR podiatrist* OR perfusionist*) OR AB ((physical N1 therapist*) OR physiotherapist* OR (occupational N1 therapist*) OR (recreational N1 therapist*) OR (music N1 therapist*) OR (art N1 therapist*) OR dietitian* OR nutritionist* OR ((speech and language) N1 therapist*) OR (speech N1 pathologist*) OR audiologist* OR (exercise N1 physiologist*) OR osteopath* OR (sonographer* OR radiographer* OR radiotherapist*) OR ((radiology OR radiation) N1 (therapist* OR technician* OR technologist* OR assistant* OR scientist*)) OR (respiratory N1 therapist*) OR ((anesthesia OR anesthesiologist) N1 (technician* OR assistant*)) OR (dental N1 hygienist*) OR (surgical N1 (technician* OR technologist*)) OR orthotist* OR orthoptist* OR podiatrist* OR perfusionist*) OR SU ((physical N1 therapist*) OR physiotherapist* OR (occupational N1 therapist*) OR (recreational N1 therapist*) OR (music N1 therapist*) OR (art N1 therapist*) OR dietitian* OR nutritionist* OR ((speech and language) N1 therapist*) OR (speech N1 pathologist*) OR audiologist* OR (exercise N1 physiologist*) OR osteopath* OR (sonographer* OR radiographer* OR radiotherapist*) OR ((radiology OR radiation) N1 (therapist* OR technician* OR technologist* OR assistant* OR scientist*)) OR (respiratory N1 therapist*) OR ((anesthesia OR anesthesiologist) N1 (technician* OR assistant*)) OR (dental N1 hygienist*) OR (surgical N1 (technician* OR technologist*)) OR orthotist* OR orthoptist* OR podiatrist* OR perfusionist*)
77 TI counsel?or* OR AB counsel?or* OR SU counsel?or*
78 TI ((clinical OR (clinical N1 laboratory) OR medical OR (medical N1 laboratory)) N1 (technician* OR technologist* OR assistant* OR scientist*)) OR AB ((clinical OR (clinical N1 laboratory) OR medical OR (medical N1 laboratory)) N1 (technician* OR technologist* OR assistant* OR scientist*)) OR SU ((clinical OR (clinical N1 laboratory) OR medical OR (medical N1 laboratory)) N1 (technician* OR technologist* OR assistant* OR scientist*))
79 TI ((human or health) N1 service N1 profession*) OR AB ((human or health) N1 service N1 profession*) OR SU ((human or health) N1 service N1 profession*)
80 TI (public N1 health N1 (service or agency)) OR AB (public N1 health N1 (service or agency)) OR SU (public N1 health N1 (service or agency))
81 TI ("secondary traumati?ation" or (work* N2 (trauma survivor*))) OR AB ("secondary traumati?ation" or (work* N2 (trauma survivor*))) OR SU ("secondary traumati?ation" or (work* N2 (trauma survivor*)))
82 TI ((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N1 therapy) OR (occupational N1 therapy)) N1 student*) OR AB ((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N1 therapy) OR (occupational N1 therapy)) N1 student*) OR SU ((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N1 therapy) OR (occupational N1 therapy)) N1 student*)
83 TI (college N1 student*) OR AB (college N1 student*) OR SU (college N1 student*)
84 TI (nursing N1 (graduates OR education)) OR AB (nursing N1 (graduates OR education)) OR SU (nursing N1 (graduates OR education)) OR TI (medical N2 train*) OR AB (medical N2 train*) OR SU (medical N2 train*) OR TI (student N1 nurse*) OR AB (student N1 nurse*) OR SU (student N1 nurse*)
85 S61 OR S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68 OR S69 OR S70 OR S71 OR S72 OR S73 OR S74 OR S75 OR S76 OR S77 OR S78 OR S79 OR S80 OR S81 OR S82 OR S83 OR S84
86 S60 AND S85
87 S60 AND S85, Limiters - Published Date: 19900101-20190631
88 S60 AND S85, Limiters - Published Date: 20161001-20190631

PSYNDEX EBSCOhost

Searched 24 June 2019 [31 records]

1 DE "Resilience (Psychological)"
2 DE "Adaptability (Personality)"
3 DE "Emotional Adjustment" OR DE "Social Adjustment"
4 DE "Coping Behavior"
5 DE "Posttraumatic Growth"
6 DE "Protective Factors"
7 TI ("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR AB ("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR SU ("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")
8 TI (positiv* N1 (adapt* OR adjust*)) OR AB (positiv* N1 (adapt* OR adjust*)) OR SU (positiv* N1 (adapt* OR adjust*))
9 TI (psychol* N1 (adapt* OR adjust*)) OR AB (psychol* N1 (adapt* OR adjust*)) OR SU (psychol* N1 (adapt* OR adjust*))
10 TI (resilien* OR hardiness*) OR AB (resilien* OR hardiness*) OR SU (resilien* OR hardiness*)
11 TI (cope OR coping) OR AB (cope OR coping) OR SU (cope OR coping)

12 TI ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*)) OR AB ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*)) OR SU ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*))
13 DE "Psychological Stress"
14 S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13
15 DE "Psychotherapy" OR DE "Adlerian Psychotherapy" OR DE "Adolescent Psychotherapy" OR DE "Affirmative Therapy" OR DE "Analytical Psychotherapy" OR DE "Autogenic Training" OR DE "Behavior Therapy" OR DE "Brief Psychotherapy" OR DE "Brief Relational Therapy" OR DE "Child Psychotherapy" OR DE "Client Centered Therapy" OR DE "Cognitive Behavior Therapy" OR DE "Conversion Therapy" OR DE "Eclectic Psychotherapy" OR DE "Emotion Focused Therapy" OR DE "Existential Therapy" OR DE "Experiential Psychotherapy" OR DE "Expressive Psychotherapy" OR DE "Eye Movement Desensitization Therapy" OR DE "Feminist Therapy" OR DE "Geriatric Psychotherapy" OR DE "Gestalt Therapy" OR DE "Group Psychotherapy" OR DE "Guided Imagery" OR DE "Humanistic Psychotherapy" OR DE "Hypnotherapy" OR DE "Individual Psychotherapy" OR DE "Insight Therapy" OR DE "Integrative Psychotherapy" OR DE "Interpersonal Psychotherapy" OR DE "Logotherapy" OR DE "Narrative Therapy" OR DE "Network Therapy" OR DE "Persuasion Therapy" OR DE "Primal Therapy" OR DE "Psychoanalysis" OR DE "Psychodrama" OR DE "Psychodynamic Psychotherapy" OR DE "Psychotherapeutic Counseling" OR DE "Rational Emotive Behavior Therapy" OR DE "Reality Therapy" OR DE "Relationship Therapy" OR DE "Solution Focused Therapy" OR DE "Supportive Psychotherapy" OR DE "Transactional Analysis" OR DE "Individualpsychologische Therapie" OR DE "Jugendlichenpsychotherapie" OR DE "Affirmative Therapie" OR DE "Analytische Psychotherapie (C. G. Jung)" OR DE "Autogenes Training" OR DE "Verhaltenstherapie" OR DE "Kurzpsychotherapie" OR DE "Beziehungsorientierte Kurzpsychotherapie" OR DE "Kinderpsychotherapie" OR DE "Klientenzentrierte Psychotherapie" OR DE "Kognitive Verhaltenstherapie" OR DE "Konversionstherapie (Homosexualität)" OR DE "Eklektische Psychotherapie" OR DE "Emotionsfokussierte Therapie" OR DE "Existenzialtherapie" OR DE "Erfahrungsorientierte Psychotherapie" OR DE "Expressive Psychotherapie" OR DE "Augenbewegungsdesensibilisierung" OR DE "Feministische Therapie" OR DE "Geriatrische Psychotherapie" OR DE "Gestalttherapie" OR DE "Gruppenpsychotherapie" OR DE "Geleitete Fantasievorstellung" OR DE "Humanistische Psychotherapie" OR DE "Hypnotherapie" OR DE "Einzelpsychotherapie" OR DE "Einsichtstherapie" OR DE "Integrative Psychotherapie" OR DE "Interpersonelle Psychotherapie" OR DE "Logotherapie" OR DE "Narrative Therapie" OR DE "Netzwerktherapie" OR DE "Persuasionstherapie" OR DE "Primärtherapie" OR DE "Psychoanalytische Therapie" OR DE "Psychodrama" OR DE "Psychodynamische Psychotherapie" OR DE "Psychotherapeutische Beratung" OR DE "Rational-Emotive Verhaltenstherapie" OR DE "Realitätstherapie" OR DE "Relationship Therapy" OR DE "Lösungsorientierte Therapie" OR DE "Unterstützende Psychotherapie" OR DE "Transaktionsanalyse"
16 DE "Cognitive Techniques"
17 DE "Psychotherapeutic Techniques"
18 DE "Relaxation Therapy"
19 DE "Mindfulness"
20 DE "Stress Management"
21 TI (psychotherap* OR psycho-therap*) OR AB (psychotherap* OR psycho-therap*) OR SU (psychotherap* OR psycho-therap*)
22 TI (behav* N3 (intervention* OR program* OR therap*)) OR AB (behav* N3 (intervention* OR program* OR therap*)) OR SU (behav* N3 (intervention* OR program* OR therap*))
23 TI ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*)) OR AB ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*)) OR SU ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*))
24 TI (psycho* N3 (intervention* OR program* OR therap*)) OR AB (psycho* N3 (intervention* OR program* OR therap*)) OR SU (psycho* N3 (intervention* OR program* OR therap*))
25 TI relaxation OR AB relaxation OR SU relaxation
26 TI mindful* OR AB mindful* OR SU mindful*
27 TI (counsel?ing OR coaching) OR AB (counsel?ing OR coaching) OR SU (counsel?ing OR coaching)
28 TI ("third wave" N1 (psycho* OR therap*)) OR AB ("third wave" N1 (psycho* OR therap*)) OR SU ("third wave" N1 (psycho* OR therap*))
29 TI "cognit* restructur*" OR AB "cognit* restructur*" OR SU "cognit* restructur*"
30 TI "positive psychology" OR AB "positive psychology" OR SU "positive psychology"
31 TI (reframe* OR re-frame* OR reapprais*) OR AB (reframe* OR re-frame* OR reapprais*) OR SU (reframe* OR re-frame* OR reapprais*)
32 TI (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR AB (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR SU (stress N1 (inoculation OR manag* OR reduc* OR resist*))
33 TI (anxiety N3 manage*) OR AB (anxiety N3 manage*) OR SU (anxiety N3 manage*)
34 TI "acceptance and commitment" OR AB "acceptance and commitment" OR SU "acceptance and commitment"
35 DE "Multimodal Treatment Approach"
36 TI (multimodal OR multi-modal OR "combined modal*") OR AB (multimodal OR multi-modal OR "combined modal*") OR SU (multimodal OR multi-modal OR "combined modal*")
37 DE "Health Promotion"
38 TI (health N3 (educat* OR promot*)) OR AB (health N3 (educat* OR promot*)) OR SU (health N3 (educat* OR promot*))
39 S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38
40 S14 AND S39

41 TI (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR SU (resilien* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
42 TI (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR AB (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*)) OR SU (hardiness* N5 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
43 S40 OR S41 OR S42
44 DE "Clinical Trials"
45 DE "Longitudinal Studies"
46 DE "Program Evaluation"
47 DE "Treatment Effectiveness Evaluation"
48 TI random* OR AB random*
49 TI (allocat* OR assign*) OR AB (allocat* OR assign*)
50 TI (clinic* OR control*) N1 trial*)) OR AB (clinic* OR control*) N1 trial*))
51 TI ((control* OR experiment* OR intervention*) N3 group*) OR AB ((control* OR experiment* OR intervention*) N3 group*)
52 TI ((singl* OR doubl* OR trebl* OR tripl*) N3 (blind* OR mask*)) OR AB ((singl* OR doubl* OR trebl* OR tripl*) N3 (blind* OR mask*))
53 TI (crossover* OR "cross over*") OR AB (crossover* OR "cross over*")
54 TI (placebo* OR (usual N1 treatment*) OR waitlist OR wait-list) OR AB (placebo* OR (usual N1 treatment*) OR waitlist OR wait-list)
55 TI prospectiv* OR AB prospectiv*
56 TI (crossover OR cross-over) OR AB (crossover OR cross-over)
57 TI ((singl* OR doubl* OR tripl* OR trebl*) N1 (blind* OR mask*)) OR AB ((singl* OR doubl* OR tripl* OR trebl*) N1 (blind* OR mask*))
58 TI ((effectiveness OR evaluat*) N3 (stud* OR research*)) OR AB ((effectiveness OR evaluat*) N3 (stud* OR research*))
59 S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 OR S55 OR S56 OR S57 OR S58
60 S43 AND S59
61 DE "Health Personnel" OR DE "Health professional"
62 TI (health* N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)) OR AB (health* N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)) OR SU (health* N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))
63 TI (“medical care” N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR AB (“medical care” N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR SU (“medical care” N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR TI (medical N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR AB (medical N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR SU (medical N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))
64 TI (care N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR AB (care N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR SU (care N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))
65 TI (doctor* OR physician* OR "general practitioner" OR ("primary care" N2 practitioner*) OR surgeon*) OR AB (doctor* OR physician* OR "general practitioner" OR ("primary care" N2 practitioner*) or surgeon*) OR SU (doctor* OR physician* OR "general practitioner" OR ("primary care" N2 practitioner*) or surgeon*)
66 TI (nurse* OR (nursing N1 assistant*) OR (nursing N1 staff)) OR AB (nurse* OR (nursing N1 assistant*) OR (nursing N1 staff)) OR SU (nurse* OR (nursing N1 assistant*) OR (nursing N1 staff))
67 DE "nursing"
68 TI nursing OR AB nursing OR SU nursing
69 TI ((hospital OR ambulance) N1 personnel) OR AB ((hospital OR ambulance) N1 personnel) OR SU ((hospital OR ambulance) N1 personnel)
70 TI ((intensive N1 care) OR ICU OR (intensive N1 care N1 unit N1 personnel*)) OR AB ((intensive N1 care) OR ICU OR (intensive N1 care N1 unit N1 personnel*)) OR SU ((intensive N1 care) OR ICU OR (intensive N1 care N1 unit N1 personnel*))
71 TI ((allied N1 health) N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)) OR AB ((allied N1 health) N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)) OR SU ((allied N1 health) N1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))
72 TI (psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”) OR AB (psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”) OR SU (psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”)
73 TI (social N1 worker*) OR AB (social N1 worker*) OR SU (social N1 worker*)
74 TI (paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N1 responder*)) OR AB (paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N1 responder*)) OR SU (paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N1 responder*))
75 TI (professional N1 caregiver*) OR AB (professional N1 caregiver*) OR SU (professional N1 caregiver*)

76 TI ((physical N1 therapist*) OR physiotherapist* OR (occupational N1 therapist*) OR (recreational N1 therapist*) OR (music N1 therapist*) OR (art N1 therapist*) OR dietitian* OR nutritionist* OR ((speech and language) N1 therapist*) OR speech N1 pathologist*) OR audiologist* OR (exercise N1 physiologist*) OR osteopath* OR (sonographer* OR radiographer* OR radiotherapist*) OR ((radiology OR radiation) N1 (therapist* OR technician* OR technologist* OR assistant* OR scientist*)) OR (respiratory N1 therapist*) OR ((anesthesia OR anesthesiologist) N1 (technician* OR assistant*)) OR (dental N1 hygienist*) OR (surgical N1 (technician* OR technologist*)) OR orthotist* OR orthoptist* OR podiatrist* OR perfusionist*) OR AB ((physical N1 therapist*) OR physiotherapist* OR (occupational N1 therapist*) OR (recreational N1 therapist*) OR (music N1 therapist*) OR (art N1 therapist*) OR dietitian* OR nutritionist* OR ((speech and language) N1 therapist*) OR (speech N1 pathologist*) OR audiologist* OR (exercise N1 physiologist*) OR osteopath* OR (sonographer* OR radiographer* OR radiotherapist*) OR ((radiology OR radiation) N1 (therapist* OR technician* OR technologist* OR assistant* OR scientist*)) OR (respiratory N1 therapist*) OR ((anesthesia OR anesthesiologist) N1 (technician* OR assistant*)) OR (dental N1 hygienist*) OR (surgical N1 (technician* OR technologist*)) OR orthotist* OR orthoptist* OR podiatrist* OR perfusionist*) OR SU ((physical N1 therapist*) OR physiotherapist* OR (occupational N1 therapist*) OR (recreational N1 therapist*) OR (music N1 therapist*) OR (art N1 therapist*) OR dietitian* OR nutritionist* OR ((speech and language) N1 therapist*) OR (speech N1 pathologist*) OR audiologist* OR (exercise N1 physiologist*) OR osteopath* OR (sonographer* OR radiographer* OR radiotherapist*) OR ((radiology OR radiation) N1 (therapist* OR technician* OR technologist* OR assistant* OR scientist*)) OR (respiratory N1 therapist*) OR ((anesthesia OR anesthesiologist) N1 (technician* OR assistant*)) OR (dental N1 hygienist*) OR (surgical N1 (technician* OR technologist*)) OR orthotist* OR orthoptist* OR podiatrist* OR perfusionist*)
77 TI counsel?or* OR AB counsel?or* OR SU counsel?or*
78 TI ((clinical OR (clinical N1 laboratory) OR medical OR (medical N1 laboratory)) N1 (technician* OR technologist* OR assistant* OR scientist*)) OR AB ((clinical OR (clinical N1 laboratory) OR medical OR (medical N1 laboratory)) N1 (technician* OR technologist* OR assistant* OR scientist*)) OR SU ((clinical OR (clinical N1 laboratory) OR medical OR (medical N1 laboratory)) N1 (technician* OR technologist* OR assistant* OR scientist*))
79 TI ((human or health) N1 service N1 profession*) OR AB ((human or health) N1 service N1 profession*) OR SU ((human or health) N1 service N1 profession*)
80 TI (public N1 health N1 (service or agency)) OR AB (public N1 health N1 (service or agency)) OR SU (public N1 health N1 (service or agency))
81 TI ("secondary traumati?ation" or (work* N2 (trauma survivor*))) OR AB ("secondary traumati?ation" or (work* N2 (trauma survivor*))) OR SU ("secondary traumati?ation" or (work* N2 (trauma survivor*)))
82 TI ((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N1 therapy) OR (occupational N1 therapy)) N1 student*) OR AB ((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N1 therapy) OR (occupational N1 therapy)) N1 student*) OR SU ((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N1 therapy) OR (occupational N1 therapy)) N1 student*)
83 TI (college N1 student*) OR AB (college N1 student*) OR SU (college N1 student*)
84 TI (nursing N1 (graduates OR education)) OR AB (nursing N1 (graduates OR education)) OR SU (nursing N1 (graduates OR education)) OR TI (medical N2 train*) OR AB (medical N2 train*) OR SU (medical N2 train*) OR TI (student N1 nurse*) OR AB (student N1 nurse*) OR SU (student N1 nurse*)
85 S61 OR S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68 OR S69 OR S70 OR S71 OR S72 OR S73 OR S74 OR S75 OR S76 OR S77 OR S78 OR S79 OR S80 OR S81 OR S82 OR S83 OR S84
86 S60 AND S85
87 S60 AND S85, Limiters - Published Date: 1990-2019
88 S60 AND S85, Limiters - Published Date: 2016-2019

Web Of Science Core Collection (SCI, SSCI, CPCI-S, CPCI-SSH)

Searched 26 June 2019 [515 records]

#40 #18 AND #38
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=2016-2019
#39 #16 AND #17
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=1990-2016
#38 #37 OR #36 OR #35 OR #34 OR #33 OR #32 OR #31 OR #30 OR #29 OR #28 OR #27 OR #26 OR #25 OR #24 OR #23 OR #22 OR #21 OR #20 OR #19
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#37 TS=("college student*")
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#36 TS=((nursing or medical or premedical or paramedic or psychology or "physical therapy" or "occupational therapy") NEAR/2 student*)
#35 ts=("secondary trauma*" or (work* NEAR/2 "trauma survivor*"))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#34 TS=("public health service*" or "public health agenc*")
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#33 TS=((clinical or medical*) NEAR/1 (technician* or technologist* or assistant* or scientist*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#32 TS=(counsellor* or counselor*)

Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#31 TS=(anesthetist* or anaesthetist* or audiologist* or "dental hygienist*" or dentist* or dietitian* or "midwi*e*" or nutritionist* or pathologist* or physiologist* or physiotherapist* or therapist or osteopath* or sonographer* or radiographer* or radiotherapist* or ((radiology or radiation) NEAR/1 (technician* or technologist* or assistant* or scientist*)) or ((anesthesia or anesthesiologist) NEAR/1 (technician* or assistant*)) or (surgical NEAR/1 (technician* or technologist*)) or orthotist* or orthoptist* or podiatrist* or perfusionist*)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#30 TS=(professional NEAR/1 (caregiver* or care-giver*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#29 TS=((first or emergency or disaster) NEAR/1 (response or responder*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#28 TS=(paramedic* or para-medic* or ambulance)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#27 ts=(psychologist* or psychotherapist* or psychiatrist* or "mental health clinician*" or "mental health profession*" or "mental health worker*" or "social worker*")
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#26 TS= ("allied health*" NEAR/2 (personnel* or profession* or worker* or practitioner* or provider* or staff))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#25 TS=((intensive NEAR/2 care) or ICU)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#24 TS=((hospital or ambulance) NEAR/1 (staff or personnel))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#23 ts=(nurse* or nursing)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#22 TS=(doctor* or physician* or general practitioner* or ("primary care" NEAR/2 practitioner*) or surgeon*)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#21 TS=(care* NEAR/1 (personnel or profession* or worker* or practitioner* or provider* or staff))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#20 TS=(medical NEAR/3 (personnel or profession* or worker* or practitioner* or provider* or staff))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#19 TS=(health* NEAR/3 (personnel or profession* or worker* or practitioner* or provider* or staff))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#18 #17 AND #16
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#17 TS=(random* or trial* or assign* or control* or group* or placebo* or blind* or prospectiv* or longitudinal* or meta-analys* or systematic review*)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#16 #14 or #15
#15 TS=((resilience or hardiness) near/3 (train* or program* or intervention* or promot* or prevent* or enhanc* or learn* or teach* or educat* or increas* or develop* or manag* or therap* or protocol* or treat*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#14 #13 AND #6
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#13 #12 OR #11 OR #10 OR #9 OR #8 OR #7
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#12 TS=(health near/3 (educat* or promot*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#11 TS= ((multimodal* or "multi modal*" or "combined modal*") NEAR/3 (treat* or therap* or intervention* or program*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#10 TS=("acceptance and commitment")
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#9 TS=((anxiety near/1 manag*) or relaxation or mindful* or counsel*ing or coaching or "third wave" or refram* or "re fram*" or "cognitive restructur*" or "positive psychology")
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#8 TS=(stress near/3 (inoculat* or manag* or reduc* or resist*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#7 TS=((psychotherap* or "psycho therap*") or CBT or mindful* or (behav* near/3 (intervention* or program* or therap*)) OR ((cognit* or "cognitive behavior*" or CBT) near/3 (intervention* or program* or therap*)) OR (psycho* near/3 (intervention* or program* or therap*)))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#6 #5 OR #4 OR #3 OR #2 OR #1
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
#5 TS= ((withstand* or overcom* or resist* or recover* or thriv* or adapt* or adjust* or "bounc* back") near/1 (stress* or trauma* or advers*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years

# 4 TS=(psychol* near/1 (adapt* or adjust*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
# 3 TS=(positiv* near/1 (adapt* or adjust*))
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years
# 2 TS=("post traumatic growth" or "posttraumatic growth" or "stress related growth")
TS=(resilien* or hardiness*)
Indexes=SCI-EXPANDED, SSCI, CPCI-S, CPCI-SSH Timespan=All years

International Bibliography of the Social Sciences ProQuest

Searched 25 June 2019 [135 records]

(((MAINSUBJECT.EXACT("Coping") OR TI(resilien* OR hardiness) OR AB(resilien* OR hardiness)) OR (TI((psychol* OR social) NEAR/1 (adapt* OR adjust*)) OR AB((psychol* OR social) NEAR/1 (adapt* OR adjust*))) OR (TI(positiv* NEAR/1 (adapt* OR adjust*)) OR AB(positiv* NEAR/1 (adapt* OR adjust*))) OR (TI("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR AB ("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (TI(cope OR coping) OR AB(cope OR coping)) OR (TI((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") NEAR/5 (stress* OR trauma* OR adversit*)) OR AB((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") NEAR/5 (stress* OR trauma* OR adversit*)))) AND ((MAINSUBJECT.EXACT("Psychotherapy") OR MAINSUBJECT.EXACT("Cognitive therapy") OR MAINSUBJECT.EXACT("Group therapy") OR TI(psychotherap* OR psycho-therap*) OR AB(psychotherap* OR psycho-therap*) OR TI(behav* NEAR/3 (intervention* OR program* OR therap*)) OR AB(behav* NEAR/3 (intervention* OR program* OR therap*)) OR TI(cognit* OR "cognitive behavior*" OR CBT) OR AB(cognit* OR "cognitive behavior*" OR CBT) OR TI(psycho* NEAR/3 (intervention* OR program* OR therap*)) OR AB(psycho* NEAR/3 (intervention* OR program* OR therap*)) OR TI(relaxation OR mindful* OR counsel?ing OR coaching OR "third wave") OR AB(relaxation OR mindful* OR counsel?ing OR coaching OR "third wave") OR TI(cognit* NEAR/1 restructur*) OR AB(cognit* NEAR/1 restructur*) OR TI("positive psychology") OR AB("positive psychology")) AND (MAINSUBJECT.EXACT("Clinical trials") OR (TI(control* OR group OR random* OR placebo* OR longitudinal OR prospective* OR blind* OR trial*) OR AB(control* OR group OR random* OR placebo* OR longitudinal OR prospective* OR blind* OR trial*)))) Limited to publication year 2016-2019

Applied Social Sciences Index & Abstracts ProQuest

Searched 24 June 2019 [41 records]

1 SU.EXACT("Resilience")
2 SU.EXACT("Hardiness")
3 ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")
4 ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)
5 ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))
6 SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand*
OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))
7 ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
8 ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
9 (SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
10 ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)
11 ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)
12 ti(randomi?ed) OR ab(randomi?ed)
13 ti(placebo*) OR ab(placebo*)
14 ti(randomly) OR ab(randomly)
15 ti(trial) OR ab(trial)

16 (ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial))
17 ((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))
18 ti((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))) OR ab((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)))
19 ti((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR ab((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)))
20 ti(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*) OR ab(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*)
21 ti(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)) OR ab(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff))
22 SU.EXACT("nursing")
23 ti(nursing) OR ab(nursing)
24 ti((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)) OR ab((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*))
25 ti(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*") OR ab(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*")
26 ti(social N/1 worker*) OR ab(social N/1 worker*)
27 ti(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)) OR ab(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*))
28 ti(physiotherapist* OR (occupational N/1 therapist*)) OR ab(physiotherapist* OR (occupational N/1 therapist))
29 ti(counsel?or*) OR ab(counsel?or*)
30 ti((human or health) N/1 service N/1 profession*) OR ab((human or health) N/1 service N/1 profession*)
31 ti(public N/1 health N/1 (service or agency)) OR ab(public N/1 health N/1 (service or agency))
32 ti("secondary traumati?ation" OR (work* N/2 ("trauma survivor*"))) OR ab("secondary traumati?ation" OR (work* N/2 ("trauma survivor*")))
33 ti((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*) OR ab((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*)
34 ti(college N/1 student*) OR ab(college N/1 student*)
35 (ti((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))) OR ab((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)))) OR (ti((care NEAR/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR ab((care NEAR/1
(personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)))) OR (ti(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*) OR ab(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*)) OR (ti(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)) OR ab(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff))) OR SU.EXACT("nursing") OR (ti(nursing) OR ab(nursing)) OR (ti((intensive N/1 care) OR ICU OR (intensive N/1 care
N/1 unit N/1 personnel*)) OR ab((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*))) OR (ti(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*") OR ab(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*")) OR (ti(social N/1 worker*) OR ab(social N/1 worker*)) OR (ti(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)) OR ab(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*))) OR (ti(physiotherapist* OR (occupational N/1 therapist*)) OR ab(physiotherapist* OR (occupational N/1 therapist))) OR (ti(counsel?or*) OR ab(counsel?or*)) OR (ti((human or health) N/1 service N/1 profession*) OR ab((human or health) N/1 service N/1 profession*)) OR (ti(public N/1 health N/1 (service or agency)) OR ab(public N/1 health N/1 (service or agency))) OR (ti("secondary traumati?ation" OR (work* N/2 ("trauma survivor*"))) OR ab("secondary traumati?ation" OR (work* N/2 ("trauma survivor*")))) OR (ti((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*) OR ab((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*)) OR (ti(college N/1 student*) OR ab(college N/1 student*))
36 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5

(stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))) OR ab((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))))
37 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))) OR ab((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)))) AND pd(20161001-20190624), 2016-10-01 - 2019-06-20
38 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((care NEAR/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR ab((care NEAR/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))))
39 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((care NEAR/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR ab((care NEAR/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)))), 2016-10-01 - 2019-06-20
40 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*) OR ab(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*))
41 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5

(train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*) OR ab(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*)), 2016-10-01 - 2019-06-20

42 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)) OR ab(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)))

43 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)) OR ab(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff))), 2016-10-01 - 2019-06-20

44 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR
"post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND SU.EXACT("nursing")

45 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR
"post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND SU.EXACT("nursing"), 2016-10-01 - 2019-06-20

46 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nursing) OR ab(nursing))

47 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR

ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nursing) OR ab(nursing)), 2016-10-01 - 2019-06-20

48 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)) OR ab((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)))

49 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)) OR ab((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*))), 2016-10-01 - 2019-06-20

50 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*") OR ab(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*"))

51 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*") OR ab(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*")), 2016-10-01 - 2019-06-20

52 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*))

OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(social N/1 worker*) OR ab(social N/1 worker*))
53 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(social N/1 worker*) OR ab(social N/1 worker*)), 2016-10-01 - 2019-06-20
54 (((SU.EXACT("Resilience") OR
SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)) OR ab(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)))
55 (((SU.EXACT("Resilience") OR
SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)) OR ab(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*))), 2016-10-01 - 2019-06-20
56 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(physiotherapist* OR (occupational N/1 therapist*)) OR ab(physiotherapist* OR (occupational N/1 therapist)))
57 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(physiotherapist* OR (occupational N/1 therapist*)) OR ab(physiotherapist* OR (occupational N/1 therapist))), 2016-10-01 - 2019-06-20
58 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR

ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(counsel?or*) OR ab(counsel?or*))

59 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(counsel?or*) OR ab(counsel?or*)), 2016-10-01 - 2019-06-20

60 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR anag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((human or health) N/1 service N/1 profession*) OR ab((human or health) N/1 service N/1 profession*))

61 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR anag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((human or health) N/1 service N/1 profession*) OR ab((human or health) N/1 service N/1 profession*)), 2016-10-01 - 2019-06-20

62 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(public N/1 health N/1 (service or agency)) OR ab(public N/1 health N/1 (service or agency)))

63 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR

ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(public N/1 health N/1 (service or agency)) OR ab(public N/1 health N/1 (service or agency))), 2016-10-01 - 2019-06-20
64 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti("secondary traumati?ation" OR (work* N/2 ("trauma survivor*"))) OR ab("secondary traumati?ation" OR (work* N/2 ("trauma survivor*"))))
65 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti("secondary traumati?ation" OR (work* N/2 ("trauma survivor*"))) OR ab("secondary traumati?ation" OR (work* N/2 ("trauma survivor*")))), 2016-10-01 - 2019-06-20
66 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*))OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*) OR ab((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*))
67 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*))OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*) OR ab((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*)), 2016-10-01 - 2019-06-20
68 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien*
N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(college N/1 student*) OR ab(college N/1 student*))
69 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5

(stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien*
N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(college N/1 student*) OR ab(college N/1 student*)), 2016-10-01 - 2019-06-200
Subsequent (individual) export of results in lines 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69

ProQuest Dissertations & Theses ProQuest

Searched 24 June 2019 [22 records]

1 SU.EXACT("Resilience")
2 SU.EXACT("Hardiness")
3 ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")
4 ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)
5 ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*))
6 SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))
7 ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
8 ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
9 (SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))
10 ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)
11 ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)
12 ti(randomi?ed) OR ab(randomi?ed)
13 ti(placebo*) OR ab(placebo*)
14 ti(randomly) OR ab(randomly)
15 ti(trial) OR ab(trial)
16 (ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial))
17 ((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))
18 ti((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))) OR ab((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)))
19 ti(medical N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR ab(medical N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))

20 ti((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR ab((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)))
21 ti(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*) OR ab(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*)
22 ti(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)) OR ab(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff))
23 SU.EXACT("nursing")
24 ti(nursing) OR ab(nursing)
25 ti((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)) OR ab((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*))
26 ti(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*") OR ab(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*")
27 ti(social N/1 worker*) OR ab(social N/1 worker*)
28 ti(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)) OR ab(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*))
29 ti(physiotherapist* OR (art N/1 therapist*) OR dietitian* OR (dental N/1 hygienist*)) OR ab(physiotherapist* OR (art N/1 therapist*) OR dietitian* OR (dental N/1 hygienist*))
30 ti(counsel?or*) OR ab(counsel?or*)
31 ti("secondary traumati?ation" OR (work* N/2 ("trauma survivor*"))) OR ab("secondary traumati?ation" OR (work* N/2 ("trauma survivor*")))
32 ti((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*) OR ab((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*)
33 ti(college N/1 student*) OR ab(college N/1 student*)
34 ti(nursing N/1 (graduates OR education)) OR ab(nursing N/1 (graduates OR education))
35 (ti((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))) OR ab((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)))) OR (ti(medical N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR ab(medical N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR (ti((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR ab((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)))) OR (ti(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*) OR ab(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*)) OR (ti(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)) OR ab(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff))) OR SU.EXACT("nursing") OR (ti(nursing) OR ab(nursing)) OR (ti((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)) OR ab((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*))) OR (ti(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*") OR ab(psychologist* OR psychotherapist* OR "mental health clinician*" OR "mental health profession*" OR "mental health worker*")) OR (ti(social N/1 worker*) OR ab(social N/1 worker*)) OR (ti(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)) OR ab(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*))) OR (ti(physiotherapist* OR (art N/1 therapist*) OR dietitian* OR (dental N/1 hygienist*)) OR ab(physiotherapist* OR (art N/1 therapist*) OR dietitian* OR (dental N/1 hygienist*))) OR (ti(counsel?or*) OR ab(counsel?or*)) OR (ti("secondary traumati?ation" OR (work* N/2 ("trauma survivor*"))) OR ab("secondary traumati?ation" OR (work* N/2 ("trauma survivor*")))) OR (ti((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*) OR ab((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*)) OR (ti(college N/1 student*) OR ab(college N/1 student*)) OR (ti(nursing N/1 (graduates OR education)) OR ab(nursing N/1 (graduates OR education)))
36 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))) OR ab((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))))
37 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention*

OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff))) OR ab((health* N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff)))), 2016-10-01 - 2019-06-20
38 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((medical N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR ab(medical N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)))
39 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((medical N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)) OR ab(medical N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))), 2016-10-01 - 2019-06-20
40 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR ab((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))))
41 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*))) OR ab((care N/1 (personnel OR profession* OR worker* OR practitioner* OR provider* OR staff*)))), 2016-10-01 - 2019-06-20
42 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*)

OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*) OR ab(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*))
43 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*) OR ab(doctor* OR physician* OR "general practitioner" OR ("primary care" N/2 practitioner*) OR surgeon*)), 2016-10-01 - 2019-06-20
44 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)) OR ab(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)))
45 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff)) OR ab(nurse* OR (nursing N/1 assistant*) OR (nursing N/1 staff))), 2016-10-01 - 2019-06-20
46 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND SU.EXACT("nursing")
47 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND SU.EXACT("nursing"), 2016-10-01 - 2019-06-20

48 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nursing) OR ab(nursing))
49 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nursing) OR ab(nursing)), 2016-10-01 - 2019-06-20
50 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)) OR ab((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)))
51 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*)) OR ab((intensive N/1 care) OR ICU OR (intensive N/1 care N/1 unit N/1 personnel*))), 2016-10-01 - 2019-06-20
52 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”) OR ab(psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”))
53 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR

overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”) OR ab(psychologist* OR psychotherapist* OR “mental health clinician*” OR “mental health profession*” OR “mental health worker*”)), 2016-10-01 - 2019-06-20

54 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(social N/1 worker*) OR ab(social N/1 worker*))

55 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(social N/1 worker*) OR ab(social N/1 worker*)), 2016-10-01 - 2019-06-20

56 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)) OR ab(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)))

57 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*)) OR ab(paramedic* OR ambulance OR medic* OR ((first OR emergency OR disaster) N/1 responder*))), 2016-10-01 - 2019-06-20

58 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat*

OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(physiotherapist* OR (art N/1 therapist*) OR dietitian* OR (dental N/1 hygienist*)) OR ab(physiotherapist* OR (art N/1 therapist*) OR dietitian* OR (dental N/1 hygienist*)))
59 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(physiotherapist* OR (art N/1 therapist*) OR dietitian* OR (dental N/1 hygienist*)) OR ab(physiotherapist* OR (art N/1 therapist*) OR dietitian* OR (dental N/1 hygienist*))), 2016-10-01 - 2019-06-20
60 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(counsel?or*) OR ab(counsel?or*))
61 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(counsel?or*) OR ab(counsel?or*)), 2016-10-01 - 2019-06-20
62 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(“secondary traumati?ation” OR (work* N/2 (“trauma survivor*”))) OR ab(“secondary traumati?ation” OR (work* N/2 (“trauma survivor*”))))
63 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR

ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(“secondary traumati?ation” OR (work* N/2 (“trauma survivor*”))) OR ab(“secondary traumati?ation” OR (work* N/2 (“trauma survivor*”)))), 2016-10-01 - 2019-06-20
64 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*) OR ab((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*))
65 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*) OR ab((nursing OR medical OR premedical OR paramedic OR psychology OR (physical N/1 therapy) OR (occupational N/1 therapy)) N/1 student*)), 2016-10-01 - 2019-06-20
66 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(college N/1 student*) OR ab(college N/1 student*))
67 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(college N/1 student*) OR ab(college N/1 student*)), 2016-10-01 - 2019-06-20
68 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nursing N/1 (graduates OR education)) OR ab(nursing N/1 (graduates OR education)))

69 (((SU.EXACT("Resilience") OR SU.EXACT("Hardiness") OR (ti("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR ab("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth")) OR (ti(resilien* OR hardiness*) OR ab(resilien* OR hardiness*)) OR (ti((withstand* OR
overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)) OR ab((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N/5 (stress* OR trauma* OR adversit*)))) OR ti((resilien* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*))) OR ti((hardiness* N/5 (train* OR program* OR intervention* OR promot* OR prevent* OR enhanc* OR learn* OR teach* OR educat* OR increas* OR develop* OR manag* OR therap* OR protocol* OR treat*)))) AND ((ti(randomi?ed N/1 control* N/1 trial*) OR ab(randomi?ed N/1 control* N/1 trial*)) OR (ti(control* N/1 clinical N/1 trial*) OR ab(control* N/1 clinical N/1 trial*)) OR (ti(randomi?ed) OR ab(randomi?ed)) OR (ti(placebo*) OR ab(placebo*)) OR (ti(randomly) OR ab(randomly)) OR (ti(trial) OR ab(trial)))) AND (ti(nursing N/1 (graduates OR education)) OR ab(nursing N/1 (graduates OR education))), 2016-10-01 - 2019-06-20
Subsequent (individual) export of results in lines 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69

Cochrane Database of Systematic Reviews (CDSR), part of the Cochrane Library

Searched 26 June 2019 (5 records)

IDSearchHits
#1(resilien* or hardiness*):ti,ab
#2(post next traumatic next growth or posttraumatic NEXT growth or stress next related next growth):ti,ab
#3(positiv* near/1 (adapt* or adjust*)):ti,ab
#4(psychol* near/1 (adapt* or adjust*)):ti,ab
#5{or #1-#4}
#6(behav* or psycho* or cbt or cognit* or mindful* or reframe* or re next fram*):ti,ab
#7(stress near/3 (inoculat* or manag* or reduc* or resist*)):ti,ab
#8(anxiety near/3 manag*):ti,ab
#9"acceptance and commitment":ti,ab
#10(multimodal* or multi next modal* or combined next modal*):ti,ab
#11(health near/3 (educat* or promot*)):ti,ab
#12{or #6-#11}
#13#5 and #12 with Cochrane Library publication date Between Oct 2016 and Jun 2019, in Cochrane Reviews, Cochrane Protocolss

Epistemonikos (www.epistemonikos.org/)

Searched 24 June 2019 [6 records]

1 (title:(resilien* OR hardiness*) OR abstract:(resilien* OR hardiness*))
2 (title:("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth") OR abstract:("posttraumatic growth" OR "post-traumatic growth" OR "stress-related growth"))
3 (title:("positive adaptation" OR "positive adjustment") OR abstract:("positive adaptation" OR "positive adjustment"))
4 (title:("psychological adaptation" OR "psychological adjustment") OR abstract:("psychological adaptation" OR "psychological adjustment"))
5 OR/#1-#4
6 (title:("health personnel*" OR "health profession*" OR "health professional*" OR "health worker*" OR "health practitioner*" OR "health provider*" OR "health staff") OR abstract:("health personnel*" OR "health profession*" OR "health professional*" OR "health worker*" OR "health practitioner*" OR "health provider*" OR "health staff"))
7 (title:("healthcare personnel*" OR "healthcare profession*" OR "healthcare professional*" OR "healthcare worker*" OR "healthcare practitioner*" OR "healthcare provider*" OR "healthcare staff") OR abstract:("healthcare personnel*" OR "healthcare profession*" OR "healthcare professional*" OR "healthcare worker*" OR "healthcare practitioner*" OR "healthcare provider*" OR "healthcare staff"))
8 (title:("health care personnel*" OR "health care profession*" OR "health care professional*" OR "health care worker*" OR "health care practitioner*" OR "health care provider*" OR "health care staff") OR abstract:("health care personnel*" OR "health care profession*" OR "health care professional*" OR "health care worker*" OR "health care practitioner*" OR "health care provider*" OR "health care staff"))
9 OR/#6-#8
10 AND/#5-#9; Publication year (Custom year range): 1990 – 2019; Publication type: Systematic Review; Systematic review question: All; Cochrane review: All; Type of meta-analysis: All

ERIC EBSCOhost

26 June 2019 (505 records)

All years searched in 2019 as there were errors in the 2016 search

S1DE "Resilience (Psychology)"
Database - ERIC

S2DE "Social Adjustment" OR DE "Emotional Adjustment"
Database - ERIC
S3TI ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth") OR AB ("posttraumatic growth" OR "posttraumatic growth" OR "stress-related growth")
Database - ERIC
S4TI (positiv* N1 (adapt* OR adjust*)) OR AB (positiv* N1 (adapt* OR adjust*))
Database - ERIC
S5TI (psychol* N1 (adapt* OR adjust*)) OR AB (psychol* N1 (adapt* OR adjust*))
Database - ERIC
S6TI (resilien* OR hardiness*) OR AB (resilien* OR hardiness*) OR SU (resilien*)
Database - ERIC
S7TI (cope OR coping) OR AB (cope OR coping) OR SU (cope OR coping)
Database - ERIC
S8TI ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*)) OR AB ((withstand* OR overcom* OR resist* OR recover* OR thriv* OR adapt* OR adjust* OR "bounc* back") N5 (stress* OR trauma* OR adversit*))
Database - ERIC
S9S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8
Database - ERIC
S10DE "Psychotherapy" OR DE "Milieu Therapy" OR DE "Relaxation Training"
Database - ERIC
S11TI (psycho-therap* OR psychotherap*) OR AB (psychotherap* OR psychotherap*) OR SU (psycho-therap* OR psychotherap*)
Database - ERIC
S12TI (behav* N3 (intervention* OR program* OR therap*)) OR AB (behav* N3 (intervention* OR program* OR therap*))
Database - ERIC
S13TI ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*)) OR AB ((cognit* OR "cognitive behavior*" OR CBT) N3 (intervention* OR program* OR therap*))
Database - ERIC
S14TI (psycho* N3 (intervention* OR program* OR therap*)) OR AB (psycho* N3 (intervention* OR program* OR therap*))
Database - ERIC
S15TI relaxation OR AB relaxation OR SU relaxation
Database - ERIC
S16TI mindful* OR AB mindful*
Database - ERIC
S17TI (counsel?ing OR coaching) OR AB (counsel?ing OR coaching) OR SU (counsel?ing OR coaching)
Database - ERIC
S18TI ("third wave" N1 (psycho* OR therap*)) OR AB ("third wave" N1 (psycho* OR therap*))
Database - ERIC
S19TI ("cognit* restructur*") OR AB ("cognit* restructur*") OR SU ("cognit* restructur*")
Database - ERIC
S20TI "positive psychology" OR AB "positive psychology"
Database - ERIC
S21TI (refram* OR refram* OR reapprais*) OR AB (refram* OR refram* OR reapprais*)Interface - EBSCOhost Research Databases
Database - ERIC
S22TI (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR AB (stress N1 (inoculation OR manag* OR reduc* OR resist*)) OR SU (stress N1 (inoculation OR manag* OR reduc* OR resist*))
Database - ERIC
S23TI (anxiety N3 manage*) OR AB (anxiety N3 manage*)
Database - ERIC
S24TI "acceptance and commitment" OR AB "acceptance and commitment"
Database - ERIC
S25TI (multimodal OR multimodal OR "combined modal*") OR AB (multimodal OR multimodal OR "combined modal*")
Database - ERIC
S26TI (health N3 (educat* OR promot*)) OR AB (health N3 (educat* OR promot*)) OR SU (health N3 (educat* OR promot*))
Database - ERIC
S27S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26
Database - ERIC
S28S9 AND S27
Database - ERIC
S29((DE "Health Occupations" OR DE "Allied Health Occupations" OR DE "Medical Education" OR DE "Health Personnel" OR DE "Allied Health Personnel" OR DE "Mental Health Workers" OR DE "Nurses" OR DE "Physicians" OR DE "Psychologists" OR DE "Graduate Medical

Education" OR DE "Nursing Education" OR DE "Allied Health Occupations Education" OR DE "Clinical Experience" OR DE "Medical Schools" OR DE "Medical Students" OR DE "Premedical Students"
Database - ERIC
S30DE "Counselors" OR DE "School Social Workers" OR DE "Social Work"
Database - ERIC
S31TI(health* N3 (personnel or profession* or worker* or practitioner* or provider* or staff)) OR AB(health* N3 (personnel or profession* or worker* or practitioner* or provider* or staff))
Database - ERIC
S32TI(medical N3 (personnel or profession* or worker* or practitioner* or provider* or staff)) OR AB(medical N3 (personnel or profession* or worker* or practitioner* or provider* or staff))
Database - ERIC
S33TI(care N1 (personnel or profession* or worker* or practitioner* or provider* or staff)) OR AB(care N1 (personnel or profession* or worker* or practitioner* or provider* or staff))Database - ERIC
S34TI(doctor* or physician* or general practitioner* or (primary care N2 practitioner*) or surgeon*) OR AB(doctor* or physician* or general practitioner* or (primary care N2 practitioner*) or surgeon*)
Database - ERIC
S35TI(nurse* or nursing) OR AB(nurse* or nursing)
Database - ERIC
S36TI(hospital or ambulance) OR AB(hospital or ambulance)
Database - ERIC
S37TI((intensive N2 care) or ICU) OR AB((intensive N2 care) or ICU)
Database - ERIC
S38TI(allied health* N2 (personnel* or profession* or worker* or practitioner* or provider* or staff)) OR AB(allied health* N2 (personnel* or profession* or worker* or practitioner* or provider* or staff))
Database - ERIC
S39TI(psychologist* or psychotherapist* or psychiatrist* or mental health clinician* or mental health profession* or mental health worker*) OR AB(psychologist* or psychotherapist* or psychiatrist* or mental health clinician* or mental health profession* or mental health worker*)
Database - ERIC
S40TI(social worker*) OR AB(social worker*)
Database - ERIC
S41TI(paramedic* or para-medic* or ambulance) OR AB(paramedic* or para-medic* or ambulance)
Database - ERIC
S42TI(first or emergency or disaster) N1 (response or responder*)) OR AB(first or emergency or disaster) N1 (response or responder*))
Database - ERIC
S43TI(professional N1 (caregiver* or care-giver*)) OR AB(professional N1 (caregiver* or care-giver*))
Database - ERIC
S44TI (physical therapist* or physiotherapist* or occupational therapist* or recreational therapist* or music therapist* or art therapist* or dietitian* or nutritionist* or ((speech and language) N1 therapist*) or speech pathologist* or audiologist* or exercise physiologist* or osteopath* or sonographer* or radiographer* or radiotherapist* or ((radiology or radiation) N1 (therapist* or technician* or technologist* or assistant* or scientist*)) or respiratory therapist* or ((anesthesia or anesthesiologist) N1 (technician* or assistant*)) or dental hygienist* or (surgical N1 (technician* or technologist*)) or orthotist* or orthoptist* or podiatrist* or perfusionist*) OR AB (physical therapist* or physiotherapist* or occupational therapist* or recreational therapist* or music therapist* or art therapist* or dietitian* or nutritionist* or ((speech and language) N1 therapist*) or speech pathologist* or audiologist* or exercise physiologist* or osteopath* or sonographer* or radiographer* or radiotherapist* or ((radiology or radiation) N1 (therapist* or technician* or technologist* or assistant* or scientist*)) or respiratory therapist* or ((anesthesia or anesthesiologist) N1 (technician* or assistant*)) or dental hygienist* or (surgical N1 (technician* or technologist*)) or orthotist* or orthoptist* or podiatrist* or perfusionist*)
Database - ERIC
S45TI(counsel*or*) OR AB(counsel*or*)
S46TI((clinical OR medical*) N1 (technician* or technologist* or assistant* or scientist*)) OR AB((clinical OR medical*) N1 (technician* or technologist* or assistant* or scientist*))
Database - ERIC
S47TI(public health service* or public health agenc*) OR AB(public health service* or public health agenc*)
Database - ERIC
S48TI(secondary trauma* or (work* N2 trauma survivor*)) OR AB(secondary trauma* or (work* N2 trauma survivor*))
Database - ERIC
S49TI (nursing or medical or midwifery OR premedical or paramedic or psychology or physical therapy or occupational therapy) N2 student*) OR AB (nursing or medical or midwifery OR premedical or paramedic or psychology or physical therapy or occupational therapy) N2 student*)
Database - ERIC
S50TI(college student*) OR AB(college student*)
Database - ERIC

S51TI((nurs* N1 graduate*) or (nurs* N1 education) or (medic* N1 train*)) OR AB((nurs* N1 graduate*) or (nurs* N1 education) or (medic* N1 train*))
Database - ERIC
S52S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51
Database - ERIC
S53S28 AND S52
Database - ERIC
S54DE "Meta Analysis" OR DE "Evaluation Research" OR DE "Control Groups" OR DE "Experimental Groups" OR DE "Longitudinal Studies" OR DE "Followup Studies" OR DE "Program Effectiveness" OR DE "Program Evaluation"
Database - ERIC
S55(random* or trial* or group or experiment* or PROSPECTIVE* OR longitudinal or BLIND* or CONTROL* or treatment as usual or TAU)
Database - ERIC
S56S54 OR S55
Database - ERIC
S57S53 AND S56
Database - ERIC

Current Controlled Trials (now ISRCTN registry; www.isrctn.com)

Searched 24 June 2019 [33 records]

Text search:
(((((resilience OR hardiness OR "posttraumatic growth" OR stress OR trauma) AND (psychotherap OR relaxation OR mindfulness OR coaching OR "positive psychology" OR reappraisal OR "stress inoculation" OR "stress management" OR multimodal OR "health promotion")) OR ((resilience OR hardiness) AND (training OR program OR intervention OR promot OR prevent OR enhanc OR learn OR teach OR educat OR increas or develop OR manag OR therap OR protocol OR treat)))) AND ("health personnel" OR "health professional" OR "health worker" OR "health practitioner" OR "health provider" OR "health staff" OR students OR "human service professional"))
Date assigned from 01/10/2016 to 24/06/2019

ClinicalTrials.gov (clinicaltrials.gov)

Searched 24 June 2019 [147 records]

Condition or disease = resilience OR hardiness OR posttraumatic growth OR stress OR trauma
Other terms = health personnel OR health professional OR health worker OR health practitioner OR health provider OR health staff OR students OR human service professional
Study type: Interventional studies (clinical trials)
Intervention/treatment: resilience training OR hardiness training OR psychotherapy OR relaxation OR mindfulness OR coaching OR positive psychology OR reappraisal OR stress inoculation OR stress management OR multimodal OR health promotion Title or acronym: resilience OR hardiness OR posttraumatic growth OR stress OR trauma
Study start: 01/10/2016 to 24/06/2019

WHO ICTRP (apps.who.int/trialsearch)

Searched 24 June 2019 [145 records]

title = health personnel OR health professional OR health worker OR health practitioner OR health provider OR health staff OR students OR human service professional
intervention = resilience OR hardiness OR posttraumatic growth OR stress OR trauma OR psychotherapy OR relaxation OR mindfulness OR coaching OR positive psychology OR reappraisal OR stress inoculation OR stress management OR multimodal OR health promotion
Recruitment status: ALL
Date of registration: 01/10/2016 – 24/06/2019

Appendix 10. Data collection/extraction sheet (items according to Li 2019)

Source	• Study ID (created by review author) • Report ID (created by review author) • Review author ID (created by review author) • Citation and contact detail
Eligibility	• Confirm eligibility for review

(Continued)

	• Reason for exclusion

Methods	• Study design
	• Total study duration
	• Sequence generation[a]
	• Allocation sequence concealment[a]
	• Blinding[a]
	• Other concerns about bias:[a]
	  ○ analyses to assure baseline comparability of groups for sociodemographic characteristics and outcomes of interest; and
	  ○ selection of comparison group

Participants	• Total number • Setting • Diagnostic criteria • Age • Sex • Country • Comorbidity • Sociodemographics • Date of study

Interventions	• Total number of intervention groups
	• For each intervention and comparison group of interest:
	  ○ specific intervention; and
	  ○ intervention details (sufficient for replication, if feasible)

Outcomes	• Outcomes and time points (1) collected; (2) reported[a]
	• For each outcome of interest:
	  ○ outcome definition (with diagnostic criteria, if relevant)
	  ○ unit of measurement (if relevant)
	• For scales: upper and lower limits and whether high or low score is good

Results	• Number of participants allocated to each intervention group
	• For each outcome of interest:
	  ○ sample size
	  ○ missing participants[a]
	  ○ summary data for each intervention group (e.g. means and SDs for continuous data at baseline and any time point after treatment; change);
	  ○ estimate of effect with standard error, 95% CI and P value
	  ○ subgroup analyses
	• Potential adverse effects

Miscellaneous aspects	• Funding source • Declaration of interests for the primary investigators • Key conclusions of the study authors • Miscellaneous comments from the study authors • References to other relevant studies • Correspondence required • Miscellaneous outcomes by the review authors

CI: confidence interval;**ID:** identifier; **SD:** standard deviation.

Footnotes

[a]Full description required for standard items in 'Risk of bias' tool.

Appendix 11. Criteria for 'Risk of bias' assessment in included RCTs (according to Higgins 2011a)

Item	Judgment	Description
1. Random sequence generation (selection bias). We described the method used to generate the allocation sequence in sufficient detail for each included trial to allow an assessment of whether it should have produced comparable groups	Low risk	The investigators described a random component in the sequence generation process such as: • random-number table; • computer random-number generator; • coin tossing; • shuffling cards or envelopes; • throwing dice; • drawing of lots; or • minimisation.* *Minimisation may be implemented without a random element (treatment sums are equal), and this is considered to be equivalent to being random

	High risk	The researchers described a (systematic or non-systematic) non-random component in the sequence generation process such as:
		• systematic, non-random approach
		  ◦ generating the sequence by, for example:
		  ◦ odd or even date of birth;
		  ◦ date (or day) of admission;
		  ◦ hospital or clinic record number; or
		  ◦ alternation.
		• non-systematic, non-random approach
		  ◦ allocating the participant by, for example:
		  ◦ judgement of the clinician;
		  ◦ preference of the participant;
		  ◦ results of a laboratory test or a series of tests; or
		  ◦ availability of the intervention.

	Unclear risk	Insufficient information provided to permit a judgement of 'Low risk' or 'High risk'.
2. Allocation concealment (selection bias). For each RCT we described the method used to conceal the allocation sequence in sufficient detail to determine whether intervention allocations could have been foreseen in advance of, or during, enrolment	Low risk	Participants and investigators enrolling participants could not have foreseen assignment because one of the following, or an equivalent method, was used to conceal allocation: • central allocation (including telephone, web-based and pharmacy-controlled randomisation); • sequentially-numbered drug containers of identical appearance; or • sequentially-numbered, opaque, sealed envelopes
	High risk	Participants or investigators enrolling participants could possibly have foreseen assignment and thus introduced selection bias because one of the following methods was used:

(Continued)

		• open random allocation schedule (e.g. a list of random numbers); • assignment envelopes without appropriate safeguards (e.g. if envelopes were unsealed or non-opaque or not sequentially numbered); • alternation or rotation; • date of birth; • case record number; or • any other explicitly unconcealed procedure.
	Unclear risk	Insufficient information was provided to permit a judgement of 'Low risk' or 'High risk'. This was usually the case if the method of concealment was not described or not described in sufficient detail to allow a definite judgement (e.g. if the use of assignment envelopes was described, but it remained unclear whether envelopes were sequentially numbered, opaque and sealed)
3. Blinding of participants and personnel (performance bias): objective outcomes. For each included trial we described all methods used to blind trial participants and personnel from knowledge of which intervention a participant received. We provided any information relating to whether the intended blinding was effective. We assessed blinding separately for different classes of outcomes. Outcomes were divided into objective (e.g. cortisol) and subjective (e.g. self-reported resilience and other psychological outcomes). We considered the same outcomes at different time points	Low risk	Any one of the following: • no blinding or incomplete blinding, but the review authors judged that the outcome was not likely to have been influenced by lack of blinding; or • blinding of participants and key study personnel ensured, and unlikely that the blinding could have been broken
4. Blinding of participants and personnel (performance bias): subjective outcomes. For each included trial we described all methods used to blind trial participants and personnel from knowledge of which intervention a participant received. We provided any information relating to whether the intended blinding was effective. We assessed blinding separately for different classes of outcomes. Outcomes were divided into objective (e.g. cortisol) and subjective (e.g. self-reported resilience and other psychological outcomes). We considered the same outcomes at different time points	Low risk	Blinding of participants and intervention providers, and unlikely that the blinding could have been broken
	High risk	Any one of the following: • no blinding or incomplete blinding, and the outcome was likely to have been influenced by lack of blinding; or • blinding of key study participants and personnel attempted, but likely that the blinding could have been broken; and the outcome was likely to have been influenced by the lack of blinding
	Unclear risk	Insufficient information provided to permit a judgement of 'Low risk' or 'High risk'
5. Blinding of outcome assessors (detection bias): objective outcomes. For each included trial we described all methods used to blind	Low risk	Any one of the following:

(Continued)

outcome assessors from knowledge of which intervention a participant received. We provided any information relating to whether the intended blinding was effective. We assessed blinding separately for different classes of outcomes. Outcomes were divided into objective (e.g. cortisol) and subjective (e.g. self-reported resilience and other psychological outcomes). We considered the same outcomes at different time points		• no blinding of outcome assessment, but the review authors judged that the outcome measurement was not likely to have been influenced by lack of blinding; or • blinding of outcome assessment ensured, and unlikely that the blinding could have been broken
6. Blinding of outcome assessors (detection bias): subjective outcomes. For each included trial we described all methods used to blind outcome assessors from knowledge of which intervention a participant received. We provided any information relating to whether the intended blinding was effective. We assessed blinding separately for different classes of outcomes. Outcomes were divided into objective (e.g. cortisol) and subjective (e.g. self-reported resilience and other psychological outcomes). We considered the same outcomes at different time points	Low risk	Any one of the following: • no blinding of outcome assessment, but the review authors judged that the outcome measurement was not likely to have been influenced by lack of blinding; or • blinding of outcome assessment ensured, and unlikely that the blinding could have been broken
	High risk	Any one of the following: • no blinding of outcome assessment, and the outcome measurement was likely to have been influenced by lack of blinding; or • blinding of outcome assessment, but likely that the blinding could have been broken, and the outcome measurement is likely to have been influenced by lack of blinding
	Unclear risk	Insufficient information provided to permit a judgment of 'Low risk' or 'High risk'
7. Incomplete outcome data (attrition bias). For each RCT we described the completeness of outcome data for each main outcome, including attrition and exclusions from the analysis. We stated whether attrition and exclusions were reported, the numbers included at each stage (compared with the total number of participants randomised), reasons for attrition or exclusions (where reported), and whether missing data were balanced across groups or were related to outcomes. Where sufficient data were reported, or could be provided by the study authors, we re-included the missing data in the analyses	Low risk	Any one of the following: • no missing outcome data; • reasons for missing outcome data were unlikely to be related to true outcome (for survival data, censoring unlikely to be introducing bias); • missing outcome data balanced in numbers across intervention groups, with similar reasons for missing data across groups; • for dichotomous outcome data, the proportion of missing outcomes compared with observed event risk was not enough to have a clinically-relevant impact on the intervention effect estimate; • for continuous outcome data, plausible effect size (difference in means or standardised difference in means) among missing outcomes was not enough to have a clinically-relevant impact on the observed effect size; • missing data were imputed using appropriate methods; or • intention-to-treat; all randomised participants were analysed in the group to which they were allocated by randomisation, irrespective of noncompliance and co-interventions
	High risk	Any one of the following: • reasons for missing outcome data were likely to be related to true outcome, with either imbalance in numbers or reasons for missing data across intervention groups;

(Continued)

		• for dichotomous outcome data, the proportion of missing outcomes compared with observed event risk was enough to induce clinically-relevant bias in the intervention effect estimate; • for continuous outcome data, plausible effect size (difference in means or standardised difference in means) among missing outcomes was enough to induce clinically-relevant bias in observed effect size; • potentially inappropriate application of simple imputation; or • 'as-treated' analysis done with substantial departure of the intervention received from that assigned at randomisation
	Unclear risk	Insufficient reporting of attrition or exclusions to permit a judgement of 'Low risk' or 'High risk' (e.g. number randomised not stated, no reasons for missing data provided, number of dropouts not reported for each group)
8. Selective outcome reporting (reporting bias). For each included trial we described how the possibility of selective outcome reporting was examined, and what was found	Low risk	Any one of the following: • the study protocol was available and all of the study's prespecified (primary and secondary) outcomes that were of interest in the review have been reported in the prespecified way; or • the study protocol was not available, but it was clear that the published reports included all expected outcomes, including those that were prespecified (convincing text of this nature may be uncommon)
	High risk	Any one of the following: • not all of the study's prespecified primary outcomes have been reported; • one or more primary outcomes were reported using measurements, analysis methods or subsets of the data (e.g. subscales) that were not prespecified; • one or more reported primary outcomes were not prespecified (unless clear justification for their reporting was provided such as an unexpected adverse effect); • one or more outcomes of interest in the review were reported incompletely so that they could not be entered in a meta-analysis; or • the study report failed to include results for a key outcome that was expected to have been reported for such a study
	Unclear risk	Insufficient information provided to permit a judgement of 'Low risk' or 'High risk.

RCT(s): randomised controlled trial(s)

Appendix 12. Detailed results of both searches

Using the original search strategy (Appendix 8), our database searches retrieved 32,184 records (including 1601 from trials registers). We found an additional 100 records by searching other resources. Following de-duplication, we screened the remaining 20,410 records by title and abstract. We deemed 18,116 records to be irrelevant and sought the full texts of the remaining 2294 records for further assessment. In terms of title/abstract screening, a good agreement (kappa = 0.70) between review authors was achieved.

We retrieved 2294 full text reports. Based on the original eligibility criteria of this review (see Differences between protocol and review), 251 studies met the inclusion criteria. We identified 18 ongoing studies and 46 studies awaiting classification (in total: 315 studies from 376 reports). We excluded 1918 reports as irrelevant (Excluded studies). The full text screening for the first search resulted in excellent inter-rater reliability (kappa = 0.95). After revising the eligibility criteria to focus on healthcare professionals based on a broad definition of this

target group (including healthcare students; see Differences between protocol and review), we re-assessed the studies found by the initial screening. From these, we identified 49 studies that were performed in any of these groups. We also identified one ongoing study and 10 studies awaiting classification. Finally, after revising the eligibility criteria to focus on **healthcare students**, we also reassessed these 60 studies. From these, we identified 15 studies that fulfilled our inclusion criteria (Criteria for considering studies for this review). We also identified 10 studies awaiting classification (see Studies awaiting classification). The results of the original search are presented in Figure 4.

Figure 4. Study flow diagram for first searches (January 1990 to October 2016). [a]One ongoing study in the box above is now awaiting classification.

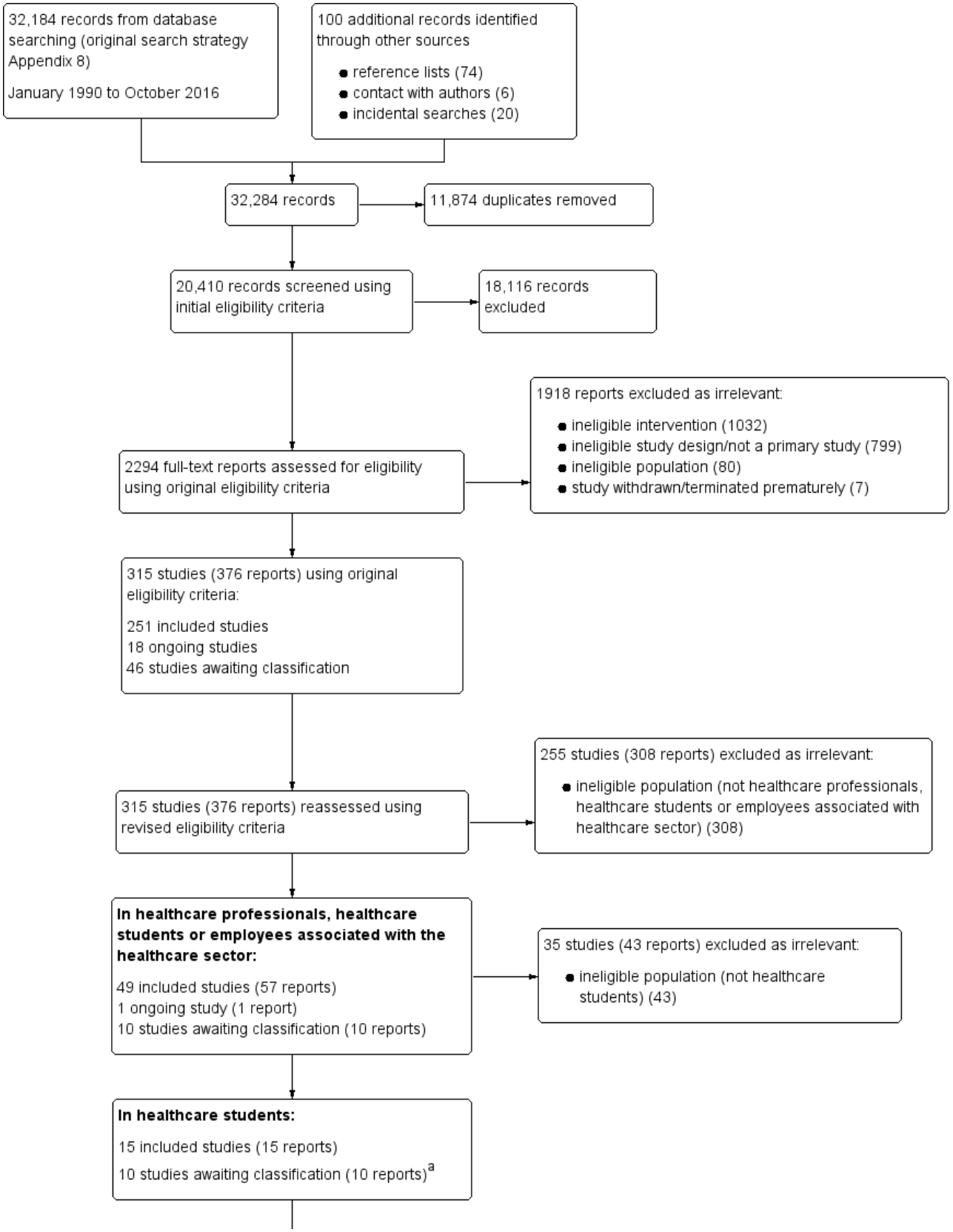
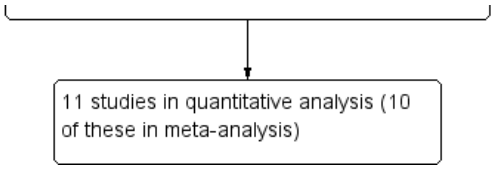
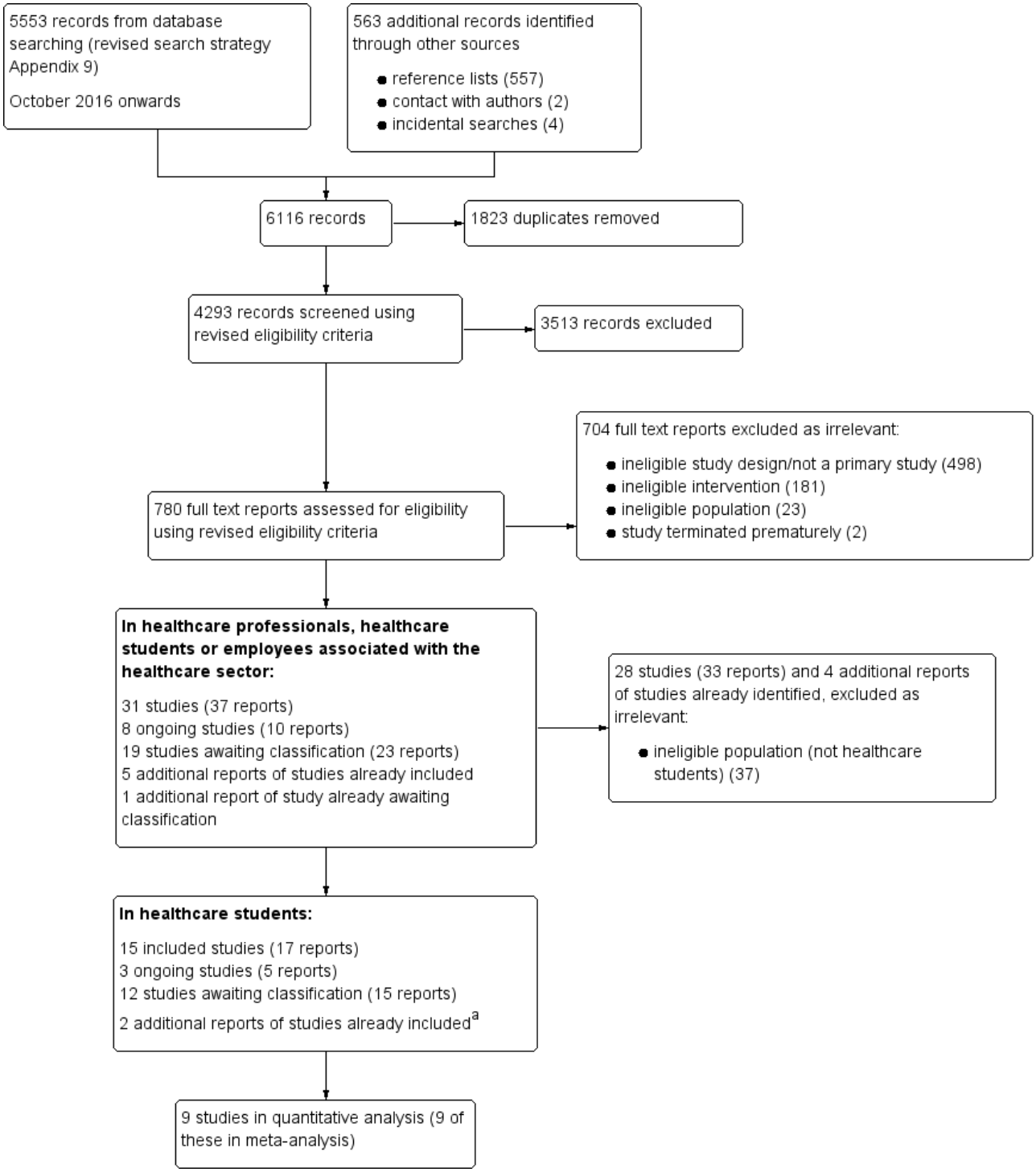


Figure 4. (Continued)



From 2016 onwards, we refined our search strategy to focus broadly on the healthcare sector (including healthcare students; Appendix 9). The searches yielded 6116 records (5553 + 563). Based on these broad criteria, we identified six additional reports of studies identified by earlier searches. We newly identified 31 studies, eight ongoing studies and 19 studies awaiting classification. We re-assessed these 58 studies according to the narrower population which is the focus of this review (healthcare students only). From these, we identified 15 studies that fulfilled our inclusion criteria. We also identified three ongoing studies and 12 studies awaiting classification. The full text screening for the top-up searches also resulted in excellent inter-rater reliability (kappa = 1). The results of the top-up searches are presented in Figure 5.

Figure 5. Study flow diagram for second searches (October 2016 onwards).
[a]Peng 2014; Galante 2018.



Appendix 13. References concerning the description of included studies

Key characteristic	Number of studies with respective references

(Continued)

Location	• USA: 11 studies (Chen 2018a; Delaney 2016; Erogul 2014; Goldstein 2019; Houston 2017; Kelleher 2018; Mejia-Downs 2016; Miu 2016; Mueller 2018; Stephens 2012; Venieris 2017) • Canada: 4 studies (Anderson 2017; Porter 2008; Waddell 2005; Waddell 2015) • Iran: 3 studies (Akbari 2017; Sahranavard 2018; Samouei 2015) • Australia: 2 studies (Barry 2019; Warnecke 2011) • Germany: 2 studies (Kötter 2016; Victor 2018) • China: 2 studies (Peng 2014; Wang 2012) • UK: 2 studies (Galante 2018; ISRCTN64217625) • Belgium: 1 study (Geschwind 2015) • India: 1 study (Mathad 2017) • Switzerland: 1 study (Recabarren 2019) • The Netherlands: 1 study (Smeets 2014)
Settings (venue or implementation sites of interventions)	• University or schools (e.g. nursing school, school of medicine): 11 studies (Akbari 2017; Erogul 2014; Houston 2017; Galante 2018; Mejia-Downs 2016; Porter 2008; Samouei 2015; Smeets 2014; Victor 2018; Waddell 2005; Waddell 2015) • Intervention site not further specified: 9 studies (Chen 2018a; Goldstein 2019; Kelleher 2018; Kötter 2016; Mathad 2017; Peng 2014; Recabarren 2019; Sahranavard 2018; Wang 2012) • Online or mobile interventions with no concrete venue: 4 studies (Anderson 2017; Mueller 2018; Stephens 2012; Venieris 2017) • Laboratory: 3 studies (Delaney 2016; Geschwind 2015; Miu 2016) • Home setting (using a spoken compact disc (CD)): 2 studies (Barry 2019; Warnecke 2011) • Mixed setting (online training plus face-to-face sessions with implementation site not further specified): 1 study (ISRCTN64217625)
Participants - number randomised	• 100 or more participants: 8 studies (Anderson 2017; Galante 2018; Houston 2017; Kötter 2016; Mathad 2017; Miu 2016; Venieris 2017; Waddell 2015) • 30 participants or fewer: 5 studies (Akbari 2017; Chen 2018a; Porter 2008; Sahranavard 2018; Waddell 2005)
Participants - age	• 3 studies reporting only age range: included participants between 18 and 40 years (Houston 2017: 18 to 23 years; Waddell 2005: 20 to 40 years; Waddell 2015: 18 to 22 years) • Alternative information on age: Galante 2018 and Delaney 2016 considered participants aged 17 or 18 years and above, respectively • Age of the sample not further specified or is unclear: 6 studies (Chen 2018a; ISRCTN64217625; Kelleher 2018; Mejia-Downs 2016; Miu 2016; Samouei 2015)

Participants - sex	• Women outnumbered men: 7 studies conducted solely in healthcare students (Akbari 2017; Kötter 2016; Miu 2016; Stephens 2012; Waddell 2015; Wang 2012; Warnecke 2011)
	• Men outnumbered women: 6 studies (Anderson 2017; Delaney 2016; Erogul 2014; Mueller 2018; Peng 2014; Porter 2008)
	• Only women: 3 studies (Mathad 2017; Sahranavard 2018; Smeets 2014)
	• Sex unclear: 6 studies (Chen 2018a; ISRCTN64217625; Kelleher 2018; Mejia-Downs 2016; Samouei 2015; Waddell 2005)
	• Studies with mixed samples (8 studies):
	  ◦ Women outnumbered men: 7 studies (Barry 2019; Galante 2018; Goldstein 2019; Houston 2017; Recabarren 2019; Venieris 2017; Victor 2018)
	  ◦ Only women: 1 study (Geschwind 2015)

Participants - target group	• Nursing or midwifery students: 8 studies (Akbari 2017; Chen 2018a; Delaney 2016; Kelleher 2018; Mathad 2017; Stephens 2012; Waddell 2005; Waddell 2015) • Medical students: 7 studies (Erogul 2014; Kötter 2016; Peng 2014; Sahranavard 2018; Samouei 2015; Wang 2012; Warnecke 2011) • Paramedic students: 3 studies (Anderson 2017; Porter 2008; ISRCTN64217625) • Psychology students: 2 studies (Miu 2016; Smeets 2014)

(Continued)

	• Physical therapy students: 2 studies (Mejia-Downs 2016; Mueller 2018) • Studies with mixed samples(i.e. healthcare students combined with other individuals such as volunteers or students in other fields): 8 studies (Barry 2019; Galante 2018; Geschwind 2015; Goldstein 2019; Houston 2017; Recabarren 2019; Venieris 2017; Victor 2018). Relevant subgroups within these studies: university students (Goldstein 2019; Houston 2017); doctoral candidates in different health fields (Barry 2019); psychology students (Geschwind 2015; Recabarren 2019; Victor 2018); 'Clinical medicine' and 'Humanities and social sciences' students (p e76; Galante 2018); students in 'Health & Wellness' and 'Social and Behavioral Sciences' (p 146; Venieris 2017)

Participants - mental health assessment at baseline	• Mental health assessment at baseline: 12 studies (Barry 2019; Galante 2018; Goldstein 2019; Houston 2017; Kötter 2016; Miu 2016; Porter 2008; Recabarren 2019; Sahranavard 2018; Victor 2018; Wang 2012; Warnecke 2011). All studies measuring mental health used self-report (screening) measures covering one or a small number of mental dysfunctions (e.g. Beck Depression Inventory-II (BDI-II) in Recabarren 2019; Symptom Checklist-90-R (SCL-90-R) in Porter 2008; Depression Anxiety and Stress Scales (DASS) in Barry 2019; General Anxiety Disorder - 7 (GAD-7) in Houston 2017; Brief Symptom Inventory - 18 (BSI-18) in Victor 2018). Of these, only one study also conducted comprehensive baseline diagnostics by the use of a structured interview (Mini-International Neuropsychiatric Interview; MINI) (Recabarren 2019)
	• No data about the mental health status of the sample: 17 studies (Akbari 2017; Anderson 2017; Chen 2018a; Delaney 2016; Erogul 2014; Geschwind 2015; Kelleher 2018; Mathad 2017; Mejia-Downs 2016; Mueller 2018; Peng 2014; Samouei 2015; Smeets 2014; Stephens 2012; Venieris 2017; Waddell 2005; Waddell 2015)
	• Unclear mental health status despite baseline assessment: 1 unpublished trial (ISRCTN64217625) and 1 study published as conference abstract (Goldstein 2019)
	• Eligibility criteria concerning mental health:
	  ◦ participants without mental health problems: 8 studies; only mentally healthy participants (Akbari 2017; Recabarren 2019), participants without severe psychiatric illness (not further specified; Mathad 2017), participants showing symptoms below a cut-off on a screening instrument (Barry 2019; Wang 2012; Warnecke 2011) or participants without certain mental disorders or suicidality (e.g. bipolar disorder, psychosis; Miu 2016; Victor 2018). Since Victor 2018 focused on burdened students, they included participants with a symptom burden ≥ 4 on the Global Severity Index of the BSI-18
	  ◦ participants with mental health problems: 1 study (Wang 2012), considered only participants with a mental health crisis

Intervention - setting	• Group setting: 17 studies (Akbari 2017; Delaney 2016; Erogul 2014; Galante 2018; Goldstein 2019; Houston 2017; Kelleher 2018; Mathad 2017; Mejia-Downs 2016; Peng 2014; Porter 2008; Recabarren 2019; Sahranavard 2018; Samouei 2015; Smeets 2014; Waddell 2015; Wang 2012) • Individual setting: 7 studies (Anderson 2017; Barry 2019; Geschwind 2015; Mueller 2018; Venieris 2017; Victor 2018; Warnecke 2011) • Variety of training settings: 4 studies (ISRCTN64217625; Kötter 2016; Stephens 2012; Waddell 2005) • Unclear setting: 2 studies (Chen 2018a; Miu 2016)
Intervention - delivery format	• Face-to-face: 17 studies (Akbari 2017; Chen 2018a; Delaney 2016; Erogul 2014; Galante 2018; Goldstein 2019; Houston 2017; Kelleher 2018; Mathad 2017; Mejia-Downs 2016; Peng 2014; Porter 2008; Sahranavard 2018; Samouei 2015; Victor 2018; Waddell 2015; Wang 2012) • Multimodal delivery: 5 studies (e.g. face-to-face group session and internet-based training; ISRCTN64217625; Kötter 2016; Recabarren 2019; Smeets 2014; Waddell 2005) • Online or mobile-based: 4 studies (Anderson 2017; Mueller 2018; Stephens 2012; Venieris 2017) • Laboratory setting and unlikely with face-to-face contact: 2 studies (Geschwind 2015; Miu 2016) • Audio format: 2 studies (Barry 2019; Warnecke 2011)
Intervention - training intensity	• High intensity (> 12 hours or > 12 sessions): 11 studies (Akbari 2017; Erogul 2014; Goldstein 2019; Mathad 2017; Peng 2014; Porter 2008; Recabarren 2019; Samouei 2015; Waddell 2015; Wang 2012; Warnecke 2011)

(Continued)

	• Low intensity (i.e. ≤ 5 hours or ≤ 3 sessions): 10 studies (Chen 2018a; Delaney 2016; Geschwind 2015; Houston 2017; Kelleher 2018; Kötter 2016; Miu 2016; Smeets 2014; Stephens 2012; Victor 2018) • Moderate intensity (i.e. > 5 hours to ≤ 12 hours or > 3 sessions to ≤ 12 sessions): 7 studies (Anderson 2017; Galante 2018; ISRCTN64217625; Mejia-Downs 2016; Mueller 2018; Sahranavard 2018; Waddell 2005) • Unclear intensity: 2 studies (Barry 2019; Venieris 2017)
Intervention - theoretical foundation	See Appendix 14
Comparator	• Wait-list control groups: 10 studies (Chen 2018a; Kelleher 2018; Mathad 2017; Mejia-Downs 2016; Mueller 2018; Peng 2014; Recabarren 2019; Sahranavard 2018; Venieris 2017; Victor 2018) • No intervention control: 7 studies (Akbari 2017; Barry 2019; Erogul 2014; Houston 2017; Kötter 2016; Porter 2008; Waddell 2005) • Attention control: 6 studies (Geschwind 2015; Goldstein 2019; Miu 2016; Smeets 2014; Stephens 2012; Victor 2018 (second CG)) • Active control: 3 studies (Delaney 2016; Samouei 2015; ISRCTN64217625) • TAU: 3 studies (Galante 2018; Waddell 2015; Warnecke 2011) • Control group not further specified: 2 studies (Anderson 2017; Wang 2012)

Funding sources	• Universities (e.g. certain faculties, medical schools) and university research funds: 6 studies (Akbari 2017; Barry 2019; Kötter 2016; Mejia-Downs 2016; Porter 2008; Recabarren 2019)
	• Different foundations: 2 studies (Erogul 2014; Peng 2014)
	• Different research grants: 2 studies (Geschwind 2015; Warnecke 2011)
	• Nursing organization Sigma theta Tau: 2 studies (Delaney 2016; Stephens 2012)
	• Scholarship: 1 study (Waddell 2005)
	• Graduate and Professional Student Association: 1 study (Venieris 2017)
	• US Substance Abuse and Mental Health Services Administration through a university's Disaster and Community Crisis Center: 1 study (Houston 2017)
	• Social Sciences and Humanities Council: 1 study (Waddell 2015)
	• Combination of funding resources (4 studies):
	  ◦ Canadian Mental Health Association, Campus Capacity Development Grant and Justice Institute of British Columbia: 1 study (Anderson 2017)
	  ◦ University, National Institute for Health Research Collaboration and Care East England: 1 study (Galante 2018)
	  ◦ Award and graduate research fellowship: 1 study (Goldstein 2019)
	  ◦ University and charity: 1 study (ISRCTN64217625)
	• Funding sources not specified/not retrievable:
	  ◦ not specified: 5 studies (Mathad 2017; Miu 2016; Smeets 2014; Victor 2018; Wang 2012)
	  ◦ could not be retrieved from the available information (e.g. conference abstract): 2 studies (Chen 2018a; Kelleher 2018)
	• No funding support: 3 studies (Mueller 2018; Samouei 2015; Sahranavard 2018)

Appendix 14. Intervention content depending on theoretical foundation

Theoretical foundation (number of studies)	Studies	Characteristics of studies within theoretical foundation	Intervention content

(Continued)

Mindfulness-based resilience interventions (8)	Barry 2019; Chen 2018a; Erogul 2014; Galante 2018; Kelleher 2018; Samouei 2015; Smeets 2014; Warnecke 2011	• Training programmes were largely delivered face-to-face (Chen 2018a; Erogul 2014; Galante 2018; Kelleher 2018; Samouei 2015) or included face-to-face elements (Smeets 2014). Two interventions used an audio format, with a recorded mindfulness practice on a CD, in individual setting (Barry 2019; Warnecke 2011) • All studies reported having a homework component as part of the intervention (e.g. daily meditations with narrated guidance) • Due to the nature of the intervention (audio format), the guided mindfulness practice in Barry 2019 and Warnecke 2011 was delivered in a home setting and required daily practices anyway. In Smeets 2014, participants were given an intervention booklet • Intervention length varied from three weeks (Smeets 2014), to four weekly sessions with daily practice (Chen 2018a; Kelleher 2018), to eight weeks of self-guided daily practice (Barry 2019; Warnecke 2011), and to eight weeks and a full-day retreat during this period (Erogul 2014). Besides Erogul 2014, two other studies also comprised eight weekly sessions that ranged from 60 to 120 minutes, combined with 20 minutes of daily homework (Galante 2018; Samouei 2015)	• Two training programmes were based on MBSR (Erogul 2014; Kelleher 2018), and two on a selected mindfulness practice (breath awareness) (Barry 2019; Warnecke 2011) • One study, Samouei 2015, taught several basic mindfulness skills such as concentrating on the present or mindful breathing • The Mindfulness Skills for Students intervention in Galante 2018, which was based on a mindfulness course book (Williams 2011), adopted flexibility often associated with MBSR and drew on two other mindful modalities (nonviolent communication, focusing) • We also considered the self-compassion intervention in Smeets 2014 as a mindfulness-based training programme because the study authors referred to mindfulness, which is viewed as one component of self-compassion (Neff 2003b) • Similarly, Chen 2018a examined a mindfulness-based compassion program with an emphasis on self-kindness • The mindfulness-based resilience interventions aimed to teach participants the principles of mindfulness (e.g. mindful awareness), and included the experiential practice of mindfulness meditations (e.g. body scan, breathing-based yoga), often in group settings, and sometimes combined with a mindfulness retreat (Erogul 2014). Participants were taught, for example, different strategies to connect with their bodies, thoughts and emotions, and to accept sensations (e.g. emotions) without judgement as well as to be more self-compassionate
Unspecific resilience interventions (7)	Akbari 2017; Anderson 2017; Houston 2017; Mathad 2017; Mejia-Downs 2016; Miu 2016; Stephens 2012	• Four interventions were delivered face-to-face in a group setting (Akbari 2017; Houston 2017; Mathad 2017; Mejia-Downs 2016), with the remaining training programmes conducted in a laboratory (Miu 2016), or delivered via	• In one study (Akbari 2017), the intervention was adopted from a program to create sage schools in the USA (Henderson 1996) • According to Houston 2017, the Resilience and Coping Intervention sessions were based on the "Listen to the Children" interview process, developed and implemented following the 1995 Oklahoma City bombing

(Continued)

		Twitter (Stephens 2012), or as an online (blended) programme (Anderson 2017) • Treatment duration ranged from six tweets on varying days and times (Stephens 2012), to a single intervention session (of approximately 25 minutes duration; Miu 2016), to a self-paced programme over two weeks (Anderson 2017) or to weekly sessions (e.g. 12 weekly 75-minute sessions; Akbari 2017). • Some of the interventions were combined with homework assignments (e.g. Akbari 2017; Mejia-Downs 2016) • Participants were followed-up at post-test or at short-term follow-up, and in one study, after the completion of a practical experience (Anderson 2017)	• The unspecific training programmes focused on, for example, defining resilience, identifying stressors (e.g. academic stress, future career concerns, time management challenges) and (emotional, physical) risks of medical work, recognising the symptoms of stress and trauma, strategies to enhance protective factors against stress, and strategies to manage self-talk, feelings and behaviour (e.g. self-awareness, support systems, coping strategies) • Some of the interventions concentrated on a specific problem shared by the group (e.g. Houston 2017) • One training programme included a yoga intervention with a monthly session and regular practice (e.g. yoga postures, breathing practices; Mathad 2017) • In one study, participants were asked to read and summarise an article that taught the 'changeability mindset' about one's own personality after confrontation with rejection or failure by presenting a personal anecdote and a scientific article about the potential to change one's personality (Miu 2016) • In Stephens 2012, participants could engage in twitter dialogue and choose to respond to tweets that referred to resilience factors, such as social support and positive emotions, for example

Combined resilience interventions (6)	Delaney 2016; Goldstein 2019; ISRCTN64217625; Kötter 2016; Recabarren 2019; Victor 2018	• Three of the combined resilience-training programmes were carried out face-to-face (Delaney 2016; Goldstein 2019; Victor 2018), whilst three were combined formats, with the intervention facilitated via face-to-face sessions and CDs or USB (universal serial bus) audio files (Kötter 2016; Recabarren 2019), or via online modules combined with face-to-face group sessions (ISRCTN64217625)
		• Participants were followed-up at post-intervention (all studies), at short-term follow-up (Delaney 2016; Goldstein 2019; Kötter 2016; Victor 2018) and at long-term follow-up in ISRCTN64217625
			• 2 studies based on mindfulness and CBT or cognitive therapy (ISRCTN64217625; Recabarren 2019):
			  ◦ ISRCTN64217625 examined an intervention based on the model of resilience by the charity Mind (Wild 2016), combined with a top-up training
			  ◦ Intervention length ranging from six sessions plus a one-hour top-up training in ISRCTN64217625 to eight two-hour sessions in Recabarren 2019
			  ◦ Face-to-face setting used in both studies, with Recabarren 2019 also involving materials on CD and ISRCTN64217625 including an internet-based component
			  ◦ The contents of both training programmes included training in mindfulness practices (e.g. awareness of breath meditation), the cognitive or CBT component in these studies involved, for example, cognitive restructuring (i.e. challenging negative thoughts and promoting cognitive reappraisal; e.g. Recabarren 2019)
			  ◦ Both interventions also focused on social skills (e.g. building social networks and social capital)
			  ◦ In addition, ISRCTN64217625 encouraged positive activities of participants. Recabarren 2019 (multidimensional stress intervention/prevention program), who also included contents related to emotion regulation, integrated techniques from the 'Freiburger Training gegen Leistungsstress' (Grolimund 2008) and RFSM-e-MOTION (RFSM: Réseau Fribourgeois de San-

(Continued)

té Mental, i.e. Fribourg Mental Health Network) (Salamin 2019) as validated approaches

- 4 combined training programmes that could not be clustered further (Delaney 2016; Goldstein 2019; Kötter 2016; Victor 2018):
  - Goldstein 2019 ('Your Enlightened Side' (YES-plus) intervention) tested an intervention using yogic breathing and an acceptance-based approach to stress-management (e.g. meditation, acceptance and social connectedness)
  - Victor 2018 combined strengths-based CBT, based on the personal model of resilience (PRM; Padesky 2012), with positive psychology, and focused on using existing resources and resilience strategies. In four steps, resilient emotions, thoughts, metaphors, images and behaviours were activated; resilience strategies worked out during training (e.g. ask for support, optimism), that could be used across different situations, were summarised in a PRM, which was then applied to the participant's specific problem areas. As homework, Victor 2018 also included behavioural experiments to encourage the participants to use the resilience strategies in different problem situations
  - The NURSE (Nurture nurse, Use resources, foster Resilience, Stress and Environment management) intervention in Delaney 2016 was based on Watson's theory of human caring (i.e. caring as science and caring relationships as foundational for nursing) and comprised breathing and mindfulness strategies along with simulation (i.e. debriefing and guided reflection) in order to promote (academic and personal) resources, such as social support, and to foster engaging in stress management (e.g. deep breathing, yoga)
  - The intervention investigated by Kötter 2016, a psycho-educative seminar plus resource-oriented coaching, combined psychological topics (e.g. emotional reactions towards stressors) with the wingwave technique (including elements of eye movement desensitization and reprocession, neurolinguistic programming techniques). Similarly to Delaney 2016, the coaching component in Kötter 2016 also focused on fostering individual stress management resources
  - All four interventions included face-to-face delivery, with Delaney 2016 being conducted in a laboratory and Kötter 2016 combining the face-to-face delivery with other formats (e.g. USB stick). Intervention length ranged from three hours plus daily practice (Kötter 2016) to 18 hours in total (Goldstein 2019)

Positive psychology (4)	Geschwind 2015; Mueller 2018; Venieris 2017; Wang 2012	• Mueller 2018 and Venieris 2017 used a self-guided online format (e.g. online educational system blackboard), while Geschwind 2015 tested	• Although named differently ('called to care' curriculum, Mueller 2018; positive psychology intervention, Venieris 2017; positive psychology-oriented group counselling, Wang 2012), three of the studies included similar positive psychology-informed contents such as positive cognition and perception,

(Continued)

		an individual-setting intervention in a laboratory and Wang 2012 examined a face-to-face (leader-led) group counselling sessions. Mueller 2018 asked participants to respond at least once to each training module on a discussion board that was monitored by the study authors • Treatment duration ranged from a 20-minute session (Geschwind 2015) to six weekly 2.5-hour sessions plus diary writing during the study period (Wang 2012) • Participants were followed-up at immediately post-intervention (e.g. after affect induction phase in Geschwind 2015) and at different short-term follow-up periods (e.g. between 20 minutes and three months)	emotional training (e.g. empathy, compassion), and making meaningful and high-quality interpersonal connections. In Venieris 2017, students were asked to choose activity from a list of five (e.g. three grateful things; positive support network message) and engage in each activity at least twice during the treatment period. Wang 2012 also included practical problem-solving and combined concepts of positive psychology and the ABC theory (activating event, belief, consequences). In addition, on a daily basis, participants were required to record positive awareness, positive experiences or related events in a diary • Compared to the other interventions, Geschwind 2015 investigated a low-intensity, positive affect induction (best possible self), with participants instructed to think about and subsequently write about a future in which everything goes well and in which they realise their dreams, and then to visualise this scenario for five minutes
Cognitive-behavioural therapy (3)	Peng 2014; Porter 2008; Sahranavard 2018	• All interventions included weekly sessions of a maximum of two hours and over a maximum of four months total duration (Porter 2008). In Porter 2008, participants received additional sessions prior to the beginning of full-time clinical placements • Healthcare students were followed-up at immediately post-intervention, and in case of Porter 2008, at approximately two months after training	• Interventions named as Penn Resilience Program (Peng 2014), psycho-educational group (Porter 2008) and stress-management-based cognitive-behavioural group treatment (Sahranavard 2018) • The training programmes aimed to improve cognitive behaviour and skills, with sessions focusing on the awareness of stress, the connection of thoughts and emotions, challenging irrational thinking and beliefs, cognitive training, self-esteem or self-confidence and social support (e.g. peer support), adaptive coping strategies to deal with stressful events (e.g. creation of personal stress management plan), and exercises for behaviour modification and problem-solving • Porter 2008 also promoted positive attitudes towards emotional expression whereas Sahranavard 2018 also included contents on study skills (e.g. time management), autogenic training and anger management
Coaching approaches (2)	Waddell 2005; Waddell 2015	• Both studies recruited nursing students from a baccalaureate nursing programme and assessed the impact of a career planning and development programme compared with TAU (Waddell 2015; see Comparators) or a no intervention control group (Waddell 2005)	• Following the career planning and development model (Donner 1998), interventions in both studies included the steps of scanning (e.g. become informed about work environment and future trends within and outside of healthcare sector), self-assessment and reality check (e.g. identify own values and strengths), creating a career vision, formulating a career plan, and discussion of marketing strategies

(Continued)

- The intervention involved three face-to-face working sessions of three hours and offered individual coaching (Waddell 2005) or comprised six face-to-face workshops at the beginning of each academic term over three years (Waddell 2015)
- Assessments were performed at post-test (Waddell 2015), at short-term follow-up (Waddell 2005) and probably also at long-term follow-up (Waddell 2015)

Appendix 15. Assessment of publication bias for the primary outcomes

Outcome, time point (number of included studies)	Assessment of publication bias
Resilience, post-intervention (9 studies)[a]	• We drew a funnel plot (see Effects of interventions and Appendix 16), which is rather symmetrical in shape and shows no clear visual evidence of asymmetry • No statistical evidence of asymmetry (see also Effects of interventions; Egger's test: t = −1.42, df = 7, P = 0.20) • Results of grey literature (Stephens 2012; no evidence of effect of positive direction) does not differ from other published studies (Barry 2019; Houston 2017), which also found no evidence of effect • Difficult to assess small-study effects due to lack of larger studies; but overestimation of effects in smaller studies unlikely, as the meta-analysis also included small studies with non-significant results (Erogul 2014; Mathad 2017; Peng 2014) • No relevant conflicts of interest for included studies during the study period
Anxiety, post-intervention (7 studies)[a]	• We drew a funnel plot (see Effects of interventions and Appendix 16), which is rather symmetrical in shape and provides no clear visual evidence of asymmetry • No statistical evidence of asymmetry (see also Effects of interventions; Egger's test: t = −1.61, df = 5, P = 0.17) • No grey literature that could have differed from published studies • Difficult to assess small-study effects due to lack of larger studies; but they are unlikely to be relevant here, since included studies (which had small sample sizes) found significant (Wang 2012) as well as non-significant results (Houston 2017) • One potential conflict of interest for one of the included studies disclosed. One of the researchers of Kötter 2016 is a certified coach of a coaching programme (wingwave®), which was tested in the study. There were no further relevant conflicts of interest for the other included studies[b] during the study period
Depression, post-intervention (6 studies)[a]	• We drew a funnel plot (see Effects of interventions and Appendix 16), which is rather symmetrical in shape and shows no clear visual evidence of asymmetry • No statistical evidence of asymmetry (see also Effects of interventions; Egger's test: t = −0.85, df = 4, P = 0.44) • No grey literature that could have differed from published studies

(Continued)

	• Difficult to assess small-study effects due to lack of larger studies; but overestimation of effects in smaller studies seems unlikely, as the meta-analysis included small studies with significant (Wang 2012) as well as non-significant results (Barry 2019; Recabarren 2019) • One potential conflict of interest for one of the included studies disclosed. One of the researchers of Kötter 2016 is a certified coach of a coaching programme (wingwave®), which was tested in the study. There were no further, relevant conflicts of interest for the other included studies[b] during the study period
Stress or stress perception, post-intervention (7 studies)[a]	• We drew a funnel plot (see Effects of interventions and Appendix 16), which is rather symmetrical in shape and provides no clear visual evidence of asymmetry • No statistical evidence of asymmetry (see also Effects of interventions; Egger's test: t = −1.55, df = 5, P = 0.18) • Results of grey literature (Stephens 2012; no evidence of effect of negative direction) does not differ from other published studies (Barry 2019; Houston 2017; Warnecke 2011), which also found no evidence of effect • Difficult to assess small-study effects due to lack of larger studies; but overestimation of effects in smaller studies seems unlikely, as the meta-analysis included small studies with significant (Erogul 2014) as well as non-significant results (Stephens 2012; Warnecke 2011) • One potential conflict of interest for one of the included studies disclosed. One of the researchers of Kötter 2016 is a certified coach of a coaching programme (wingwave®), which was tested in the study. There were no further, relevant conflicts of interest for the other included studies[b] during the study period
Well-being or quality of life, post-intervention (4 studies)[a]	• We drew a funnel plot (see Effects of interventions and Appendix 16), which is rather symmetrical in shape and shows no visual evidence of asymmetry • No statistical evidence of asymmetry (see also Effects of interventions; Egger's test: t = 0.12, df = 2, P = 0.91) • No grey literature that could have differed from published studies • Difficult to assess small-study effects due to lack of larger studies; but overestimation of effects in smaller studies seems unlikely, as the meta-analysis included small studies with significant (Wang 2012) as well as non-significant results (Mathad 2017; Recabarren 2019; Smeets 2014) • No relevant conflicts of interest for included studies during the study period

df: Degrees of freedom; **P:** P value of Egger's test; **t:** T value of Egger's test

Footnotes

[a]Despite there being fewer than 10 studies included in the meta-analysis, we drew a funnel plot and inspected it for asymmetry, and conducted Egger's test for the purpose of assessing the certainty of the evidence using the GRADE approach.
[b]According to the GRADE approach (Guyatt 2011e), publication bias should be suspected when available evidence comes from a number of small studies, most of which have been commercially funded or where there are perceived conflicts of interest.

Appendix 16. Funnel plots

In order to assess reporting bias and to examine potential funnel plot asymmetry (see Assessment of reporting biases), we drew contour-enhanced funnel plots for the comparison between resilience intervention and control for the five primary outcomes at post-test (see Effects of interventions and Appendix 15). We drew a contour-enhanced funnel plot for resilience at post-intervention (Figure 6), which is rather symmetrical in shape and shows no clear visual evidence of asymmetry. The same applies to the contour-enhanced funnel plot for anxiety at post-test (Figure 7). The contour-enhanced funnel plot for depression at post-test (Figure 8) is also rather symmetrical in shape and provides no visual evidence of asymmetry. We also found rather symmetrical, contour-enhanced funnel plots and no visual evidence of asymmetry for stress or stress perception at post-intervention (Figure 9) and well-being or quality of life (Figure 10).

Figure 6. Contour-enhanced funnel plot of comparison 1: Resilience intervention vs control, healthcare students, Resilience: post-intervention.

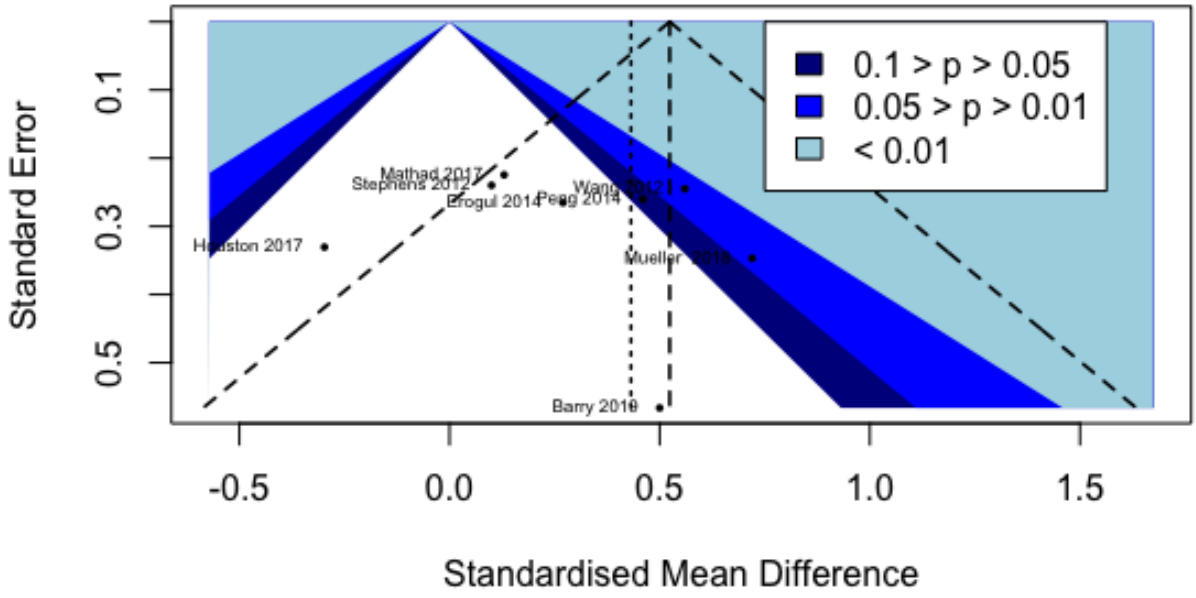


Figure 7. Contour-enhanced funnel plot of comparison 1: Resilience intervention vs control, healthcare students, Anxiety: post-intervention.

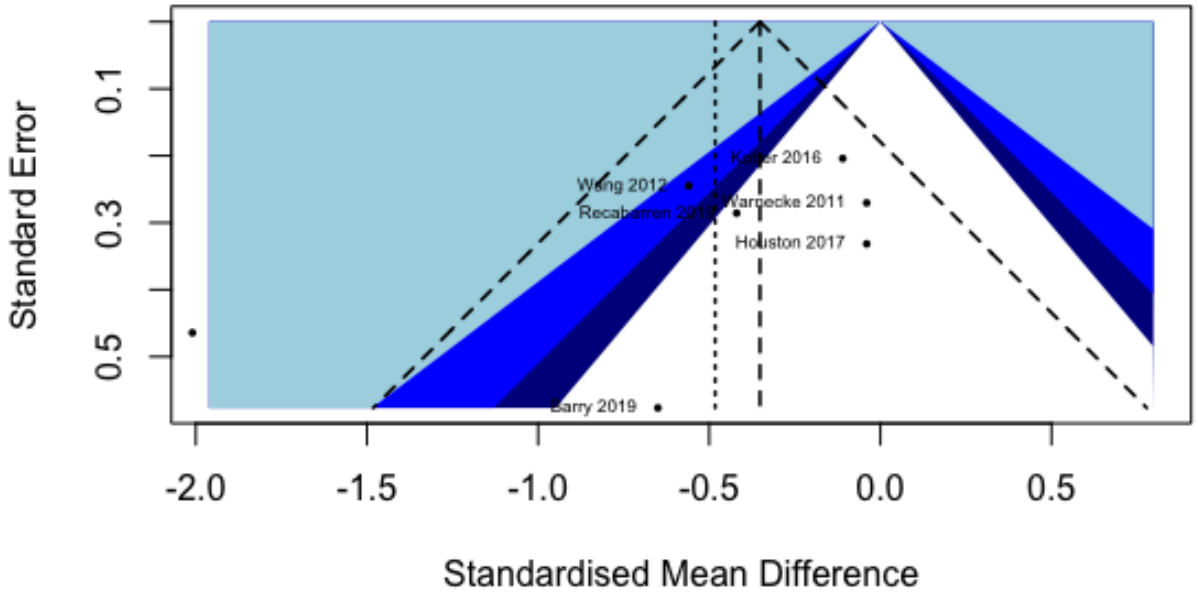


Figure 8. Contour-enhanced funnel plot of comparison 1: Resilience intervention vs control, healthcare students, Depression: post-intervention.

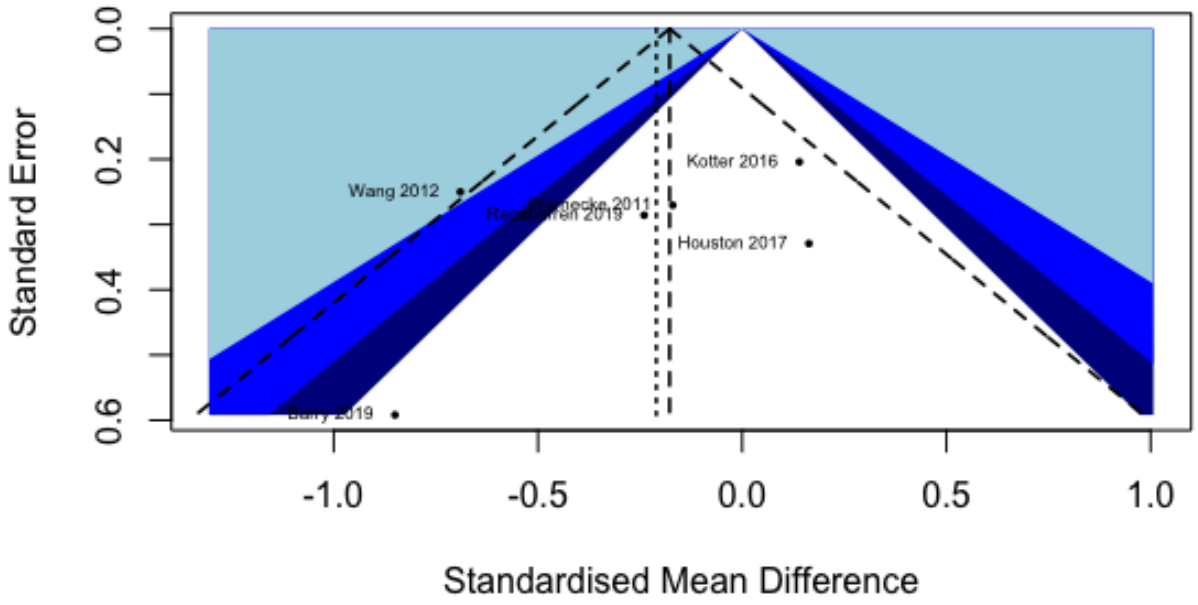


Figure 9. Contour-enhanced funnel plot of comparison 1: Resilience intervention vs control, healthcare students, Stress or stress perception: post-intervention.

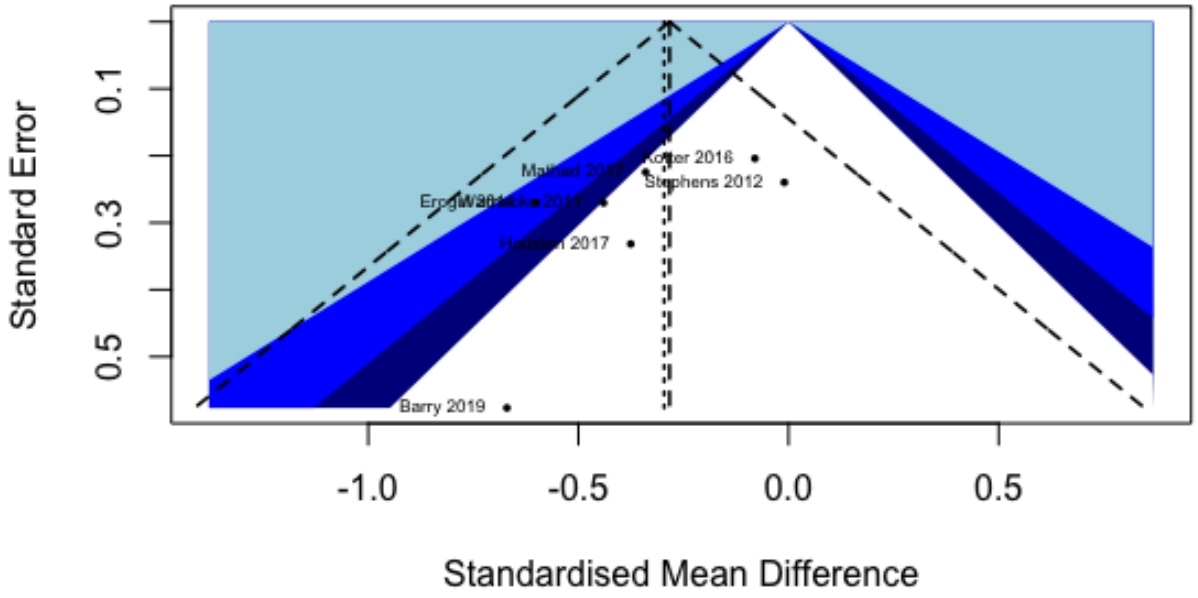
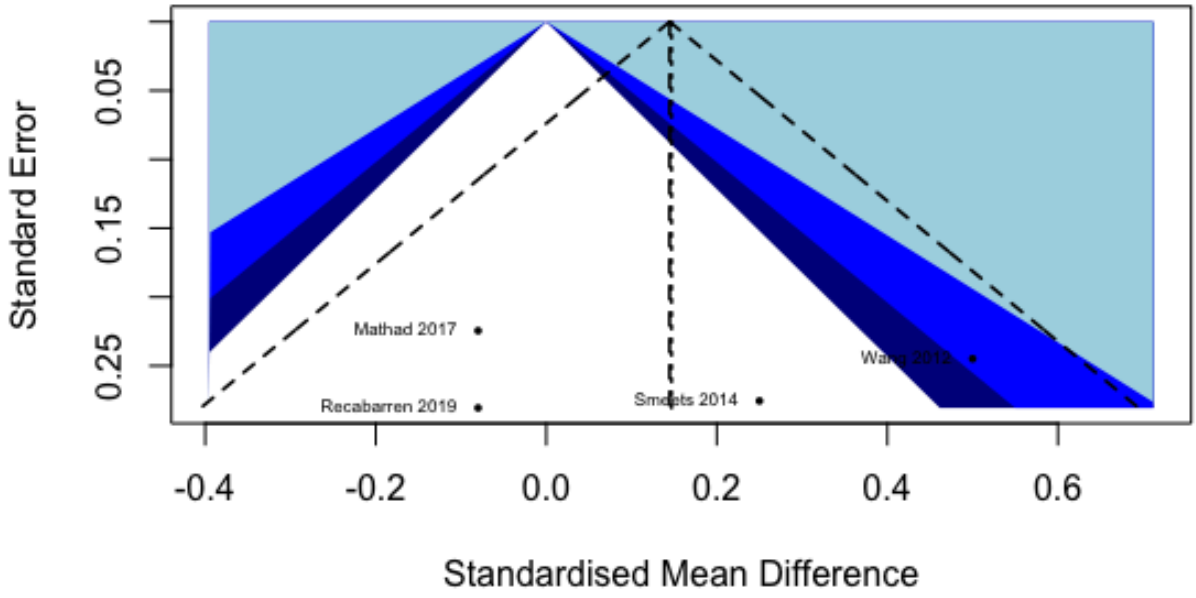


Figure 10. Contour-enhanced funnel plot of comparison 1: Resilience intervention vs control, healthcare students, Well-being or quality of life: post-intervention.



Appendix 17. Further details on the overall completeness and applicability of evidence

- **Participants:**
  - *Study field:*
    - The included studies were conducted mainly in healthcare students who already dealt with the provision of direct medical care, such as nursing or midwifery students (18/30 studies).
  - *Mental health at baseline:*
    - 40% of the 30 studies assessed mental health at baseline.
    - All studies measuring mental functioning used self-reported (screening) measures covering one or a small number of mental dysfunctions.
    - Comprehensive baseline diagnostics of mental health by the use of a structured interview were only conducted in one study (Recabarren 2019).
    - Overall, drawing from those studies assessing mental health, the severity of impairment ranged between no mental symptoms (e.g. normal range, Barry 2019) to increased levels of mental dysfunctions (Miu 2016; Victor 2018).
  - *Study location:*
    - North America (15 studies), Europe (7 studies), Asia (including the Near East, 6 studies), only two studies from Australia.
    - High-income countries in 24 studies: Australia, Belgium, Canada, Germany, The Netherlands, Switzerland, UK, USA
    - Upper-middle income countries in five studies: China, Iran
    - Lower-middle income country in one study: India
- **Comparators:**
  - There was large heterogeneity in active and attention controls by setting, delivery format and content, rendering the comparability between single-study comparisons difficult.

- **Interventions:**
  - The evidence found is restricted to certain types of intervention settings, delivery formats, training intensities and theoretical foundations.
  - Seventeen of the 30 studies assessed the effectiveness of resilience interventions in group settings that were delivered face-to-face.
  - Most of the interventions were of high intensity (11/30: > 12 hours or sessions) or low intensity (10/30; ≤ 5 hours or ≤ 3 sessions). Treatment durations ranging considerably, from a 20-minute single session to 40 hours in total.
  - Except for stress inoculation, problem-solving training, ACT and AIT, all prespecified theoretical foundations (Helmreich 2017) have been tested in RCTs found in this review.
  - The number of RCTs varies, with a relative balance between studies investigating mindfulness-based training (8/30), unspecified interventions (7/30) and combined theoretical foundations (6/30; e.g. CBT and positive psychology).
- **Outcomes:**
  - Although there is still no consensus about the definition of resilience, two aspects are viewed as essential: the exposure to substantial risk or adversity and the maintenance or fast recovery of mental health despite this adversity (e.g. Earvolino-Ramirez 2007). By considering studies in healthcare students – a target group often exposed to significant stressors – that assessed resilience or another measure of psychological adjustment, we ensured a greater homogeneity between the included studies.
  - Potential adverse or undesired effects were not specified in most included studies (see Adverse events in Effects of interventions). Three studies reported no adverse or undesired effects (unavailable data for fourth study).
  - Since most included studies had small sample sizes, the attrition bias found for nine studies has to be interpreted with caution.

Appendix 18. Prevention of potential biases by the search methods of this review

We performed extensive searches of relevant databases and checked reference lists of reviews and included studies. We also considered grey literature (e.g. conference abstracts). The search process was designed in conjunction with, and supervised by, the Cochrane Developmental, Psychosocial and Learning Problems (CDPLP) Information Specialist, in order to minimise bias in the acquisition of potentially relevant references. We contacted the authors of (included) studies to ask, for example, for full texts or additional data where reported data were insufficient or missing. In all phases of the review process, we repeatedly (at least twice) tried to contact the study authors by email, when needed.

Correspondence with the authors about data analysis was required for 25 included studies. For 11 studies, the replies we received allowed us to include those studies in the quantitative analyses (e.g. Barry 2019).

HISTORY

Review first published: Issue 7, 2020

CONTRIBUTIONS OF AUTHORS

Angela Kunzler: protocol writing, study selection, data extraction and assimilation, 'Risk of bias' assessment, GRADE assessment, statistical analysis and review writing. Angela Kunzler has overall responsibility for the review and is the guarantor for the review.
Isabella Helmreich: protocol writing, study selection, data extraction, 'Risk of bias' assessment, GRADE assessment, review writing.
Jochem König: protocol writing, expert statistical support, statistical analysis and review writing.
Andrea Chmitorz: protocol writing, review writing, arbiter.
Michèle Wessa: protocol writing and review writing.
Harald Binder: protocol writing, expert statistical support, statistical analysis and review writing.
Klaus Lieb: overall supervision of the review, protocol writing, review writing, arbiter.

All review authors agreed on this version before publication.

DECLARATIONS OF INTEREST

Angela Kunzler: none known.
Isabella Helmreich is a board-certified cognitive-behaviour therapist.
Jochem König: none known.
Andrea Chmitorz is a board-certified cognitive-behaviour therapist.
Michèle Wessa is a board-certified cognitive-behaviour therapist.
Harald Binder: none known.
Klaus Lieb (KL) is a board-certified cognitive-behaviour therapist with a special interest in schema therapy, and an Editor with Cochrane Developmental, Psychosocial and Learning Problems. KL received funding for this review from the Ministry of Science (MWWK) of the State Rhineland-Palatinate, Germany.

SOURCES OF SUPPORT

Internal sources

- Leibniz Institute for Resilience Research (LIR) gGmbH, Wallstraße 7/7a, 55122 Mainz, Germany

  Home institution of AMK, IH, MW and KL; support provided in the form of salary and resources.
- Institute of Medical Biostatistics, Epidemiology and Informatics (IMBEI), University Medical Center of the Johannes Gutenberg University Mainz, Germany

  Home institution of JK; support provided in the form of salary and resources.
- Institute of Medical Biometry and Statistics, Faculty of Medicine and Medical Center, University of Freiburg, Germany

  Home institution of HB; support provided in the form of salary and resources.

External sources

- Funding provided by the Ministry of Science (MWWK) of the State Rhineland-Palatinate, Germany

  Support provided in the form of resources.

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

We describe all modifications to the methods specified in the protocol (Helmreich 2017) in the following section.

1. Title
   a. We changed the title of the review due to the post hoc restriction to healthcare students (see Types of participants).
2. Background
   a. Due to the post hoc restriction to healthcare students, we adapted the Background sections (Description of the condition; Description of the intervention; How the intervention might work; Why it is important to do this review) for this target group, e.g. by adding current references concerning previous systematic reviews in this population.
   b. Description of the intervention
      i. We modified the first sentence of this section to illustrate that we refer to resilience intervention research in general.
      ii. To be consistent, we limited the number of references for each psychotherapeutic method to one reference.
   c. How the intervention might work
      i. We changed the order of appearance of the different psychotherapeutic approaches in order to present theoretical approaches that are associated with cognitive-behavioural therapy (CBT), such as stress inoculation and problem-solving therapy, immediately after CBT before discussing other theoretical approaches.
      ii. Instead of performing a subgroup analysis on the target group of training, we had planned to conduct a subgroup analysis on training intensity, and added arguments for whether participants could benefit differently from differing training intensities. However, we were not able to perform this subgroup analysis due to the limited number of studies (see Table 1).
      iii. To derive the planned subgroup analysis for the theoretical foundation, we modified the section by describing the recent results of Joyce 2018, who analysed the impact of theoretical foundations of resilience intervention for the first time. At the time of writing the protocol (Helmreich 2017), this systematic review had not been published.
   d. Why it is important to do this review
      i. Compared to the protocol (Helmreich 2017), we presented the need for doing this review by integrating the results of recently-published systematic reviews in clinical and non-clinical adult populations (e.g. Joyce 2018).
3. Objectives
   a. We modified the objectives of the review by referring them to healthcare students, due to the post hoc restriction to this population.
4. Types of participants
   a. Post hoc change 1: Initially, we planned to include clinical and non-clinical populations (e.g. patients, employees, students, military) in this review (see Helmreich 2017). Based on a broad search strategy in October 2016, we identified 251 studies and 18 ongoing studies evaluating resilience-training programmes in a variety of target groups. To be able to manage the large number of studies with many divergent target groups, we decided to de-scope the review based on the populations investigated. This also allowed us to perform top-up searches (i.e. for the period October 2016 to the present) that were specific to the respective target groups. We took the decision to de-scope the review for two main reasons. First, using the database of 269 studies found by searches in October 2016, the review that we had originally planned might have been trumped by the publication of studies since this time point. Studies published since 2016, for example, using innovative delivery formats or different therapy methods from earlier studies, might have affected the results of subgroup analyses in the review (e.g. concerning delivery format). We also expected a substantial number of new studies fulfilling the eligibility criteria of the review for the period from the end of 2016 to 2019. Especially since 2015, there has been a significant growth in publications in the field; for example, by searching additional sources (e.g. reference lists, trial registers) or through study protocols published until October 2016, we identified 26 RCTs published in 2017 and 2018, plus 16 completed studies

that had not yet been published (e.g. manuscripts in preparation or under review). Second, the RCTs identified were spread across a large number of comparisons (e.g. different target groups, theoretical foundations of interventions or control groups), which might have over-scoped the review and resulted in substantial heterogeneity had all 269 studies been included. Based on the number of studies identified for the healthcare sector (including healthcare professionals like physicians, healthcare students like medical students, and employees associated with the healthcare sector such as human service professionals) in October 2016, we therefore decided to focus on RCTs in these populations. In June 2019, we performed top-up searches broadly focusing on the healthcare sector, in order to guarantee a review of high credibility, which synthesised the latest evidence on the efficacy of psychological resilience interventions in this group at the time of publication.

b. Post hoc change 2: Based on the top-up searches in June 2019, we identified 31 studies and eight ongoing studies that had been performed in healthcare professionals, healthcare students, and employees associated with the healthcare sector. Combined with the original search, we found a total of 80 RCTs and nine ongoing studies in this population. During the process of writing up this publication, we made further decisions about the eligibility criteria of this review for the Types of participants. We further separated the pool of 80 RCTs into two groups: 1) healthcare professionals (i.e. with completed training), and 2) healthcare students. Based on the evidence from the two searches, the first group of healthcare professionals, which is considered in another publication (Kunzler 2020), includes physicians, nurses, hospital personnel, and allied healthcare staff (e.g. psychologists, social workers) who are not always employed in direct medical care. We also considered studies with mixed samples where one of the named groups was included as a subgroup (total: 44 RCTs and five ongoing studies). The current (second) review refers to psychological interventions to foster resilience in healthcare students (total: 30 RCTs and three ongoing studies). We took the decision to split the review for the following empirical reasons: first, when summarising the 80 RCTs in an initial review draft we identified a substantial amount of heterogeneity for these studies that could only be partially explained by the planned subgroup analyses (see Table 1). Similarly, during internal peer review, the question arose about whether the research question for such a review (i.e. including healthcare professionals, students, and different employees associated with the healthcare sector) was too broad and the studies too heterogeneous to combine in the same review. We therefore decided to split the review into two publications, one for qualified workers and one for students, in order to create two very focused reviews that are based on sufficiently homogeneous studies, are up-to-date, and provide a concise summary of the evidence for the reviews' readers. A second rationale behind the decision to split the data referred to the stressor exposure in the two groups of healthcare professionals and healthcare students: Students and qualified staff have different stressor exposures and responsibilities, which might moderate the effect of resilience training. While healthcare professionals are exposed to stressors such as shift work, medical decision-making or hierarchies, students are confronted with different kinds of stressors, e.g. exams, challenging subjects. A split between these two groups therefore seemed reasonable. Based on both searches, we identified six studies in employees widely associated with the healthcare sector, whose samples were too heterogeneous (e.g. human service professionals, nurse managers) to combine them with healthcare professionals (e.g. physicians, nurses) and who are mostly employed in clinical practice and patient care. It had also been critically questioned whether these employees can actually be viewed as frontline healthcare staff and should be included in a review of this target group. We therefore decided to omit this group of studies.

c. Based on these two post hoc changes, which had been discussed with the Cochrane Developmental, Psychosocial and Learning Problem (CDPLP) Editorial Team and the Cochrane Editorial and Methods Department, we adapted the Types of participants section accordingly, by writing that the current review considered healthcare students, i.e. students in training for health professions delivering direct medical care (e.g. medical students, nursing students, paramedic students) and for allied health professions as distinct from medical care (e.g. psychology students, social work students, counselling students, physical therapy students, occupational therapy students, speech therapy students, medical assistant students, medical technician students). Since we also identified several eligible studies in mixed samples, we stated that we would consider these mixed samples in the review and also included them in meta-analyses, provided that the data for healthcare students could be obtained separately through the study authors.

5. Types of interventions
   a. We stated in the protocol that we planned also to include broader, health-promoting interventions (e.g. well-being therapy) (Helmreich 2017), but in the full review included only studies that explicitly defined the aim of fostering resilience, hardiness or post-traumatic growth by using one or more of these terms in the publications. We made this modification on the basis of a post-protocol amendment in consultation with the CDPLP Editorial Team. During the initial process of data extraction, we realised that it was not feasible to consider all health-promoting interventions that aim to foster resilience in a broader sense (e.g. mental health, well-being, psychological adaptation in a population with stressor exposure) without including the terms resilience, hardiness or post-traumatic growth for the following reasons. First, it appeared very difficult to decide between which of the very large number of interventions should be included in the review and which should not, since the relationship of the interventions to the concept of resilience was not made explicit in those interventions. This would have left the review authors having to make many assumptions, with no objective criteria, resulting in reduced traceability of selection criteria and potentially low inter-rater reliability on completion of screening. Second, since the objective of the review was to synthesise the current evidence on the efficacy of resilience training, including broader interventions, could have biased the review's conclusions, as fostering resilience was not explicitly formulated as an aim in any of those interventions.
6. Types of outcome measures
   a. Based on a suggestion during internal peer review, we added adverse events as a primary outcome of this review, and marked it with an asterisk for inclusion in the 'Summary of findings' table.

7. Electronic searches
   a. We planned to perform searches in October 2016 for a review on psychological resilience interventions in clinical and non-clinical populations. However, due to post hoc adaptation of the inclusion criteria, we based the search process for the review on a two-step approach with searches performed in October 2016 and top-up searches in June 2019.
   b. We expanded the description of the search process by adding details of the use of the Cochrane Highly Sensitive Search Strategy for MEDLINE and Embase, as specified in the *Cochrane Handbook* (Lefebvre 2019), in order to present the search strategy in sufficient detail.
   c. We searched the Web of Science Core Collection databases simultaneously rather than individually (Science Citation Index; Social Science Citation Index; Conference Proceedings Citation Index - Social Science & Humanities; Conference Proceedings Citation Index - Science), since our institutional access to this database only offered this possibility.
8. Selection of studies
   a. We judged the feasibility of selection criteria after 500 instead of 50 studies screened, due to the large number of records yielded by the searches for this review.
9. Assessment of risk of bias in included studies
   a. We described our decision that the achieved baseline comparability between study conditions was part of selection bias (random-sequence generation) in addition to the standard 'Risk of bias' domains in the *Cochrane Handbook* (Higgins 2011a). We had extracted this additional information from the included studies and judged it to be interesting for the readers of this review.
10. Measures of treatment effect
   a. Continuous data: In the protocol we said we would calculate SMD effect sizes because resilience-training studies are likely to use different measures for resilience and related constructs (Helmreich 2017). In the review, we added a sentence on the actual variation in the measurement scales between the included studies and referred to Table 2 and Table 3, which report the outcome scales used. We added information on how we interpreted the magnitude of effect sizes (SMDs) for continuous outcomes in the review.
11. Unit of analysis issues
   a. Repeated observations on participants: We explained when we judged 'post-test' in intervention studies as 'post-intervention assessment' and considered them in the respective meta-analyses. Assessments at more than one week after the end of training were declared as post-test by some study authors, although interim events between the end of the intervention and the assessment might affect the effects measured. However, we wished to differentiate between such assessments and 'real' post-tests with greater proximity to the end of training (i.e. within one week after the intervention ended)
12. Dealing with missing data
   a. We supplemented the procedure of dealing with missing data in the review by explaining how we would handle missing (summary outcome) data in studies of mixed samples. We added this information because we also considered studies with mixed samples in the review (see point 4).
   b. We added a sentence about how we dealt with missing/incomplete summary outcome data, as well as missing outcome data due to attrition.
13. Assessment of heterogeneity
   a. We added a sentence explaining that we discuss the similarities and differences between the included studies (e.g. in terms of study characteristics) in the Results and Discussion section of the review.
   b. We further described the conventions used to interpret I^2 values based on the suggestions in the *Cochrane Handbook* (Deeks 2019), in order be more transparent.
   c. We added a sentence explaining that we calculated the 95% prediction intervals from random-effects meta-analyses to present the extent of between-study variation according to the *Cochrane Handbook* (Deeks 2019).
14. Assessment of reporting biases
   a. We stated in the protocol that we would assess potential publication bias by drawing and inspecting funnel plots, provided at least 10 studies were included in the meta-analysis (Helmreich 2017). However, despite the limited number of studies per outcome (fewer than 10 studies), we chose to assess reporting bias for the primary outcomes at post-test, in order to consider possible publication bias when rating the certainty of the evidence. We added this information to the review. We also stated that we did not assess reporting bias for the remaining outcomes at the other time points.
   b. We inspected contour-enhanced funnel plots for the primary outcomes, as they offer more graphical possibilities to detect publication bias than traditional funnel plots.
15. Data synthesis
   a. For several studies in the review that provided no means and SDs, but provided alternative data to calculate SMDs and the respective standard error, we described the procedure for combining these with other studies using the generic invariance method in Review Manager 5. This information had been missing from the protocol (Helmreich 2017).
   b. We expanded the description of dealing with scales for depression and burnout, as well as scales for general well-being or quality of life and work-related measures in the same study, because several included studies met these criteria.
   c. We did not conduct a planned network meta-analysis, due to the insufficient evidence base in the review.

16. Summary of findings
    a. We added information about the inclusion of the primary outcomes at post-test in the ‘Summary of findings’ table. We took the decision to restrict the outcomes reported in the 'Summary of findings' table to those assessed at post-test as a result of feedback received at internal peer review. Adverse events are now included in this table (see Types of outcome measures and point 6 in this section).
    b. We replaced the term 'quality of the evidence' with 'certainty of the evidence' throughout the review, in order to be consistent with current guidelines and preferences in the literature (Hultcrantz 2017).
    c. We provided further details for the downgrading of studies for each of the five GRADE criteria (study limitations, indirectness, inconsistency, imprecision, publication bias).
    d. We also explained how we interpreted effect sizes and rated the certainty of the evidence, as this information had been missing from the protocol (Helmreich 2017).
17. Subgroup analysis and investigation of heterogeneity
    a. We omitted the preplanned sensitivity analysis on 'target group in resilience interventions', due to the review's revised focused on healthcare students only.
    b. We added a post hoc analysis of training intensity; low-intensity training included interventions with a total duration of five hours or less or three sessions or fewer (if no duration in hours or minutes was indicated); moderate intensity to training that included more than five hours to 12 hours or less, or more than three sessions to 12 sessions or fewer; and high intensity to programmes of more than 12 hours or more than 12 sessions. We added this subgroup analysis post hoc, due to the restriction to healthcare students (see point 2c).
    c. We added a subgroup for mobile-based delivery format to the preplanned analysis on delivery format, given the evidence found in this review.
    d. We changed ‘multimodal intervention’ to ‘combined intervention’ to the preplanned analysis on theoretical foundation, to refer to resilience interventions that were based on two or more explicit theoretical foundations, such as CBT and ACT or CBT and mindfulness. We also added coaching, positive psychology and nonspecific resilience training. Non-specific training programmes included resilience interventions fostering one or several resilience factors, but without specifying any explicit theoretical foundation or where the underlying framework could not be assigned to a definite theoretical foundation. We changed from 'multimodal' to 'combined intervention' in order to be consistent with other subgroup analyses (compare combined setting, combined delivery). We added the subgroups based on the evidence found in this review.
    e. Lastly, we added active and attention control to the preplanned analysis on comparator group, in order to distinguish between these groups. Attention-control groups referred to an alternative treatment that mimicked the amount of time and attention received (e.g. by the trainer) in the intervention group. We used the term ‘active control’ for alternative treatment (no standard care; for example, treatment developed specifically for the treatment study) but that did not control for the amount of time and attention in the intervention group, and was not attention control in a narrow sense. We made these changes following the evidence found in this review.
18. Sensitivity analysis
    a. We provided more detail on the planned sensitivity analysis based on risk of bias (i.e. restriction to studies at low and unclear risk of attrition, as well as at low and unclear risk of reporting bias, respectively), as this information had been missing from the protocol (Helmreich 2017). See Table 1.

INDEX TERMS

Medical Subject Headings (MeSH)

Allied Health Occupations [education]; Allied Health Personnel [psychology]; Anxiety [diagnosis]; Bias; Depression [diagnosis]; Mental Health; Quality of Life; Randomized Controlled Trials as Topic; *Resilience, Psychological; Stress, Psychological [diagnosis]; Students, Health Occupations [*psychology]; Waiting Lists

MeSH check words

Adult; Female; Humans; Male; Young Adult