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**Universal, school-based interventions to promote mental and emotional wellbeing. What is being done in the UK and does it work?
A systematic review**

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Universal, school-based interventions to promote mental and emotional wellbeing. What is being done in the UK and does it work?

A systematic review

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26 **Keywords:** Review, school-based, resilience, wellbeing, intervention.

27 **Word count:** 5067 (excluding abstract, figures, tables and references).

28

29 **ABSTRACT**

30 **Objectives:** The present review aimed to assess the quality, content and
31 evidence of efficacy of universally-delivered (to all pupils) school-based, mental
32 health interventions designed to promote wellbeing and resilience, provided
33 within the UK.

34 **Setting:** A systematic review of published literature set within UK
35 mainstream school settings was conducted.

36 **Participants:** 12 studies were included for review (5 primary school
37 based, 7 secondary school based).

38 **Interventions:** Selected studies included intervention approaches such as
39 CBT, mental health education, mindfulness and behavioural approaches.

40 **Results:** Effectiveness of school-based universal interventions was found
41 to be neutral or small with more positive effects found for poorer quality studies
42 and those based in Primary schools (pupils aged 9-12 years old). Studies varied
43 widely in their use of measures and study design. Methodological issues such as
44 small sample size, varying course fidelity and lack of randomisation reduced
45 overall study quality. Where there were several positive outcomes, effect sizes
46 were small and methodological issues rendered many results to be interpreted
47 with caution. Overall, results suggested a trend whereby higher quality studies
48 reported less positive effects. The only study that conducted a health economic
49 analysis suggested the intervention was not cost-effective.

50 **Conclusions:** The current evidence suggests there are neutral to small
51 effects of universal, school-based interventions in the UK that aim to promote
52 emotional or mental wellbeing or the prevention of mental health difficulties.
53 Robust, long-term methodologies need to be pursued ensuring adequate
54 recording of fidelity, the use of validated measures sensitive to mechanisms of
55 change, reporting of those lost to follow up and any adverse effects. Further
56 high quality and large scale research is required across the UK in order to
57 robustly test any long-term benefits for pupils or on the wider educational or
58 health system.

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61 **Limitations:**

- 62 ○ Included papers largely based in England so unlikely to be
63 representative of the cultural diversity within UK schools.
64 ○ Date limit excluded papers published prior to 2000.

65 **Strengths:**

- 66 ○ Addressed a gap in the literature.
67 ○ Used a robust methodology to review the literature in this area.
68 ○ Conclusions will help inform policy and practice as this topic continues
69 to be debated in current health, education and political spheres.
70

71 **INTRODUCTION**

72 The mental and emotional wellbeing of children and young people has
73 received increasing attention worldwide. It has been reported that the
74 prevalence of mental health problems ranges from 10-20% [1], and that by the
75 age of 18 up to 20% of young people will have experienced an emotional disorder
76 [2]. Mental health conditions such as anxiety and depression often persist into
77 adulthood [3] and have been associated with a range of negative outcomes
78 including lower academic achievement, higher likelihood of health risk
79 behaviours, self-harm and suicide [4, 5]. However, provision of services for those
80 in need can be as low as 20% [6]. Such access issues to specialist services like
81 CAMHS has meant that school-based interventions have been increasingly
82 explored due to their far reach [7] and existing infrastructure to support child
83 development [8], while noting that schools need support to use the evidence
84 base when applying such interventions [9].
85

86 Numerous systematic reviews and meta-analyses have been conducted to
87 review the effectiveness of school-based, mental health interventions at both
88 the universal (delivered to all pupils irrespective of perceived need), and
89 targeted (delivered to vulnerable or 'high risk' individuals only) levels. Overall,
90 this literature has indicated mixed results regarding efficacy of school-based
91 interventions.

1 92 Findings have suggested positive effects on social emotional skills, self-
2 93 concept, positive social behaviours, conduct problems, emotional distress and
3 94 problem solving when reviewing school based, universal programs aiming to
4 95 enhance social and emotional skills [10-11]. Further reviews found Cognitive
5 96 Behavioural Therapy (CBT) formed the basis of the majority of anxiety
6 97 prevention programs (78%) and over 75% of trials reported a significant reduction
7 98 in anxiety [12]. CBT-based interventions were also tentatively endorsed as mildly
8 99 effective in reducing depression (E.S. = 0.29) and moderately effective (E.S. =
9 100 0.50) in reducing anxiety symptoms [13].
10 101

11 102 With regards to optimal implementation, it has been noted that more
12 103 positive outcomes were obtained for programs adopting a ‘whole-school’
13 104 approach, that lasted more than one year, and aimed to promote mental health
14 105 rather than prevent mental illness [11]. A balance of both universal and targeted
15 106 approaches has been recommended, along with accurate implementation of
16 107 interventions [14].
17 108

18 109 However, the long-term impact and target audience of such initiatives has
19 110 been questioned. A meta-analysis reviewing prevention of depression
20 111 programmes found that while there was evidence of immediate post-
21 112 intervention effects, these did not sustain over time (24-36 months) [15].
22 113 Moreover, a review evaluating both anxiety and depression programmes found
23 114 that while the majority were effective for depression (65%) and anxiety (73%),
24 115 the effect sizes were small (0.12 - 0.29) [16].
25 116

26 117 It has also been argued that universal prevention interventions are,
27 118 overall, not efficacious [17-18], with targeted programs being most effective
28 119 (E.S. = 0.21 to 1.40). Likewise, that while school-based CBT programmes have
29 120 been demonstrated to lead to a short-term reduction in depression symptoms,
30 121 interventions are most effective for those in the clinical range [19].
31 122

32 123 The literature has, therefore, conveyed conflicting results regarding the
33 124 efficacy of universal school-based interventions whilst consistently in
34 125 highlighting methodological issues within the existing research base. Common
35

1 126 issues include a lack of active intervention controls [20], studies'
2
3 127 operationalisation and measurements of 'resilience' lack homogeneity [21]; that
4
5 128 weak program fidelity and treatment dosage impacts outcomes [10] and that
6
7 129 there is insufficient use of validated, standardised measures and long-term
8
9 130 follow up [22].
10

131

11 132 It is also noteworthy that the majority of reviews have focussed
12
13 133 worldwide, with most reviewed interventions based in Australia, the US or
14
15 134 Canada. No reviews have to date focused on studies in schools in the UK. This
16
17 135 trend was also referenced in a NICE funded review [23] of targeted and universal
18
19 136 school-based interventions who noted that though findings from international
20
21 137 based research are helpful, the generalisability to the UK educational system is
22
23 138 questionable. Thus, giving rise to a need for reviews specifically within the UK
24
25 139 context.

140

26 141 One systematic review of targeted school-based interventions within the
27
28 142 UK research has been conducted [24]. This found that nurture groups
29
30 143 demonstrate an immediate positive impact on the social and emotional
31
32 144 wellbeing on vulnerable young people, however, that results from longer term
33
34 145 follow-up studies are less clear.

146

35 147 The need to carry out a review of universal school-based interventions
36
37 148 specifically within the UK context therefore remains. This is especially pertinent
38
39 149 in light of the increasing emphasis from national government on developing
40
41 150 CAMHS services within the UK, and the impetus on health and education services
42
43 151 to work together in order to improve wellbeing outcomes for children and young
44
45 152 people [25, 26, 27].

153

154 **Review aims**

49 155 The present review aims to fill this gap in the literature by focusing on
50
51 156 universally-delivered, school-based mental health interventions provided within
52
53 157 the UK only. The following questions will be explored:

- 1 158 1. *How effective are universal school-based interventions in the UK that*
2 159 *promote mental health, emotional wellbeing, or psychological resilience*
3 160 *and what tools are being used to measure effectiveness?*
4 161 2. *What methodologies are being applied in UK schools when trialling*
5 162 *interventions and what is the quality of these studies?*
6 163 3. *What are the intervention characteristics e.g. delivery, content, target*
7 164 *audience?*
8 165 4. *What are the identified barriers in delivering and evaluating universal*
9 166 *school based interventions?*
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18 168 **Search Strategy**

19
20 169 Electronic databases were searched for relevant published research on
21 170 14th April 2016: EMBASE, CINAHL, MEDLINE, PsycINFO, PsycArticles, ASSIA and
22 171 Psychological and Behavioural Sciences. Selected journals relevant to the area
23 172 were hand-searched (British Journal of Educational Psychology; British Journal of
24 173 School Nursing). Previous reviews and relevant papers were reviewed and
25 174 following consultation with University librarians, the following keyword search
26 175 terms were used linked with the Boolean operators 'AND' and 'OR' (* indicates
27 176 truncation of words):

28 177 Mental Health OR Early Intervention OR Anxi* OR depress * OR resilien* OR
29 178 emotion* OR stress* OR psycho* OR wellbeing

30 179 AND

31 180 Adolescent OR Adolescen* OR child* OR teen* OR youth OR young pe* OR pupil*
32 181 OR student* OR learner* OR scho*

33 182 AND

34 183 School based OR School based mental health OR School based intervention OR
35 184 interven* OR effect* OR program* OR initiative OR strateg* OR evaluat*

36 185 AND

37 186 United Kingdom OR UK OR Sco* OR eng* OR northern ir* OR wales OR wel* OR
38 187 brit* OR kingdom

188 Study design criteria was wide to allow for the diverse range of
189 methodologies used to overcome challenges in school-based research. Search
190 terms were, therefore, chosen primarily to promote sensitivity to the subject
191 area. A limit date was set from 2000 to April 2016. The early date limit was
192 selected as this area has been promoted by UK governmental policy largely
193 within the last decade. Further, detailed appraisal of the previous systematic
194 reviews in this area found few, if any, discovered studies prior to this date.

195 **Study selection**

196 The inclusion criteria were as follows:

- 197 • The intervention was based in a mainstream school environment;
- 198 • Pupils were the recipients of the interventions;
- 199 • The study adopted a pre-post design;
- 200 • The intervention aimed to target mental health and/or emotional
201 wellbeing;
- 202 • The study used a validated measure to quantitatively evaluate emotional
203 or mental wellbeing outcomes and reported those outcomes;
- 204 • The study was published between 2000 and April 2016 in a peer reviewed
205 journal.

206 Exclusion criteria included:

- 207 • The study aims or methodology did not fit the inclusion criteria.
- 208 • Any studies using a non-validated outcome measure as their primary
209 outcome e.g. Likert scales that were unvalidated.
- 210 • Any studies using a purely qualitative methodology.

211 **Details of included and excluded studies (see Figure 1, below.)**

212 Duplicate papers were excluded. Titles were screened to identify only
213 those that clearly met inclusion criteria. Abstracts were assessed independently
214 by the authors. Raters met to compare included papers. Where eligibility was
215 unclear based on the abstract, full articles were retrieved and assessed jointly
216 by raters. Reference lists of included papers were searched as well as previous
217 reviews on related topics. Articles citing included articles were also reviewed
218 and one paper was sourced via this method. Authors of protocol papers were

1 contacted leading to an additional paper being sourced. Experts in the field in
2
3 Scotland, England, Northern Ireland and Wales were contacted regarding any
4
5 other studies. However, none were eligible for inclusion. Twelve papers were
6
7 included in the final review.

8 (Editors: See attached Image)

9 10 *Quality rating of studies*

11
12 The Downs and Black [28] checklist was used to assess quality. This
13
14 checklist assesses internal and external validity, selection bias and study power
15
16 over 27 items. This checklist was used due to its utility in assessing studies
17
18 relating to public health and its applicability to assess quality in both
19
20 randomised and non-randomised studies. Reliability and validity assessment has
21
22 found the Quality Index to have high internal consistency, good test-retest
23
24 (r = 0.88) and inter-rater (r = 0.75) reliability and good face and criterion validity
25
26 (0.90) [28].

27 A sample of papers were assessed by an independent researcher (CA). Any
28
29 rating discrepancies were discussed and a shared decision reached. A decision
30
31 was taken not to exclude any studies found to be of poor quality as the aim of
32
33 this current review was to critique universal school-based interventions whilst
34
35 acknowledging that the real-world implementation of such evaluations can be
36
37 challenging and, as a result, may reasonably impact study quality.

38 *Data extraction*

39 Due to the heterogeneity of the studies, meta-analysis was not
40
41 appropriate. A narrative synthesis was applied to explain the findings of this
42
43 review in line with current guidance [29]. Information gathered from the studies
44
45 included: study aim, intervention (model, duration, delivery), sample
46
47 characteristics, study procedures, outcomes and measures, and results. Issues
48
49 relating to the implementation, as well as effectiveness, of interventions were
50
51 also noted from those studies commenting on such barriers.

52 **Patient and Public Involvement**

53 No patients or members of the public were directly involved in this piece of
54
55 research.
56

250 RESULTS

251 Overview of interventions

252 Of the twelve studies sourced, five took place in primary schools [30-34]
253 and seven took place in secondary schools [35-41]. An overview of study
254 interventions based in Primary and Secondary schools can be found in Table 1.

255 *Primary school studies:*

256 The five studies within primary school settings evaluated interventions
257 based on computerised CBT [30]; a teacher led intervention embedded within
258 the curriculum (e.g. PATHS - 'Promoting Alternative Thinking Strategies' [31]);
259 manualised anxiety interventions (e.g. a locally developed anxiety intervention,
260 or the Australian developed 'FRIENDS' programme) delivered by both school staff
261 (teachers and nurses) and external health staff (e.g. psychologists) [32-34].

262 *Secondary school studies:*

263 Three of the secondary school-based studies trialled interventions based
264 on Cognitive Behavioural Therapy principles (e.g. UK Resilience programme
265 (UKRP), Resourceful Adolescent Programme (RAP-UK) [36, 39, 41]) delivered by
266 school staff [36], educational psychologists [39] and external facilitators [41].
267 Interventions were also said to include principles of Interpersonal Therapy (RAP-
268 UK [41]) and behavioural approaches ('TRY' [39]).

269 One study trialled an intervention based on Positive Psychology [35], two
270 studies trialled a mindfulness-based intervention [38-39] and two trialled locally
271 developed mental health education sessions delivered to all pupils [37,40].
272 These interventions were led by trained school teachers [35, 38, 40], and trained
273 volunteers [37]. All delivered the intervention during Personal Health and Social
274 Education (PHSE) classes.

275 Methodological quality

276 The quality of studies ranged from 'poor' (34% [30]; 37.5% [35]) to
277 'excellent' (75% [34,37]; 78.1% [36]; 81.3% [41]).

278 Six studies used a randomised controlled pre-post design [30-32, 34, 37,
279 41]. The remaining were non-randomised pre-post designs and only one did not

280 have a control group [33]. Some studies were particularly weak on their
 281 description of sample characteristics and representation of the population
 282 [30,35], reporting of those lost to follow up and accounting for those in the
 283 analysis [32,35], and the exploring of adverse events, of which only one study
 284 provided information [41]. Only six studies provided a power calculation [31,
 285 34,36,37,40,41], most of which had samples sufficiently powered to determine
 286 an effect (except [37]). The remaining studies did not provide such information.

287 Of the eleven studies employing controls, six used controls from the same
 288 school in which the intervention was taking place (32,34,36,37,39). All other
 289 studies recruited controls from different schools.

290 Sample sizes ranged from 13 [30] to 5075 [31]. The age of participants
 291 ranged from 4 [31] to 16 years old [38,41] with the majority of studies targeting
 292 the early adolescent age range (9-12 years old) at the end of Primary school or
 293 at the beginning of Junior / Secondary school [30, 32, 34-37].

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296

Table 1. Overview of interventions based in Primary and Secondary schools.

PRIMARY SCHOOLS

Study (Location)	Sample	Study aim / hypothesis	Intervention - Theoretical model and Content	Intervention - Setting, Structure and Delivery
Attwood et al., 2012 [30] (Bristol, England)	10-12 year old boys from two co-educational schools. (n=13)	A proof of concept study to explore the viability and possible benefits of a cCBT programme.	'Think, Feel, Do' - Based on CBT principles with a psychoeducation component. Cartoon characters guide users through various activities including: emotional recognition; linking thoughts, feelings and behaviours; identifying and challenging negative thoughts; and problem solving. Involves quizzes, practical exercises, videos, music and animation.	Six x 45min sessions delivered via an interactive multimedia CD-ROM. Took place within the school, facilitated by the researcher.

<p>Berry et al., 2016 [31]</p> <p>(Birmingham, England)</p>	<p>4-6 year old pupils (n=5075; 56 x schools)</p>	<p>Test the effectiveness and cost-effectiveness of the intervention to reduce children's level of behavioural and emotional difficulty.</p>	<p>'PATHS' (Promoting alternative thinking strategies). Aims to improve skills in five areas: self-awareness, managing feelings, motivation, empathy and social skills. Lessons are developmentally sequenced and focus on techniques for self-control; emotional and interpersonal understanding steps for solving interpersonal problems; positive self-esteem and improved peer relationships.</p>	<p>44 lessons in Year 1; 47 x lessons in Year 2. Delivered by trained teachers within classroom.</p> <p>Manual provides teacher scripts, pictures, activity sheets, photos, posters, and home activities.</p>
<p>Collins et al., 2013 [32]</p> <p>(South Lanarkshire, Scotland)</p>	<p>9-10 year old pupils (n=317; 9 schools; 18 classes).</p>	<p>To explore if anxiety & coping showed improvement post-intervention, and test effects of delivery.</p>	<p>'Lessons for living: Think Well, Do Well'. CBT based intervention to develop coping skills. A series of skills practice using interactive teaching methods. Children are guided to recognise emotional symptoms, reduce avoidant coping strategies, and focus on proactive problems solving and support-seeking.</p>	<p>Ten lessons delivered by a psychologist (n=103) & teacher (n=79) during PSE. Teachers provided with intervention manual following one-day training.</p>
<p>Stallard et al., 2007 [33]</p> <p>(Bath & N.E. Somerset, England)</p>	<p>9-10 year old pupils (n=106; 3 schools; 4 classes).</p>	<p>To evaluate an Australian-originated intervention in the UK; test delivery by school nurses.</p>	<p>'FRIENDS - Feelings, Relax, I can do it, Explore solutions, Now reward, Don't forget practice, Smile'. Based on CBT principles it teaches children practice skills to: identify their anxious feelings and learn to relax; identify unhelpful thoughts and replace them with helpful thoughts; face and overcome problems and challenges.</p>	<p>Ten sessions delivered by school nurses who attended 2-day training. Lessons comprise group work, workbooks, role play and games. Parents invited to pre-intervention session.</p>
<p>Stallard et al., 2014 [34]</p> <p>(Bath, N.E. Somerset, Swindon, Wiltshire, England)</p>	<p>9-10 year old pupils (n=1448; 45 x schools)</p>	<p>To assess the effectiveness of FRIENDS delivered by both health and school professionals on anxiety prevention.</p>	<p>As above (Stallard et al., 2007)</p>	<p>Nine x 60 min lessons delivered to whole classes. Health-led group: two trained facilitators. Teacher-led group: led by class teacher. All attended 2-day training.</p>

SECONDARY SCHOOLS

Study (Location)	Sample	Study aim / hypothesis	Intervention - Theoretical model and Content	Intervention - Setting, Structure & Delivery
Boniwell et al., 2016 [35] (S.E. London, England)	11-12 year old pupils (n=296; 2 x Haberdashers' Aske's Fed. of Schools)	To test the efficacy of a new school programme for the promotion of happiness and wellbeing skills.	'Personal Wellbeing Lesson Curriculum'. Covers the 'scientific basis of happiness' focusing specifically on two core aspects: positive emotions / experiences and positive relationships. Based on theoretical constructs from wellbeing research and positive psychology e.g. 'three good things', forgiveness letter, gratitude visit.	Eighteen bi-weekly 50 min scripted lessons delivered to 8 classes by 4 teachers who attended 5-day training. Provided with lesson plans, PowerPoints and handouts.
Challen et al., 2014 [36] (Greater London, N.W. England & N.E. England)	11-12 year old pupils (n=2844; 16 x schools; 3 x L.As)	To evaluate a UK version of Penn Resiliency Program (PRP). Hypothesised high completion rates and reduction of depression symptoms.	'UK Resiliency Program'. Aims to build resilience and promote realistic thinking and adaptive coping, based on Ellis's 'Activating event-belief consequences model'. Teaches cognitive behavioural and social problem-solving skills; encourages accurate appraisal of situations; and assertiveness, negotiation and relaxation skills.	An 18-hour program delivered within the timetable at the teacher's discretion. Delivered by school staff who attended 10-day training in the US.
Chisholm et al., 2016 [37] (Birmingham, England)	12-13 year old pupils (n=769; 6 x schools).	To test whether contact with an individual with MH diagnosis plus education is more effective in reducing stigma, improving MH literacy and promoting wellbeing than education alone.	'Schoolspace'. A 10-module MH intervention designed by study researchers covering topics such as stress, depression, psychosis, different ways of thinking and a drama workshop. The 'contact' group had an individual facilitating who was a MH service user and had a diagnosis (e.g. psychosis, BPD) - this was revealed halfway through the day.	A one-day intervention within the school led by NHS staff, trained volunteers and MH service users.
Kuyken et al., 2013 [38] (England)	12-16 year old pupils (n= 522; 12 x	To investigate the acceptability of a mindfulness programme for teachers and	'Mindfulness in Schools Program' (MiSP). Involved learning to direct attention to immediate experience with open-minded curiosity and acceptance. Skills were learned	Nine weekly scripted lessons delivered as part of the curriculum, or at lunchtime by 7

1		schools).	students; test	through practice sessions and	teachers trained
2			efficacy of	everyday application.	and approved to
3			programme on	Mindfulness practice used to	deliver the MiSP
4			MH and	work with mental states and	curriculum.
5			wellbeing.	everyday stressors to cultivate	
6				wellbeing and promote mental	
7				health.	
8					
9					
10	Rice et al.,	13-14	To compare	'TRY' (Thinking about Reward	Eight weekly
11	2015 [39]	year old	three types of	in Young People). Aimed to	manualised
12	(S.E.	pupils	intervention	enhance reward processing	sessions of each
13	England)	(n=256;	which may	through actively selecting	intervention
14		3 x	prevent	activities to lift mood.	delivered within
15		schools).	adolescent	CBT. Aimed to change negative	50-minute PHSE
16			depression and	thinking patterns by	lessons by
17			explore	encouraging evaluation of	Educational
18			cognitive	thoughts.	Psychologists who
19			mechanisms	'MBCT' (Mindfulness Based	attended regular
20			involved with	Cognitive Therapy). Aimed to	supervision.
21			each.	promote awareness and	
22				acceptance of thoughts and to	
23				develop regulation of attention	
24				through guided meditation.	
25				Psychoeducation regarding	
26				depression was provided to all	
27				groups.	
28					
29					
30					
31	Naylor et	14-15	To explore	Mental health lessons. Topics	Six 50 min
32	al. 2009	year old	whether	included: stress, learning	weekly lessons
33	[40]	pupils	teaching	disability, depression, suicide /	delivered by 7
34	(Greater	(n=416;	adolescents	self-harm, eating disorders,	group tutors
35	London,	2 x	about mental	and bullying using methods	from pastoral
36	England)	schools).	health would	such as discussion, role playing	care who
37			result in gains in	and internet searching.	attended a 1-day
38			knowledge and		training from
39			empathy.		researchers.
40					
41					
42	Stallard et	12-16	To assess effects	'RAP-UK: Resourceful	Nine 50-60 min
43	al., 2013	year old	of classroom	Adolescent Programme'. A	manualised
44	[41]	pupils	based CBT on	depression prevention	lessons delivered
45	(Bath, N.E.	(n=5030;	symptoms of	programme based on CBT and	within the PSHE
46	Somerset,	8 x	depression and	interpersonal therapy	curriculum by
47	Bristol,	schools,	in relation to	principles adapted to fit the	two trained
48	Wiltshire,	28 x	other aspects of	UK curriculum. Key elements	facilitators
49	Notting-	year	psychological	include: personal strengths,	external to the
50	hamshire,	groups).	wellbeing and	helpful thinking, keeping calm,	school.
51	England)		specific	problem solving, support	
52			demographic	networks and keeping the	Two booster
53			sub-groups.	peace. Students complete	sessions offered
54				workbooks as they progress.	to schools at 6
55					month follow up.
56					

297 **EFFECTIVENESS OF INTERVENTIONS**

298 An overview of study characteristics and outcomes can be found in Tables 2 and
299 3.

300 **Data collection and measurement**

301 Studies varied widely in their use of measures. Measures used to rate
302 depressive symptoms included the Children's Depression Inventory (CDI) [36],
303 the Short Mood and Feelings Questionnaire (SMFQ) [39, 41] and the Center for
304 Epidemiological Studies - Depression Scale (CES-D) [38]. Measures used to rate
305 anxiety included the Revised Children's Anxiety and Depression Scale (RCADS)
306 [34, 41], Revised Children's Manifest Anxiety Scale (RCMAS) [36], Penn State
307 Worry questionnaire [41] and the Spence anxiety scale [30,32,33]. Measures used
308 to capture different methods of coping related to symptoms of anxiety or
309 depression included: Children's Automatic Thoughts Scale (CATS) [41], Coping
310 Strategy Indicator (CSI) [32], Sentence Completion for Events in the Past Test
311 (SCEPT) [39], and Perceived Stress Scale (PSS) [38]. Two studies used measures
312 related specifically to wellbeing or resilience: Warwick-Edinburgh Mental
313 Wellbeing Scale (WEMWBS) [38] and the Resilience Scale [37] and others used
314 measures related to self-esteem [33,34,41] and life satisfaction [35]. The
315 Strength and Difficulties Questionnaire (SDQ) was the most commonly used
316 measure said to rate behavioural, emotional difficulties and overall functioning
317 and either the child, parent or teacher version was used in six of the twelve
318 studies [30,31,33,36,37,40]. Studies varied according to the length of follow up
319 ranging from 4 weeks [37], to 2 years [41]. Four of the twelve studies sought to
320 obtain qualitative, as well as quantitative data [30,35,37,41]. However, it was
321 beyond the scope of this paper to comment on qualitative findings.

322 Due to the heterogeneity of studies, the effectiveness of each
323 intervention approach will be discussed in turn. Overall, results suggested a
324 trend whereby higher quality studies reported less positive effects.

325 **Studies trialling bespoke mental health education programmes (n=3;**
326 **[40,37,35] - all in secondary schools).**

327 Two studies found small ($d=0.11-0.22$) but significant improvements in
328 total and subscale SDQ scores for those that received mental health education.

1 329 However, of those, it is noteworthy that Chisholm et al. [37] did not employ a
2 330 non-intervention condition. Boniwell et al. [35] trialled a bespoke intervention
3 331 based on Positive Psychology principles and found a decrease in outcomes of life
4 332 satisfaction and an increase in negative affect for both groups. However, this
5 333 was less so for the intervention group ($d=-0.24$ compared to $d=-0.79$) which was
6 334 interpreted as the intervention having a 'buffering effect' at a time of stress for
7 335 the pupils.

12 336 **Studies trialling CBT-based interventions** [$n= 8$; 30-34,36,39,41]. These are
13 337 described by setting (Primary and then Secondary).

16 338 *Primary schools*

19 339 All primary-school based studies trialled interventions pertaining to
20 340 altering thinking styles based on CBT principles. Four studies, three of which
21 341 employed a control arm, reported statistically positive outcomes on anxiety-
22 342 related measures following interventions including FRIENDS [33,34], 'Think Feel
23 343 Do' [30] and locally developed CBT programmes [32] with larger effects for
24 344 those in 'high risk' groups ($d=-1.26$; [33] - no control arm). Methodological issues
25 345 such as a small sample size and significant group differences at baseline
26 346 ($n=13$;[30]), failure to include those lost to follow-up in analysis [32], lack of
27 347 controls [33], and small effect sizes for universal samples ($d=0.01 - 0.2$) [34]
28 348 should be noted when taking inference from those results. Mixed results were
29 349 found in relation to delivery, with stronger effects found in interventions led by
30 350 health professionals ($d=0.2$) versus school staff ($d=0.02$) [34], or no difference
31 351 between psychologist or teacher-led interventions [32]. A sufficiently powered,
32 352 good-quality study evaluating the use of PATHS within the curriculum found few,
33 353 small significant results ($d = 0.06 - 0.14$; teacher-rated intervention measure) at
34 354 12-month follow up, and no effects on any measure at 24-month follow up [31].

35 355 *Secondary schools*

36 356 Fewer significant outcomes were found in trials based within secondary
37 357 school populations. Small ($d=0.093$), but short-lived positive outcomes were
38 358 found on the CDI for those in the UKRP intervention [36]. Mixed results were
39 359 found for those in the UK-RAP intervention, with results indicating some
40 360 beneficial and also potentially negative outcomes [41] although all with small

1 361 effect sizes. Both were high quality, longitudinal, well-powered studies
2 362 employing robust methodologies. Further, no effects were found in the CBT
3 363 group when compared with as-usual controls or other treatments in a smaller
4 364 study looking at mechanisms of change [39]. In the same study, a behavioural
5 365 intervention (TRY) was found to have positive effects on reward-seeking
6 366 behaviour and SMFQ measure ($d=-0.8$) when compared with other treatments;
7 367 however, this finding was not confirmed when compared with PHSE-as-usual
8 368 controls.

15 369 **Studies using mindfulness-based interventions** ($n=2$; [38,39] - both in
16 370 secondary schools).

19 371 Positive outcomes were found in a feasibility study evaluating a
20 372 mindfulness-based intervention [38] which yielded statistically significant,
21 373 modest effects on both depression (CES-D: $d=-0.24$) and wellbeing (WEMWBS:
22 374 $d=0.15$) measures. Due to small sample sizes this study was likely to be
23 375 underpowered; however, outcomes were sustained at 3 months follow up and
24 376 were associated with greater mindfulness practice. No significant outcomes were
25 377 found in a smaller study trialling MBCT on measures of mood (SMFQ) or reward-
26 378 seeking [39].

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Table 2. Design and outcome characteristics of primary-school based studies.

Study (% quality rating)	Study Design	Measures	Follow-up	Effects / Outcomes
Attwood et al., 2012 [30] (34%)	Randomised pre-post intervention evaluation using opportunistic sample. No blinding or randomisation procedure reported. 'cCBT' (n=6) x control group (n=7).	<ul style="list-style-type: none"> • SCAS - Parent & Child version. • SDQ - Parent version. • Focus groups (n=8) 	Baseline; 6-weeks post intervention.	Significant reduction in SCAS-C 'social' (d=0.49*) and 'general anxiety' (d=0.48*) subscales (NB: Intervention group significantly higher on SCAS at baseline). No effects on parent rated measures.
Berry et al., 2016 [31] (68.8%)	Randomised controlled trial; web randomisation system. 29 schools 'PATHS' intervention x 27 schools WL Control. ¹	<ul style="list-style-type: none"> • SDQ - teacher version. • PATHS teacher rating scale (PTRS). • T-POT. 	Baseline; 12 month post-intervention; 24 month post intervention.	No differences on SDQ at 12-month F-up. Some significant results on subscales of PTRS at 12 month f-up (Social competence: d=0.09*; Aggression: d=0.14*; Inattention: d=-0.06*; Peer relations: -0.10*). Not maintained at 24 month follow up.
Collins et al., 2013 [32] (46.9%)	Randomised 3 x 3 mixed design. No randomisation procedure reported. Psychologist led anxiety intervention (n=103) x Teacher led anxiety intervention (n=79) x Controls (n=135).	<ul style="list-style-type: none"> • CSI • SCAS -Child version administered by teachers. 	Baseline; post-intervention; (within 3 weeks of end); 6 months follow up.	Improvement in psychologist-led and teacher-led groups on SCAS-C (d=0.41*; d=0.31*) & CSI 'Avoidance' (d=0.31*; d=0.31*) and 'problem solving' (d=-0.66*; d=0.52*) subscales. No difference between psychologist or teacher-led groups. SCAS-C outcomes maintained at 6 months follow up (d=0.39*; d=0.39*). NB: Those lost to follow up (n=155) not included in analysis.
Stallard et al., 2007 [33] (43.4%)	Pre- post evaluation of pupils (n=106) from 3 schools taking part in the FRIENDS intervention. No controls employed.	<ul style="list-style-type: none"> • SCAS-Child version. • CFSEQ. 	'T1': 6 month prior; 'T2': prior to intervention; 'T3': 3-month follow-up.	Improvements in SCAS (d=-0.50*) and CFSEQ (d=0.58*) from T1 to T3 for whole sample; not between T2 and T3 (across intervention). Improvements on both measures (d=-1.26*; d=-1.27*) for 'high risk' group between T2-T3.

<p>Stallard et al., 2014 [34] (75%)</p>	<p>Cluster randomised controlled trial randomised through computer tool.</p> <p>Health-led FRIENDS (n=489) x School led FRIENDS (n=472) x Controls (n=401).¹</p>	<ul style="list-style-type: none"> • RCADS 30 - child & parent. • Penn State Worry Questionnaire. • RSES. • Bully / victim questionnaire. • Subjective wellbeing assessment. • SDQ- Parent version; teachers completed 'Impact scale'. 	<p>Baseline;6 months f-up; 12 months follow-up.</p>	<p>Improvement on total RCADS (d=0.20*) and social (d=-0.09*) & general anxiety subscales (d=-0.20*) - not depression. Smaller effect sizes in school led group (d=0.02*; d=0.11*; d=0.01*);. No statistical improvements on secondary outcome measures or teacher / parent rating scales.</p>
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¹ Study sufficiently powered to detect change. ² Power calculation provided but proportion lost to follow up (>15%) reduced sample required for adequate power. *Significant at p<0.5 level.

SCAS = Spence Children's Anxiety Scale; SDQ – Strength and Difficulties Questionnaire; PATHS = Promoting Alternative Thinking Strategies; PTRS = Paths teacher rating scale; T-POT = Teacher Pupil Observation Tool; CFSEQ = Culture-free Self-esteem questionnaire; RCADS = Revised Child Anxiety and Depression Scale; CSI = Coping Strategy Indicator

Table 3. Design and outcome characteristics of Secondary school-based studies.

Study (% quality rating)	Study Design	Measures	Follow-up	Effects / outcomes
Boniwell et al. 2016 [35] (37.5%)	Non-randomised control group pre-post design. 'Personal Wellbeing' intervention group (n=211) x control group (n=85).	<ul style="list-style-type: none"> • SLSS. • MSLSS. • PNASC. • Qualitative interviews. 	Baseline; Post-intervention (10 month f-up)	No significant improvement on SLSS or MSLSS. Decrease in 'satisfaction with school'(d=0.4*) and 'friends' (d=-0.17) scores for whole sample. Decrease in positive affect for both intervention and control groups (d=-0.24*; -0.79*); increase in negative affect (d=0.54*) for control group. NB: Those lost to follow up (n=103) not accounted for in analysis.
Challen et al. 2014 [36] (78.1%)	Non-randomised pragmatic controlled trial. UKRP intervention (n=1016) group x Control (n=1894) group. ¹	<ul style="list-style-type: none"> • CDI. • RCMAS. • SDQ. 	Baseline; post intervention (4-9 months); 1 yr follow-up; 2 year follow-up.	Small significant impact on CDI post-intervention (d=0.093*); not maintained at 1 or 2 years follow up. No significant effects on RCMAS or SDQ scores.
Chisholm et al. 2016 [37] (75%)	Pragmatic cluster randomised controlled trail, randomised by independent researcher. 'Contact and MH Education' (n=354) group x MH Education (n=303) group. ² No 'as usual' controls.	<ul style="list-style-type: none"> • RIBS (not validated for adolescents). • MAKS (not validated for adolescents). • SDQ. • Resilience scale. • Helpseeking Q. • Focus groups. 	Baseline - 2 weeks prior to intervention day; 2 weeks post-intervention day.	Statistical sig. improvements on several scales post intervention day for both groups - 'contact and education' and 'education only': Attitudinal based stigma (d=0.23*; d=0.25*), knowledge based stigma (d=0.54*; d=0.59*), mental health literacy (d=0.05; d=0.13*); emotional wellbeing (d=0.16*; d=0.14*), and resilience (d=0.07; d=0.22*). No change in 'helpseeking'.

¹ Study sufficiently powered to detect change.

² Power calculation provided but proportion lost to follow up (>15%) reduced sample required for adequate power. *statistically significant at p < 0.05 level.

SLSS – Student’s Life Satisfaction Scale; MSLSS = Multidimensional Students Life Satisfactions Scale; PNASC = Positive and Negative Affect Schedule for Children; CDI = Children’s Depression Inventory; RCMAS = Revised Children’s Manifest Anxiety Scale; SDQ = Strength and Difficulties Questionnaires; RIBS = Reported and Intended Behaviour Scale; MAKS = Mental Health Knowledge Schedule; WEMWBS = Warwick Edinburgh Mental Wellbeing Scale;

<p>Kuyken et al. 2013 [38] (59%)</p>	<p>Non-randomised controlled feasibility study. MiSP intervention group (n=256) x control (n=266).</p>	<ul style="list-style-type: none"> • WEMWBS. • PSS. • CES-D. • Mindfulness practice. 	<p>Baseline; Post-intervention (9 weeks); 3 month follow-up.</p>	<p>Lower depression scores post-intervention (d=-0.29*). Improvement on all measures at 3 month follow-up (WEMWBS: d=0.15*; PSS: d=-0.09*; CES-D: d=-0.24*). Mindfulness practice significantly associated with greater gains across all measures (unable to calculate E.S.).</p>
<p>Rice et al. 2015 [39] (50%)</p>	<p>Non-randomised longitudinal design with three intervention conditions. TRY intervention group (n=50) x CBT group (n=53) x MBCT group (n=54) x PHSE controls (n=99).</p>	<ul style="list-style-type: none"> • SMFQ. • CGT to measure reward seeking. • DASC and corresponding response time. • SCEPT to measure overgeneral memory. 	<p>Baseline; 9 week follow-up.</p>	<p>Statistical sig. changes in reward seeking in TRY group (d=0.12*); no change after CBT or MBCT. No statistically significant decrease in SMFQ across groups compared to PHSE controls. When comparing treatment groups only, TRY showed statistical reduction in SMFQ when compared with MBCT and CBT (d=-0.8*); reward-seeking moderated reductions in SMFQs scores (d=1.62*).</p>
<p>Naylor et al. 2009 [40] (56.3%)</p>	<p>Non-randomised pre-post control group study. MH intervention group (n=175) x Control group (n=242).¹</p>	<ul style="list-style-type: none"> • Mental Health Questionnaire (unvalidated). • SDQ. 	<p>Baseline (1 week before intervention); 6 months post-intervention.</p>	<p>Improvement in MHQ with regards to awareness of depression causes (d=0.21*) and bullying (d=0.31*). Changes in specific SDQ subscales: 'conduct' (d=0.22*) and 'prosocial' (d=0.11*) but not on total difficulties.</p>
<p>Stallard et al. 2013 (81.3%)</p>	<p>Cluster randomised controlled trial, randomised by computer. UK-RAP intervention group (n=1753) x Attention controls (n=1673) x PHSE controls (n=1604)¹</p>	<ul style="list-style-type: none"> • SMFQ. • CATS. • RSES. • RCADS. • School connectedness. • Attachment Questionnaire. • European Quality of Life-5 	<p>Screening - SMFQ only; Baseline; 6 months follow-up; 12 months follow-up.</p>	<p>No significant effect on SMFQ at 12 months follow-up. Some effect of intervention on bullying status at 12 months, and Cannabis use at 6mo and 12 months follow-up. Intervention less useful than usual PHSE or attention controls for panic; less useful than usual PHSE on CATS 'personal failure' and general anxiety. Signs of benefits and harm of intervention found, all reported to be small effect sizes (data unavailable to calculate effect size).</p>

PSS = Perceived Stress Scale; CES-D = Center for Epidemiologic Studies Depression Scale; SMFQ = Short Mood and Feelings Questionnaire; CGT = Cambridge Gambling Task; DASC = Dysfunctional Attitudes Scale for Children; SCEPT = Sentence completion for Events from the Past (SCEPT); CATS = Children's Automatic Thoughts Scale; RSES = Rosenberg Self Esteem Scale.

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¹ Study sufficiently powered to detect change. ² Power calculation provided but proportion lost to follow up (>15%) reduced sample required for adequate power. *Significant at p<0.5 level.

Peer review only

380 Implementation Issues

381 Common issues relating to implementation were found across all studies.

382 *Fidelity*

383 Fidelity to intervention delivery was highlighted as an issue in terms of both
384 measurement and outcome. Studies used self-rated fidelity methods [32], external
385 fidelity ratings on a proportion of sessions [31,34,36,37,41] or no fidelity rating
386 methods reported at all. Studies commented variably on the possible effect of
387 fidelity and ‘treatment dosage’ on outcomes. In Stallard et al.’s [37] study the
388 health-led condition with 100% fidelity (i.e. administered all pieces of homework
389 and activity tasks), was associated with significantly better outcomes than the
390 school-led group who achieved 60-80% fidelity. ‘High quality’ workshops were also
391 found to be related to greater declines in CDI measures [36]. Conversely, Berry et
392 al. [31] found that fidelity (when applying an arbitrary ‘80%’ rate of ‘high’ fidelity)
393 was not found to be related to outcome.

394 *Attrition*

395 Investment from schools was raised as an issue as demonstrated by school
396 participation and attrition [31,41] and failure to administer follow up measures as
397 per study procedures [32,35]. All studies, with the exception of Stallard et al. [41]
398 provided little information about school or participant characteristics of those who
399 dropped out. This confounding factor may have positively biased results. For
400 instance, in Kuyken et al’s [38] study, teachers who delivered the mindfulness
401 intervention had been invested in the intervention for approximately 2 years
402 before the beginning of the study and attended regular supervision, demonstrating
403 good motivation throughout the study which found positive outcomes.

404 *Costs*

405 Two studies actively explored health economic costs involved [31,41]. Cost-
406 effectiveness was not calculated by Berry et al. [31] due to lack of impact, and
407 Stallard et al. [41] concluded that the intervention was not cost-effective. Of
408 note, both studies may have sustained high costs due to employing external
409 facilitators to lead the intervention rather than teachers [41] and hiring ‘coach
410 consultants’ to monitor delivery [31].

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3 411 **DISCUSSION**

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5 412 This review aimed to explore the effectiveness and study quality of
6 413 universally delivered school-based interventions within the UK which aim to
7 414 promote mental and emotional wellbeing, or prevent mental ill health. Several
8 415 clear conclusions can be drawn from this review, while other issues require further
9 416 clarity from future research.

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16 418 ***How effective are universal school-based interventions in the UK that promote***
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18 419 ***mental health, emotional wellbeing, or psychological resilience?***

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20 420 Based on the studies included in this review, the effectiveness of universal
21 421 school based interventions remains mixed, and at best, modest. Where there were
22 422 several positive outcomes, effect sizes were small and methodological issues
23 423 rendered many results to be interpreted with caution.

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27 424 Studies based in Primary schools seemed to find more encouraging results
28 425 from CBT-based interventions on measures of anxiety, although most studies had
29 426 methodological limitations relating to use of appropriate controls, and failure to
30 427 include those lost to follow up in analysis. Positive results tended to fall in the
31 428 older age range of Primary school pupils (9-12 years old).

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36 429 Within the Secondary school population, the most positive results were
37 430 obtained when delivering mental health education sessions, behavioural or
38 431 mindfulness interventions. Two high powered, good quality studies evaluating CBT
39 432 based interventions within secondary populations found few significant results and
40 433 one study indicated possible detrimental impacts of the intervention compared to
41 434 controls, although any effect sizes related to these findings were small.

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46 435 It is curious that studies fail to detect promising effects in the older,
47 436 secondary school, population. It could be argued that a 2 year follow-up is not
48 437 sufficient to truly detect change or prevention during the developmentally-
49 438 sensitive time that is adolescence. Arguably, the demands placed on adolescents
50 439 merely change in nature rather than impact over time. Adolescent psychosocial
51 440 development [42] is particularly vulnerable as individuals are required to manage
52 441 academic demands as they progress through their school career, navigate

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3 442 friendships, seek to develop self-identities and deal with the physiological changes
4 443 that occur as they transition through puberty. It could be that the existence of
5 444 such pervasive and fluctuating stressors juxtaposed with measurement issues,
6 445 discussed below, contribute to the failure to detect significant results in secondary
7 446 school populations. Or, that such interventions simply have less impact for this
8 447 population.

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15 449 ***What methodologies are being applied in UK schools when trialling***
16 450 ***interventions and what is the quality of these studies?***

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19 451 Methodological issues were predominant in this review. Only four of the
20 452 studies were of 'excellent' quality and findings indicated a trend towards higher
21 453 quality papers finding fewer positive results. Studies were weakened largely due to
22 454 their lack of randomisation and blinding of researchers, and small sample sizes
23 455 which likely rendered them underpowered to detect true effects.

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28 456 While it was encouraging that initial consenting rates were high and
29 457 remained reasonable throughout, study quality would benefit from better
30 458 reporting of those lost to follow up who, possibly, could be a population of
31 459 particular interest when considering the objective of promoting mental and
32 460 emotional wellbeing for all within the school setting. Further, statistical methods
33 461 used to account for such missing data require careful consideration to ensure that
34 462 more stringent and conservative methods - for example, intent-to-treat analyses -
35 463 are applied in school-based research. Otherwise, studies that instead apply a
36 464 'defined completers' or 'completers' analysis expose themselves to the risk of
37 465 yielding false positives.

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45 466 Another issue was the use of controls. Few studies explicitly provided
46 467 details of the content controls groups received. Some indicated that controls may
47 468 have already received materials available in the school around social and
48 469 emotional wellbeing, which could reasonably have confounded results.
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50 470 Additionally, considering the demographic data provided, it is unlikely that the
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52 471 included studies accurately represent the cultural diversity of schools across the
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3 472 UK, therefore caution should be taken when considering the generalizability of
4 473 results.

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7 474 The last prominent issue highlighted in this study was the diverse use of
8 475 measures and length of follow up across studies, making it difficult to ascertain a
9 476 coherent picture of measurement and effects in the current research base.

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12 477 As commented in one study [36] and further afield [21], measurement issues
13 478 within universal populations are particularly problematic due to common floor
14 479 effects, particularly when using measures pertaining to the existence of mental
15 480 health conditions. As has been well-documented, demonstrating improvement in
16 481 'high risk' groups is somewhat easier as baseline scores are often elevated
17 482 providing scope for reduction [41]. Demonstrating change within a universal
18 483 population is therefore inherently more difficult and requires careful thought when
19 484 moving forward. Is it sufficient that the absence of a mental health condition
20 485 equates to greater wellbeing or resilience as suggested by Boniwell et al. [35], or
21 486 should researchers direct attention to explicitly measuring wellbeing and resilience
22 487 and mechanisms of change within such constructs in order to truly operationalise
23 488 factors relating to the prevention of mental health difficulties?

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26 489 Few studies in this review used wellbeing or resilience measures. However,
27 490 those that did [37, 38] found positive effects. While any meaning of these results
28 491 must be taken with caution due to methodological issues, this nevertheless
29 492 suggests that such measures are at least able to detect change within a universal
30 493 population.

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33 494 Only one study explored mechanisms of change [39] by using cognitive
34 495 reasoning tests when comparing several interventions, and found that a
35 496 behavioural intervention led to more reward-seeking and a reduction in mood
36 497 symptoms. It would be of value to explore this further given the
37 498 neurodevelopmental stage of early adolescence when frontal lobes are still
38 499 maturing and neuronal connections continue to grow [43]. Consequently, the
39 500 adolescent's ability to plan, problem solve and manipulate abstract information, as
40 501 is arguably necessary in cognitive-based interventions, may be overridden by more
41 502 disinhibited, emotionally driven impulses and the seeking of concrete rewards, as

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3 503 may be seen in earlier adolescence and would potentially explain increased
4 504 receptiveness to a behavioural rather than cognitive intervention.
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9 506 ***What are the identified barriers in delivering and evaluating universal school***
10 ***based interventions?***
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13 508 Implementation barriers relating to fidelity to intervention delivery and
14 509 costs were also raised within this review. Variance in fidelity measurement to
15 510 confirm reliable manualised delivery was a recurring issue, which is of particular
16 511 salience when delivery has been consistently argued to be related to outcome
17 512 [10,12]. Intervention delivery itself varied between studies where school staff or
18 513 external researchers delivered the courses. While results were mixed when
19 514 comparing the effectiveness of teacher-led versus externally-led interventions,
20 515 overall within this review the results were neutral suggesting, at best, that there is
21 516 no negative impact of teacher delivery. While issues relating to treatment fidelity
22 517 may be more prominent with teacher delivery, considering sustainability, it could
23 518 be argued that this would be the optimal approach in school settings, especially
24 519 considering the financial costs involved in employing external facilitators as
25 520 demonstrated by two studies in this review [31, 41]. Further, research has
26 521 indicated that pupils prefer both that mental health education be delivered by
27 522 someone with a thorough knowledge of the subject, and for it to be delivered by
28 523 someone they know e.g., a teacher [44].
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40 524 No study in this review explored the impact on any allied services such as
41 525 CAMHS. For instance, it may be useful to audit local CAMHS referral-rates whilst
42 526 reviewing the effectiveness of school-based interventions, and whether an increase
43 527 or decrease in referrals would be observed. Considering the absence of reliable
44 528 positive outcomes at the individual level at this point, a systemic perspective
45 529 could be of value when considering any cost benefits to the wider health and social
46 530 care services.
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52 531 Further, it was unclear from the review what local or national political or
53 532 strategic drivers instigated each study, and indeed, the extent to which children
54 533 and young people were consulted in the process, design and delivery of the
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3 534 interventions. It was outside the scope of this review to explore the qualitative
4 535 findings from the few studies that employed focus groups. Therefore, it is
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6 536 recommended that future qualitative reviews of school-based research are
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8 537 conducted in order to ensure that children's and young people's views as
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10 538 stakeholders in this work are sufficiently represented.

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13 14 540 **Limitations**

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16 541 This study was limited in its ability to source evaluations representative of
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18 542 the entire UK as the majority of studies were based in England. While efforts were
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20 543 made to source evaluations from elsewhere in the UK, the lack of validated
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22 544 measures or application of pre-post methodology meant that such evaluations from
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24 545 the 'grey literature' could not be included in this review. It should therefore be
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26 546 noted that there is much relevant work being conducted in schools across the UK.
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28 547 However, schools and local authorities should be urged to reliably evaluate their
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30 548 valuable efforts and contribute to the published literature, thereby demonstrating
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32 549 the important work being driven by teachers and policymakers nationwide.

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34 550 This study was also limited in its date source in that only studies from the
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36 551 year 2000 were included in this review. While results from other systematic
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38 552 reviews suggested that little relevant research was done in the UK before this
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40 553 time, it could still be that some studies were missed due to this limit.

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43 44 555 **Implications**

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46 556 This review highlighted the need to employ robust methodological designs
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48 557 within school-based research in order for any effects to be interpreted
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50 558 meaningfully. Measurement issues exist where they do not adequately detect
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52 559 change in universal populations, and there is a wide variety of measures used
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54 560 ranging from 'clinical' to wellbeing measures. This review concludes that school-
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56 561 based researchers across the UK should attempt to come together to discuss ways
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58 562 to address this issue and improve coherence in the literature.

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3 563 An additional, imperative implication from this review is the proactive
4 564 inclusion and involvement of teachers in this work. As has been commented
5 565 elsewhere [45] without the ‘buy-in’ from teachers, any school-based intervention
6 566 is less likely to sustain or achieve positive outcomes. In a time of additional
7 567 pressures on teachers, the need to feel in control of initiatives is key. Of note, two
8 568 of the studies in this review included adult-focussed exercises for the teachers
9 569 themselves as an adjunct to the intervention training. This approach may go
10 570 further to assist teachers’ stress management and understanding of mental health
11 571 whilst attending to the needs of their pupils.
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20 573 **Conclusions**

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22 574 The current evidence suggests there are neutral to small effects of
23 575 universal, school-based interventions in the UK that aim to promote emotional or
24 576 mental wellbeing or prevention of mental health difficulties. Whilst the real-world
25 577 limitations of conducting research in schools exists, robust, long-term
26 578 methodologies need to be attempted when conducting research in this area in
27 579 order to explore the longitudinal impact of school-based interventions on
28 580 wellbeing. Academic attainment, school attendance and rates of high-risk
29 581 presentations also need to be further explored. This requires adequate recording
30 582 of fidelity, the use of validated measures sensitive to mechanisms of change,
31 583 reporting of those lost to follow up and any adverse effects, and the use of
32 584 qualitative data to supplement quantitative outcomes. Interventions in the existing
33 585 UK-based literature include educational, behavioural, cognitive and mindfulness
34 586 components, each demonstrating variable results. Nevertheless, national and local
35 587 policy [25, 26, 27] indicates that there remains an appetite to develop work in this
36 588 area in order to promote wellbeing outcomes for children and young people. In this
37 589 case, further research collaborations are required across the UK to robustly
38 590 demonstrate any benefits for pupils or on the wider system.
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3 594 **CONTRIBUTORSHIP**
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5 595 This piece of research was submitted in part fulfilment for a Doctorate
6 596 degree in Clinical Psychology. KM (Dr Karen Mackenzie) was the main researcher
7 597 and responsible for developing the research questions, conducting the search
8 598 strategy and analysing results. CW (Professor Chris Williams) supervised this
9 599 research and acted as co-rater during the search process. Many thanks to Dr Claire
10 600 Adey (CA) who assisted in the quality rating process.
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15 601 **COMPETING INTERESTS**
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17 602 CW is President of BABCP- the lead body for CBT in the UK, and a CBT
18 603 researcher and trainer. He is also author of a range of CBT-based resources
19 604 including some aimed at primary and secondary school populations. These are
20 605 available commercially as books, online courses, and classes. He receives royalty,
21 606 and is shareholder and director of a company that commercialises these resources.
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25

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27

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29 609 commercial or not-for-profit sectors.
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32 610 **DATA SHARING**
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36

37 612 **FIGURE LEGEND**
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39 Figure 1: PRISMA flow diagram
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41 Table 1: Overview of interventions
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43 Table 2: Study design and outcomes - Primary schools
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45 Table 3: Study design and outcomes - Secondary schools
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60

617 **REFERENCES**

- 618 1. Kieling C, Baker-Henningham H, Belfer M, et al. Child and adolescent mental
619 health worldwide: evidence for action. *Lancet* 2011;378:1515-25.
- 620 2. Costello EJ, Mustillo S, Erkanli A, et al. Prevalence and development of
621 psychiatric disorders in childhood and adolescence. *Arch Gen Psychiatry* 2003;
622 60:837-44.
- 623 3. Kendall, P. C., Safford, S., Flannery-Schroeder, E., & Webb, A. Child anxiety
624 treatment: Outcomes in adolescence and impact on substance abuse and
625 depression at 7.4 year follow-up. *Journal of Consulting and Clinical Psychology*
626 2004;72:276-287.
- 627 4. Collins, K. A., & Dozois, D. J. A. What are the active ingredients in preventative
628 interventions for depression? *Clinical Psychology: Science and Practice*
629 2008;15:313-330.
- 630 5. Patel V, Flisher AJ, Hetrick S, McGorry P. Mental health of young people: a
631 global public-health challenge. *The Lancet* 2007;369(9569):1302-13.
- 632 6. World Health Organization. Atlas: Child and Adolescent Mental Health
633 Resources: Global Concerns, Implications for the Future. WHO, 2005.
- 634 7. Masia-Warner, C., Nangle, D. W., & Hansen, D. J. Bringing evidence-based child
635 mental health services to the schools: General issues and specific populations.
636 *Education and Treatment of Children* 2006;29:165-172.
- 637 8. Domitrovich CE, Bradshaw CP, Greenberg MT, Embry D, Poduska JM, Ialongo NS.
638 Integrated models of school-based prevention: logic and theory. *Psychology in*
639 *Schools*. 2010;47(1):71-88.
- 640 9. Vostanis, P., Humphrey, N., Fitzgerald, N., Deighton, J., & Wolpert, M. (2013).
641 How do schools promote emotional wellbeing among their pupils? Findings from a
642 national scoping survey of mental health provision in English schools. *Child and*
643 *Adolescent Mental Health* 2013;18:151-157.

- 1
2
3 644 10. Durlak, JA, Weissberg, RP, Dymnicki, AB, Taylor, RD & Schellinger, KB. The
4 645 Impact of Enhancing Students' Social and Emotional Learning: A Meta-Analysis of
5 646 School-Based Universal Interventions. *Child Development* 2011;82(1):405-432.
6
7
8 647 11. Wells, J, Barlow, J & Stewart-Brown. A systematic review of universal
9 648 approaches to mental health promotion in school. *Health Education* 2003;103(4):
10 649 197-220.
11
12
13 650 12. Neil, A.L. & Christensen, H. Efficacy and effectiveness of school-based
14 651 prevention and early intervention programs for anxiety. *Clinical Psychology Review*
15 652 2009; 29(3):208-215.
16
17
18 653 13. Mychailyszyn. M.P., Brodman, D.M., Read, K.L., et al. Cognitive Behavioural
19 654 School-based interventions for anxious and depressed youth: a meta-analysis of
20 655 outcomes. *Clinical Psychology Science and Practice* 2012;19:129-153.
21
22
23 656 14. Weare, K & Nind, M. Mental health promotion and problem prevention in
24 657 schools: what does the evidence say? *Health Promotion International* 2011;26(1):
25 658 29-69.
26
27
28 659 15. Merry, S., Hetrick, S., Cox, G.R., et al. Psychological and educational
29 660 interventions for preventing depression in children and adolescents. *Cochrane*
30 661 *Database of Systematic Reviews* 2011;12.DOI:10.1002/14651858.CD003380.pub3.
31
32
33 662 16. Corrieri, S., Heider, D., Conrad, I., et al. School-based prevention programs for
34 663 depression and anxiety in adolescence: a systematic review. *Health Promotion*
35 664 *International* 2013;29(3):427-441.
36
37
38 665 17. Spence, S.H., & Shortt, A.L. Research review: Can we justify widespread
39 666 dissemination of universal based interventions for the preventions of depression
40 667 among children and adolescents? *Journal of Child Psychology and Psychiatry*
41 668 2007;48(6):526-542.
42
43
44 669 18. Calear, al. & Christensen, H. Review of internet-based prevention and
45 670 treatment programs for anxiety and depression in children and adolescents. *The*
46 671 *Medical Journal of Australia* 2010;192(11):12-14.
47
48
49
50
51
52
53
54
55
56
57
58
59
60

- 1
2
3 672 19. Kavanagh, J., Oliver, S., Lorenc, T., et al. School based cognitive-behavioural
4 673 interventions: A systematic review of effects and inequalities. *Health Sociology*
5 674 *Review* 2009;18: 61-78.
6
7
8 675 20. Stallard, P. School-based intervention for depression and anxiety in children
9 676 and adolescents. *Evidence-based Mental Health* 2013;16(3):60-61.
10
11
12 677 21. Reavley, N., Bassilos, B., Ryan, S., et al. Interventions to build resilience in
13 678 Young People: a literature review. *Victorian Health Promotion Foundation* 2015.
14 679 Melbourne.
15
16
17 680 22. Sancassiani, F., Pintus, E., Holte, A., et al. Enhancing the Emotional and Social
18 681 Skills of the Youth to promote their Wellbeing and Positive Development: A
19 682 systematic review of Universal School-based Randomised Controlled Trials. *Clinical*
20 683 *Practice & Epidemiology in Mental Health* 2015;11:21-40.
21
22
23 684 23. National Institute of Clinical Excellence. *Promoting children's social and*
24 685 *emotional well-being in primary education*. 2008. Retrieved from
25 686 <http://www.nice.org.uk/guidance/index>. Accessed June 2016.
26
27
28 687 24. Cheney, G., Schlosser, A., Nash, P., et al. Targeted group-based interventions
29 688 in schools to promote emotional well-being: A systematic review. *Clinical Child*
30 689 *Psychology & Psychiatry* 2014;19(3):412-438
31
32
33 690 25. Department of Education. *Mental health and behaviour in schools:*
34 691 *Departmental advice for school staff*. 2016.
35 692 www.nationalarchives.gov.uk/doc/open-government-licence/version/3. Accessed
36 693 June 2016.
37
38
39 694 26. Education Scotland (no publication date). Curriculum for Excellence. *Health*
40 695 *and Wellbeing Across Learning: Responsibilities for All. Experience and Outcomes*.
41 696 [www.educationscotland.gov.uk/health_wellbeing_experiences_outcomes_tcm4-](http://www.educationscotland.gov.uk/health_wellbeing_experiences_outcomes_tcm4-540031.pdf)
42 697 [540031.pdf](http://www.educationscotland.gov.uk/health_wellbeing_experiences_outcomes_tcm4-540031.pdf) Accessed June 2016.
43
44
45 698 27. CYMRU. 'Thinking positively: Emotional health and well-being in schools and
46 699 Early Years settings'. 2010 www.wales.gov.uk/educationandskills. Accessed June
47 700 2016.
48
49
50
51
52
53
54
55
56
57
58
59
60

- 1
2
3 701 28. Downs, S. H., & Black, N. The feasibility of creating a checklist for the
4 702 assessment of the methodological quality both of randomized and non-randomized
5 703 studies of health care interventions. *Journal of Epidemiological Community Health*
6 704 1998;52:377-384.
- 7
8
9
10 705 29. Popay, J., H. Roberts, A. Sowden, F et al. *Guidance on the Conduct of*
11 706 *Narrative Synthesis in Systematic Reviews: Final Report*. Swindon: ESRC Methods
12 707 Programme 2006.
- 13
14
15 708 30. Attwood, M., Meadows, S., Stallard, P., et al. Universal and targeted
16 709 computerised cognitive behavioural therapy (Think, Feel, Do) for emotional health
17 710 in schools: Results from two exploratory studies. *Child and Adolescent Mental*
18 711 *Health* 2012;17(3):173-178.
- 19
20
21
22 712 31. Berry, F., Axford, N., Blower, S., et al. The effectiveness and micro-costing
23 713 analysis of a Universal, School based, Social-Emotional Learning programme in the
24 714 UK: A cluster-randomised controlled trial. *School Mental Health* 2016;8:238-256.
- 25
26
27
28 715 32. Collins, S., Woolfson, L. M., & Durkin, K. Effects on coping skills and anxiety of
29 716 a universal school-based mental health intervention delivered in Scottish primary
30 717 schools. *School Psychology International* 2013; 35(1):85-100.
- 31
32
33
34 718 33. Stallard, P., Simpson, N., Anderson, S., et al. The FRIENDS Emotional Health
35 719 Programme: Initial Findings from a School-Based Project. *Child & Adolescent*
36 720 *Mental Health* 2007;12(1):32-37.
- 37
38
39 721 34. Stallard, P., Skyrabina, E., Taylor, G., et al. Classroom-based cognitive
40 722 behaviour therapy (FRIENDS): A cluster randomised controlled trial to Prevent
41 723 Anxiety in Children through Education in Schools (PACES). *The Lancet Psychiatry*
42 724 2014;1(3):185-192.
- 43
44
45
46 725 35. Boniwell, I., Osin, E.N., & Martinez, C. Teaching Happiness at school: non-
47 726 randomised controlled mixed-methods feasibility study on the effectiveness of
48 727 well-being lessons. *The Journal of Positive Psychology* 2016;11(1):85-98.
- 49
50
51
52 728 36. Challen, A. R., Machin, S.J., & Gillham J.E. The UK Resilience Programme: a
53 729 school-based universal nonrandomized pragmatic controlled trial. *Journal of*
54 730 *Consulting & Clinical Psychology* 2014;82(1):75-89.

- 1
2
3 731 37. Chisholm, K. E., Patteron, P., Torgerson, C., et al. Impact of contact on
4 732 adolescents' mental health literacy and stigma: the SchoolSpace cluster
5
6 733 randomised controlled trial. *BMC Open* 2016,6:e009435.
7
8 734 38. Kuyken, W., Weare, K., Obioha, C., et al. Effectiveness of the Mindfulness in
9
10 735 Schools Programme: Non-randomised controlled feasibility study. *The British*
11
12 736 *Journal of Psychiatry* 2013; 203(2):126-131
13
14 737 39. Rice, F., Rawal, A., Riglin, L., et al. Examining reward-seeking, negative self-
15
16 738 beliefs and over-general autobiographical memory as mechanisms of change in
17
18 739 classroom prevention programs for adolescent depression. *Journal of Affective*
19
20 740 *Disorders* 2015;186:320-327.
21
22 741 40. Naylor, P., Cowie, H.E., Watters, S.J., et al. Impact of a mental health
23
24 742 teaching programme on adolescents. *The British Journal of Psychiatry*
25
26 743 2009;194:365-370.
27
28 744 41. Stallard. P., Phillips. R., Montgomery, A.A., et al. A cluster RCT to determine
29
30 745 the clinical effectiveness and cost-effectiveness of classroom-based cognitive-
31
32 746 behavioural therapy (CBT) in reducing symptoms of depression in high-risk
33
34 747 adolescents. *Health Technology Assessment* 2013;17(47).
35
36 748 42. Erikson, Erik H. Identity, Youth and Crisis. New York: Norton. 1968.
37
38 749 43. Spear, L.P. Adolescent Neurodevelopment. [Journal of Adolescent Health 2013;](#)
39
40 750 [52\(2\):S7-13. doi:10.1016/j.jadohealth.2012.05.006](#)
41
42 751 44. Woolfson, R, Woolfson, L, Mooney, L, Bryce, D. Young people's views of mental
43
44 752 health education in secondary schools: A Scottish study. *Journal of Child: care,*
45
46 753 *health and development* 2008;35(6):790-798.
47
48 754 45. Weare, K. Editorial: Child and adolescent mental health in schools. *Child and*
49
50 755 *Adolescent Mental Health* 2015;20(2):6-8.
51
52 756
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54 757
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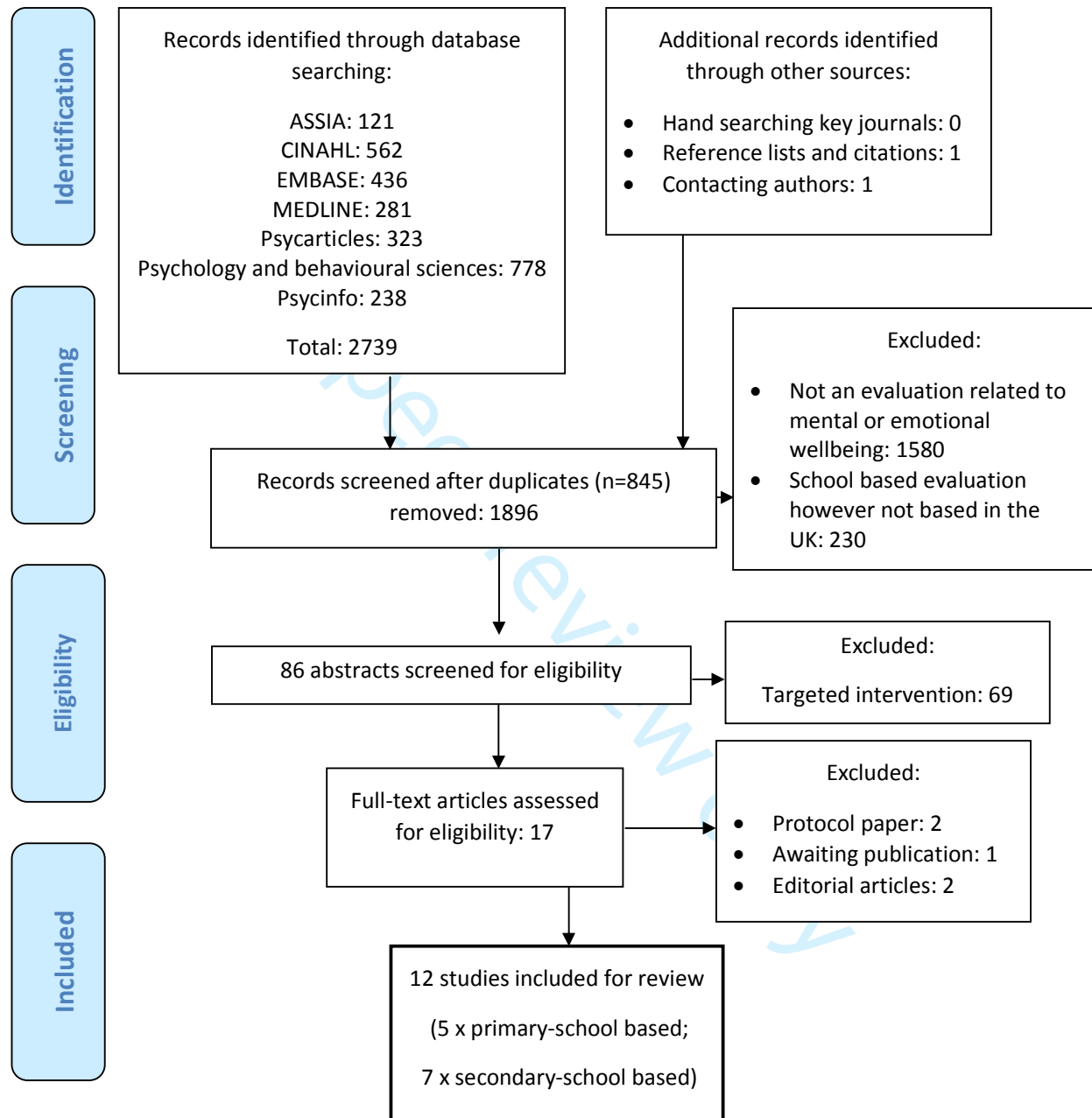


Figure 1: PRISMA diagram of systematic search process.

BMJ Open

**Universal, school-based interventions to promote mental and emotional wellbeing. What is being done in the UK and does it work?
A systematic review**

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Universal, school-based interventions to promote mental and emotional wellbeing. What is being done in the UK and does it work?

A systematic review

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29 **ABSTRACT**

30 **Objectives:** The present review aimed to assess the quality, content and
31 evidence of efficacy of universally-delivered (to all pupils aged 5-16 years),
32 school-based, mental health interventions designed to promote mental
33 health/wellbeing and resilience, using a validated outcome measure and
34 provided within the UK in order to inform UK schools-based wellbeing
35 implementation.

36 **Design:** A systematic review of published literature set within UK
37 mainstream school settings.

38 **Data sources:** Embase, Cinahl, Medline, PsycInfo, PsychArticles, ASSIA
39 and Psychological and Behavioural Sciences published between 2000 and April
40 2016.

41 **Eligibility criteria:** Published in English; universal interventions that
42 aimed to improve mental health/emotional wellbeing in a mainstream school
43 environment; school pupils were the direct recipients of the intervention; pre-
44 post design utilised allowing comparison using a validated outcome measure.

45 **Data extraction and synthesis:** 12 studies were identified including RCTs
46 and non-controlled pre-post designs (5 primary school based, 7 secondary school
47 based). A narrative synthesis was applied with study quality check (Downs and
48 Black, 1998).

49 **Results:** Effectiveness of school-based universal interventions was found
50 to be neutral or small with more positive effects found for poorer quality studies
51 and those based in Primary schools (pupils aged 9-12 years old). Studies varied
52 widely in their use of measures and study design. Only four studies were rated
53 “excellent” quality. Methodological issues such as small sample size, varying
54 course fidelity and lack of randomisation reduced overall study quality. Where
55 there were several positive outcomes, effect sizes were small and
56 methodological issues rendered many results to be interpreted with caution.
57 Overall, results suggested a trend whereby higher quality studies reported less
58 positive effects. The only study that conducted a health economic analysis
59 suggested the intervention was not cost-effective.

60 **Conclusions:** The current evidence suggests there are neutral to small
61 effects of universal, school-based interventions in the UK that aim to promote

62 emotional or mental wellbeing or the prevention of mental health difficulties.
63 Robust, long-term methodologies need to be pursued ensuring adequate
64 recording of fidelity, the use of validated measures sensitive to mechanisms of
65 change, reporting of those lost to follow up and any adverse effects. Further
66 high quality and large-scale research is required across the UK in order to
67 robustly test any long-term benefits for pupils or on the wider educational or
68 health system.

69

70 ***Limitations:***

- 71 ○ Included papers largely based in England so unlikely to be
72 representative of the cultural diversity within UK schools.
- 73 ○ Date limit excluded papers published prior to 2000.

74 ***Strengths:***

- 75 ○ Addressed a gap in the literature.
- 76 ○ Used a robust methodology to review the literature in this area.
- 77 ○ Conclusions will help inform UK policy and practice as this topic
78 continues to be debated in current health, education and political
79 spheres.

80

81 **INTRODUCTION**

82 The mental and emotional wellbeing of children and young people has
83 received increasing attention worldwide. It has been reported that the
84 prevalence of mental health problems ranges from 10-20% [1], and that by the
85 age of 18 up to 20% of young people will have experienced an emotional disorder
86 [2]. Mental health conditions such as anxiety and depression often persist into
87 adulthood [3] and have been associated with a range of negative outcomes
88 including lower academic achievement, higher likelihood of health risk
89 behaviours, self-harm and suicide [4, 5]. However, provision of services for those
90 in need can be as low as 20% [6]. Such access issues to specialist services like
91 CAMHS has meant that school-based interventions have been increasingly

1 explored due to their far reach [7] and existing infrastructure to support child
2 development [8], while noting that schools need support to use the evidence
3 base when applying such interventions [9].
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8 Numerous systematic reviews and meta-analyses have been conducted to
9 review the effectiveness of school-based, mental health interventions at both
10 the universal (delivered to all pupils irrespective of perceived need), and
11 targeted (delivered to vulnerable or 'high risk' individuals only) levels. Overall,
12 this literature has indicated mixed results regarding efficacy of school-based
13 interventions.
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17 Findings have suggested positive effects on social emotional skills, self-
18 concept, positive social behaviours, conduct problems, emotional distress and
19 problem solving when reviewing school based, universal programs aiming to
20 enhance social and emotional skills [10-11]. Further reviews found Cognitive
21 Behavioural Therapy (CBT) formed the basis of the majority of anxiety
22 prevention programs (78%) and over 75% of trials reported a significant reduction
23 in anxiety [12]. CBT-based interventions were also tentatively endorsed as mildly
24 effective in reducing depression (E.S. = 0.29) and moderately effective (E.S. =
25 0.50) in reducing anxiety symptoms [13].
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34 With regards to optimal implementation, it has been noted that more
35 positive outcomes were obtained for programs adopting a 'whole-school'
36 approach, that lasted more than one year, and aimed to promote mental health
37 rather than prevent mental illness [11]. A balance of both universal and targeted
38 approaches has been recommended, along with accurate implementation of
39 interventions [14].
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46 However, the long-term impact and target audience of such initiatives has
47 been questioned. A meta-analysis reviewing prevention of depression
48 programmes found that while there was evidence of immediate post-
49 intervention effects, these did not sustain over time (24-36 months) [15].
50 Moreover, a review evaluating both anxiety and depression programmes found
51 that while the majority were effective for depression (65%) and anxiety (73%),
52 the effect sizes were small (0.12 - 0.29) [16].
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127 It has also been argued that universal prevention interventions are,
128 overall, not efficacious [17-18], with targeted programs being most effective
129 (E.S. = 0.21 to 1.40). Likewise, that while school-based CBT programmes have
130 been demonstrated to lead to a short-term reduction in depression symptoms,
131 interventions are most effective for those in the clinical range [19].

132

133 The literature has, therefore, conveyed conflicting results regarding the
134 efficacy of universal school-based interventions whilst consistently in
135 highlighting methodological issues within the existing research base. Common
136 issues include a lack of active intervention controls [20], studies'
137 operationalisation and measurements of 'resilience' lack homogeneity [21]; that
138 weak program fidelity and treatment dosage impacts outcomes [10] and that
139 there is insufficient use of validated, standardised measures and long-term
140 follow up [22].

141

142 It is also noteworthy that the majority of reviews have focused
143 worldwide, with most reviewed interventions based in Australia, the US or
144 Canada. No reviews have to date focused on studies in schools in the UK. This
145 trend was also referenced in a NICE funded review [23] of targeted and universal
146 school-based interventions who noted that though findings from international
147 based research are helpful, the generalisability to the UK educational system is
148 questionable. Education system differences between countries and continents
149 such as funding, political drivers, curriculum pressures and workforce planning
150 issues give rise to a need for reviews specifically within the UK context,
151 especially while local funders and UK commissioners face calls to address rising
152 mental health problems in schools. Therefore, it is particularly timely to have
153 access to the most relevant information drawn from the current literature as it
154 pertains to the UK educational system specifically.

155

156 One systematic review of targeted school-based interventions within the
157 UK research has been conducted [24]. This found that nurture groups
158 demonstrate an immediate positive impact on the social and emotional

1 159 wellbeing on vulnerable young people, however, that results from longer term
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3 160 follow-up studies are less clear.

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6 162 The need to carry out a review of universal school-based interventions
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8 163 specifically within the UK context therefore remains. This is especially pertinent
9
10 164 in light of the increasing emphasis from national government on developing
11 165 CAMHS services within the UK, and the impetus on health and education services
12 166 to work together in order to improve wellbeing outcomes for children and young
13 167 people [25, 26, 27].

14 168

15 169 **Review aims**

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20 170 The present review aims to fill this gap in the literature by focusing on
21 171 universally-delivered, school-based mental health interventions provided within
22 172 the UK only. The following questions will be explored:

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25 173 *1. How effective are universal school-based interventions in the UK that*
26 174 *promote mental health, emotional wellbeing, or psychological resilience*
27 175 *and what tools are being used to measure effectiveness?*
28
29 176 *2. What methodologies are being applied in UK schools when trialling*
30 177 *interventions and what is the quality of these studies?*
31
32 178 *3. What are the intervention characteristics e.g. delivery, content, target*
33 179 *audience?*
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35 180 *4. What are the identified barriers in delivering and evaluating universal*
36 181 *school based interventions?*

37 182 **Search Strategy**

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43 183 Electronic databases were searched for relevant published research on
44 184 14th April 2016: EMBASE, CINAHL, MEDLINE, PsycINFO, PsycArticles, ASSIA and
45 185 Psychological and Behavioural Sciences. Selected journals relevant to the area
46 186 were hand-searched (British Journal of Educational Psychology; British Journal of
47 187 School Nursing). Previous reviews and relevant papers were reviewed and
48 188 following consultation with University librarians, keyword search terms were
49 189 identified and linked with the Boolean operators 'AND' and 'OR' (see
50 190 supplementary file for search strategy examples):

1 191 Study design criteria were wide to allow for the diverse range of
2 192 methodologies used to overcome challenges in school-based research. Search
3 193 terms were, therefore, chosen primarily to promote sensitivity to the subject
4 194 area. A limit date was set from 2000 to April 2016. The early date limit was
5 195 selected as this area has been promoted by UK governmental policy largely
6 196 within the last decade. Further, detailed appraisal of the previous systematic
7 197 reviews in this area found few, if any, discovered studies prior to this date.

13 198 **Study selection**

15 199 The inclusion criteria were as follows:

- 18 200 • The intervention was based in a mainstream school environment;
- 19 201 • The intervention was universal in its application (i.e. to all pupils
20 202 irrespective of need)
- 23 203 • Pupils were the direct recipients of the interventions;
- 24 204 • The study adopted a pre-post design;
- 26 205 • The intervention aimed to target mental health and/or emotional
27 206 wellbeing;
- 29 207 • The study used a validated measure to quantitatively evaluate emotional
30 208 or mental wellbeing outcomes and reported those outcomes;
- 33 209 • The study was published in English between 2000 and April 2016 in a peer
34 210 reviewed journal.

36 211 Exclusion criteria included:

- 39 212 • The study aims or methodology did not fit the inclusion criteria.
- 40 213 • Any studies using a non-validated outcome measure as their primary
41 214 outcome e.g. Likert scales that were unvalidated.
- 44 215 • Any studies using a purely qualitative methodology.

46 216 **Details of included and excluded studies**

48 217 Duplicate papers were excluded. Titles were screened to identify only
49 218 those that clearly met inclusion criteria. Abstracts were assessed independently
50 219 by the authors. Raters met to compare included papers. Where eligibility was
51 220 unclear based on the abstract, full articles were retrieved and assessed jointly
52 221 by raters. Reference lists of included papers were searched as well as previous

1 222 reviews on related topics. Articles citing included articles were also reviewed
2 223 and one paper was sourced via this method. Authors of protocol papers were
3 224 contacted leading to an additional paper being sourced. Experts in the field in
4 225 Scotland, England, Northern Ireland and Wales were contacted regarding any
5 226 other studies. However, none were eligible for inclusion. Twelve papers were
6 227 included in the final review (see Figure 1).

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11 228 (Editors: See attached Image)

12 229 *Quality rating of studies*

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16 230 The Downs and Black [28] checklist was used to assess quality. This
17 231 checklist assesses internal and external validity, selection bias and study power
18 232 over 27 items. This checklist was used due to its utility in assessing studies
19 233 relating to public health and its applicability to assess quality in both
20 234 randomised and non-randomised studies. Reliability and validity assessment has
21 235 found the Quality Index to have high internal consistency, good test-retest
22 236 ($r = 0.88$) and inter-rater ($r = 0.75$) reliability and good face and criterion validity
23 237 (0.90) [28].

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30 238 A sample of papers were assessed by an independent researcher (CA). Any
31 239 rating discrepancies were discussed and a shared decision reached. A decision
32 240 was taken not to exclude any studies found to be of poor quality as the aim of
33 241 this current review was to critique universal school-based interventions whilst
34 242 acknowledging that the real-world implementation of such evaluations can be
35 243 challenging and, as a result, may reasonably impact study quality.

36 244 *Data extraction*

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42 245 Due to the heterogeneity of the studies, meta-analysis was not
43 246 appropriate. A narrative synthesis was applied to explain the findings of this
44 247 review in line with current guidance [29]. Information gathered from the studies
45 248 included: study aim, intervention (model, duration, delivery), sample
46 249 characteristics, study procedures, outcomes and measures, and results. Issues
47 250 relating to the implementation, as well as effectiveness, of interventions were
48 251 also noted from those studies commenting on such barriers.

49 252 **Patient and Public Involvement**

1 253 No patients or members of the public were directly involved in this piece of
2
3 254 research.

4 5 255 **RESULTS**

6 7 256 **Overview of interventions**

8
9 257 Of the twelve studies sourced, five took place in primary schools [30-34]
10
11 258 and seven took place in secondary schools [35-41]. An overview of study
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13 259 interventions based in Primary and Secondary schools can be found in Table 1.

14 15 260 *Primary school studies:*

16
17 261 The five studies within primary school settings evaluated interventions
18
19 262 based on computerised CBT [30]; a teacher led intervention embedded within
20
21 263 the curriculum (e.g. PATHS - 'Promoting Alternative Thinking Strategies' [31]);
22
23 264 manualised anxiety interventions (e.g. a locally developed anxiety intervention,
24
25 265 or the Australian developed 'FRIENDS' programme) delivered by both school staff
26
266 (teachers and nurses) and external health staff (e.g. psychologists) [32-34].

27 28 267 *Secondary school studies:*

29
30 268 Three of the secondary school-based studies trialled interventions based
31
32 269 on Cognitive Behavioural Therapy principles (e.g. UK Resilience programme
33
34 270 (UKRP), Resourceful Adolescent Programme (RAP-UK) [36, 39, 41]) delivered by
35
36 271 school staff [36], educational psychologists [39] and external facilitators [41].
37
38 272 Interventions were also said to include principles of Interpersonal Therapy (RAP-
39
40 273 UK [41]) and behavioural approaches ('TRY' [39]).

41
42 274 One study trialled an intervention based on Positive Psychology [35], two
43
44 275 studies trialled a mindfulness-based intervention [38-39] and two trialled locally
45
46 276 developed mental health education sessions delivered to all pupils [37,40].
47
48 277 These interventions were led by trained school teachers [35, 38, 40], and trained
49
50 278 volunteers [37]. All delivered the intervention during Personal Health and Social
51
52 279 Education (PHSE) classes.

53 54 280 **Methodological quality**

55
56 281 The quality of studies ranged from 'poor' (34% [30]; 37.5% [35]) to
57
58 282 'excellent' (75% [34,37]; 78.1% [36]; 81.3% [41]).

283 Six studies used a randomised controlled pre-post design [30-32, 34, 37,
 284 41]. The remaining were non-randomised pre-post designs and only one did not
 285 have a control group [33]. Some studies were particularly weak on their
 286 description of sample characteristics and representation of the population
 287 [30,35], reporting of those lost to follow up and accounting for those in the
 288 analysis [32,35], and the exploring of adverse events, of which only one study
 289 provided information [41]. Only six studies provided a power calculation [31,
 290 34,36,37,40,41], most of which had samples sufficiently powered to determine
 291 an effect (except [37]). The remaining studies did not provide such information.

292 Of the eleven studies employing controls, six used controls from the same
 293 school in which the intervention was taking place (32,34,36,37,39). All other
 294 studies recruited controls from different schools.

295 Sample sizes ranged from 13 [30] to 5075 [31]. The age of participants
 296 ranged from 4 [31] to 16 years old [38,41] with the majority of studies targeting
 297 the early adolescent age range (9-12 years old) at the end of Primary school or
 298 at the beginning of Junior / Secondary school [30, 32, 34-37].

31 **Table 1. Overview of interventions based in Primary and Secondary schools.**

32 **PRIMARY SCHOOLS**

35 Study 36 (Location)	37 Sample	38 Study aim / 39 hypothesis	40 Intervention - Theoretical 41 model and Content	42 Intervention - 43 Setting, 44 Structure and 45 Delivery
46 Attwood et 47 al., 2012 48 [30] 49 (Bristol, 50 England)	51 10-12 52 year old 53 boys 54 from 55 two co- 56 educatio 57 nal 58 schools. 59 (n=13)	60 A proof of concept study to explore the viability and possible benefits of a cCBT programme.	'Think, Feel, Do' - Based on CBT principles with a psychoeducation component. Cartoon characters guide users through various activities including: emotional recognition; linking thoughts, feelings and behaviours; identifying and challenging negative thoughts; and problem solving. Involves quizzes, practical exercises, videos, music and animation.	Six x 45min sessions delivered via an interactive multimedia CD- ROM. Took place within the school, facilitated by the researcher.
61 Berry et 62 al., 2016	63 4-6 year 64 old 65 pupils	66 Test the 67 effectiveness 68 and cost-	69 'PATHS' (Promoting alternative 70 thinking strategies). Aims to 71 improve skills in five areas: self-	72 44 lessons in Year 73 1; 47 x lessons in 74 Year 2. Delivered

<p>[31]</p> <p>(Birmingham, England)</p>	<p>(n=5075; 56 x schools)</p>	<p>effectiveness of the intervention to reduce children's level of behavioural and emotional difficulty.</p>	<p>awareness, managing feelings, motivation, empathy and social skills. Lessons are developmentally sequenced and focus on techniques for self-control; emotional and interpersonal understanding steps for solving interpersonal problems; positive self-esteem and improved peer relationships.</p>	<p>by trained teachers within classroom.</p> <p>Manual provides teacher scripts, pictures, activity sheets, photos, posters, and home activities.</p>
<p>Collins et al., 2013 [32]</p> <p>(South Lanarkshire, Scotland)</p>	<p>9-10 year old pupils (n=317; 9 schools; 18 classes).</p>	<p>To explore if anxiety & coping showed improvement post-intervention, and test effects of delivery.</p>	<p>'Lessons for living: Think Well, Do Well'. CBT based intervention to develop coping skills. A series of skills practice using interactive teaching methods. Children are guided to recognise emotional symptoms, reduce avoidant coping strategies, and focus on proactive problems solving and support-seeking.</p>	<p>Ten lessons delivered by a psychologist (n=103) & teacher (n=79) during PSE. Teachers provided with intervention manual following one-day training.</p>
<p>Stallard et al., 2007 [33]</p> <p>(Bath & N.E. Somerset, England)</p>	<p>9-10 year old pupils (n=106; 3 schools; 4 classes).</p>	<p>To evaluate an Australian-originated intervention in the UK; test delivery by school nurses.</p>	<p>'FRIENDS - Feelings, Relax, I can do it, Explore solutions, Now reward, Don't forget practice, Smile'. Based on CBT principles it teaches children practice skills to: identify their anxious feelings and learn to relax; identify unhelpful thoughts and replace them with helpful thoughts; face and overcome problems and challenges.</p>	<p>Ten sessions delivered by school nurses who attended 2-day training. Lessons comprise group work, workbooks, role play and games. Parents invited to pre-intervention session.</p>
<p>Stallard et al., 2014 [34]</p> <p>(Bath, N.E. Somerset, Swindon, Wiltshire, England)</p>	<p>9-10 year old pupils (n=1448; 45 x schools)</p>	<p>To assess the effectiveness of FRIENDS delivered by both health and school professionals on anxiety prevention.</p>	<p>As above (Stallard et al., 2007)</p>	<p>Nine x 60 min lessons delivered to whole classes. Health-led group: two trained facilitators. Teacher-led group: led by class teacher. All attended 2-day training.</p>

SECONDARY SCHOOLS

Study (Location)	Sample	Study aim / hypothesis	Intervention - Theoretical model and Content	Intervention - Setting, Structure & Delivery
Boniwell et al., 2016 [35] (S.E. London, England)	11-12 year old pupils (n=296; 2 x Haberdashers' Aske's Fed. of Schools)	To test the efficacy of a new school programme for the promotion of happiness and wellbeing skills.	'Personal Wellbeing Lesson Curriculum'. Covers the 'scientific basis of happiness' focusing specifically on two core aspects: positive emotions / experiences and positive relationships. Based on theoretical constructs from wellbeing research and positive psychology e.g. 'three good things', forgiveness letter, gratitude visit.	Eighteen bi-weekly 50 min scripted lessons delivered to 8 classes by 4 teachers who attended 5-day training. Provided with lesson plans, PowerPoints and handouts.
Challen et al., 2014 [36] (Greater London, N.W. England & N.E. England)	11-12 year old pupils (n=2844; 16 x schools; 3 x L.As)	To evaluate a UK version of Penn Resiliency Program (PRP). Hypothesised high completion rates and reduction of depression symptoms.	'UK Resiliency Program'. Aims to build resilience and promote realistic thinking and adaptive coping, based on Ellis's 'Activating event-belief consequences model'. Teaches cognitive behavioural and social problem-solving skills; encourages accurate appraisal of situations; and assertiveness, negotiation and relaxation skills.	An 18-hour program delivered within the timetable at the teacher's discretion. Delivered by school staff who attended 10-day training in the US.
Chisholm et al., 2016 [37] (Birmingham, England)	12-13 year old pupils (n=769; 6 x schools).	To test whether contact with an individual with MH diagnosis plus education is more effective in reducing stigma, improving MH literacy and promoting wellbeing than education alone.	'Schoolspace'. A 10-module MH intervention designed by study researchers covering topics such as stress, depression, psychosis, different ways of thinking and a drama workshop. The 'contact' group had an individual facilitating who was a MH service user and had a diagnosis (e.g. psychosis, BPD) - this was revealed halfway through the day.	A one-day intervention within the school led by NHS staff, trained volunteers and MH service users.
Kuyken et al., 2013 [38] (England)	12-16 year old pupils (n= 522; 12 x	To investigate the acceptability of a mindfulness programme for teachers and	'Mindfulness in Schools Program' (MiSP). Involved learning to direct attention to immediate experience with open-minded curiosity and acceptance. Skills were learned	Nine weekly scripted lessons delivered as part of the curriculum, or at lunchtime by 7

1		schools).	students; test efficacy of programme on MH and wellbeing.	through practice sessions and everyday application. Mindfulness practice used to work with mental states and everyday stressors to cultivate wellbeing and promote mental health.	teachers trained and approved to deliver the MiSP curriculum.
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10	Rice et al., 2015 [39]	13-14 year old pupils (n=256; 3 x schools).	To compare three types of intervention which may prevent adolescent depression and explore cognitive mechanisms involved with each.	'TRY' (Thinking about Reward in Young People). Aimed to enhance reward processing through actively selecting activities to lift mood. CBT. Aimed to change negative thinking patterns by encouraging evaluation of thoughts. 'MBCT' (Mindfulness Based Cognitive Therapy). Aimed to promote awareness and acceptance of thoughts and to develop regulation of attention through guided meditation. Psychoeducation regarding depression was provided to all groups.	Eight weekly manualised sessions of each intervention delivered within 50-minute PHSE lessons by Educational Psychologists who attended regular supervision.
11	(S.E. England)				
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31	Naylor et al. 2009 [40]	14-15 year old pupils (n=416; 2 x schools).	To explore whether teaching adolescents about mental health would result in gains in knowledge and empathy.	Mental health lessons. Topics included: stress, learning disability, depression, suicide / self-harm, eating disorders, and bullying using methods such as discussion, role playing and internet searching.	Six 50 min weekly lessons delivered by 7 group tutors from pastoral care who attended a 1-day training from researchers.
32	(Greater London, England)				
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41	Stallard et al., 2013 [41]	12-16 year old pupils (n=5030; 8 x schools, 28 x year groups).	To assess effects of classroom based CBT on symptoms of depression and in relation to other aspects of psychological wellbeing and specific demographic sub-groups.	'RAP-UK: Resourceful Adolescent Programme'. A depression prevention programme based on CBT and interpersonal therapy principles adapted to fit the UK curriculum. Key elements include: personal strengths, helpful thinking, keeping calm, problem solving, support networks and keeping the peace. Students complete workbooks as they progress.	Nine 50-60 min manualised lessons delivered within the PSHE curriculum by two trained facilitators external to the school. Two booster sessions offered to schools at 6 month follow up.
42	(Bath, N.E. Somerset, Wiltshire, Nottinghamshire, England)				
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299 **EFFECTIVENESS OF INTERVENTIONS**

300 An overview of study characteristics and outcomes can be found in Tables 2 and
301 3.

302 **Data collection and measurement**

303 Studies varied widely in their use of measures. Measures used to rate
304 depressive symptoms included the Children's Depression Inventory (CDI) [36],
305 the Short Mood and Feelings Questionnaire (SMFQ) [39, 41] and the Center for
306 Epidemiological Studies - Depression Scale (CES-D) [38]. Measures used to rate
307 anxiety included the Revised Children's Anxiety and Depression Scale (RCADS)
308 [34, 41], Revised Children's Manifest Anxiety Scale (RCMAS) [36], Penn State
309 Worry questionnaire [41] and the Spence anxiety scale [30,32,33]. Measures used
310 to capture different methods of coping related to symptoms of anxiety or
311 depression included: Children's Automatic Thoughts Scale (CATS) [41], Coping
312 Strategy Indicator (CSI) [32], Sentence Completion for Events in the Past Test
313 (SCEPT) [39], and Perceived Stress Scale (PSS) [38]. Two studies used measures
314 related specifically to wellbeing or resilience: Warwick-Edinburgh Mental
315 Wellbeing Scale (WEMWBS) [38] and the Resilience Scale [37] and others used
316 measures related to self-esteem [33,34,41] and life satisfaction [35]. The
317 Strength and Difficulties Questionnaire (SDQ) was the most commonly used
318 measure said to rate behavioural, emotional difficulties and overall functioning
319 and either the child, parent or teacher version was used in six of the twelve
320 studies [30,31,33,36,37,40]. Studies varied according to the length of follow up
321 ranging from 4 weeks [37], to 2 years [41]. Four of the twelve studies sought to
322 obtain qualitative, as well as quantitative data [30,35,37,41]. However, it was
323 beyond the scope of this paper to comment on qualitative findings.

324 Due to the heterogeneity of studies, the effectiveness of each
325 intervention approach will be discussed in turn. Overall, results suggested a
326 trend whereby higher quality studies reported less positive effects.

327 **Studies trialling bespoke mental health education programmes (n=3;**
328 **[40,37,35] - all in secondary schools).**

329 Two studies found small ($d=0.11-0.22$) but significant improvements in
330 total and subscale SDQ scores for those that received mental health education.

1 331 However, of those, it is noteworthy that Chisholm et al. [37] did not employ a
2
3 332 non-intervention condition. Boniwell et al. [35] trialled a bespoke intervention
4 333 based on Positive Psychology principles and found a decrease in outcomes of life
5 334 satisfaction and an increase in negative affect for both groups. However, this
6 335 was less so for the intervention group ($d=-0.24$ compared to $d=-0.79$) which was
7 336 interpreted as the intervention having a ‘buffering effect’ at a time of stress for
8 337 the pupils.

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13 338 **Studies trialling CBT-based interventions** [$n= 8$; 30-34,36,39,41]. These are
14 339 described by setting (Primary and then Secondary).

15
16
17 340 *Primary schools*

18
19 341 All primary-school based studies trialled interventions pertaining to
20 342 altering thinking styles based on CBT principles. Four studies, three of which
21 343 employed a control arm, reported statistically positive outcomes on anxiety-
22 344 related measures following interventions including FRIENDS [33,34], ‘Think Feel
23 345 Do’ [30] and locally developed CBT programmes [32] with larger effects for
24 346 those in ‘high risk’ groups ($d=-1.26$; [33] - no control arm). Methodological issues
25 347 such as a small sample size and significant group differences at baseline
26 348 ($n=13$;[30]), failure to include those lost to follow-up in analysis [32], lack of
27 349 controls [33], and small effect sizes for universal samples ($d=0.01 - 0.2$) [34]
28 350 should be noted when taking inference from those results. Mixed results were
29 351 found in relation to delivery, with stronger effects found in interventions led by
30 352 health professionals ($d=0.2$) versus school staff ($d=0.02$) [34], or no difference
31 353 between psychologist or teacher-led interventions [32]. A sufficiently powered,
32 354 good-quality study evaluating the use of PATHS within the curriculum found few,
33 355 small significant results ($d = 0.06 - 0.14$; teacher-rated intervention measure) at
34 356 12-month follow up, and no effects on any measure at 24-month follow up [31].

35 357 *Secondary schools*

36 358 Fewer significant outcomes were found in trials based within secondary
37 359 school populations. Small ($d=0.093$), but short-lived positive outcomes were
38 360 found on the CDI for those in the UKRP intervention [36]. Mixed results were
39 361 found for those in the UK-RAP intervention, with results indicating some
40 362 beneficial and also potentially negative outcomes [41] although all with small

1 363 effect sizes. Both were high quality, longitudinal, well-powered studies
2
3 364 employing robust methodologies. Further, no effects were found in the CBT
4
5 365 group when compared with as-usual controls or other treatments in a smaller
6
7 366 study looking at mechanisms of change [39]. In the same study, a behavioural
8
9 367 intervention (TRY) was found to have positive effects on reward-seeking
10
11 368 behaviour and SMFQ measure ($d=-0.8$) when compared with other treatments;
12
13 369 however, this finding was not confirmed when compared with PHSE-as-usual
14
15 370 controls.

15 371 **Studies using mindfulness-based interventions** (n=2; [38,39] - both in
16
17 372 secondary schools).

18
19 373 Positive outcomes were found in a feasibility study evaluating a
20
21 374 mindfulness-based intervention [38] which yielded statistically significant,
22
23 375 modest effects on both depression (CES-D: $d=-0.24$) and wellbeing (WEMWBS:
24
25 376 $d=0.15$) measures. Due to small sample sizes this study was likely to be
26
27 377 underpowered; however, outcomes were sustained at 3 months follow up and
28
29 378 were associated with greater mindfulness practice. No significant outcomes were
30
31 379 found in a smaller study trialling MBCT on measures of mood (SMFQ) or reward-
32
33 380 seeking [39].

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Table 2. Design and outcome characteristics of primary-school based studies.

Study (% quality rating)	Study Design	Measures	Follow-up	Effects / Outcomes
Attwood et al., 2012 [30] (34%)	Randomised pre-post intervention evaluation using opportunistic sample. No blinding or randomisation procedure reported. 'cCBT' (n=6) x control group (n=7).	<ul style="list-style-type: none"> • SCAS - Parent & Child version. • SDQ - Parent version. • Focus groups (n=8) 	Baseline; 6-weeks post intervention.	Significant reduction in SCAS-C 'social' (d=0.49*) and 'general anxiety' (d=0.48*) subscales (NB: Intervention group significantly higher on SCAS at baseline). No effects on parent rated measures.
Berry et al., 2016 [31] (68.8%)	Randomised controlled trial; web randomisation system. 29 schools 'PATHS' intervention x 27 schools WL Control. ¹	<ul style="list-style-type: none"> • SDQ - teacher version. • PATHS teacher rating scale (PTRS). • T-POT. 	Baseline; 12 month post-intervention; 24 month post intervention.	No differences on SDQ at 12-month F-up. Some significant results on subscales of PTRS at 12 month f-up (Social competence: d=0.09*; Aggression: d=0.14*; Inattention: d=-0.06*; Peer relations: -0.10*). Not maintained at 24 month follow up.
Collins et al., 2013 [32] (46.9%)	Randomised 3 x 3 mixed design. No randomisation procedure reported. Psychologist led anxiety intervention (n=103) x Teacher led anxiety intervention (n=79) x Controls (n=135).	<ul style="list-style-type: none"> • CSI • SCAS -Child version administered by teachers. 	Baseline; post-intervention; (within 3 weeks of end); 6 months follow up.	Improvement in psychologist-led and teacher-led groups on SCAS-C (d=0.41*; d=0.31*) & CSI 'Avoidance' (d=0.31*; d=0.31*) and 'problem solving' (d=-0.66*; d=0.52*) subscales. No difference between psychologist or teacher-led groups. SCAS-C outcomes maintained at 6 months follow up (d=0.39*; d=0.39*). NB: Those lost to follow up (n=155) not included in analysis.
Stallard et al., 2007 [33] (43.4%)	Pre- post evaluation of pupils (n=106) from 3 schools taking part in the FRIENDS intervention. No controls employed.	<ul style="list-style-type: none"> • SCAS-Child version. • CFSEQ. 	'T1': 6 month prior; 'T2': prior to intervention; 'T3': 3-month follow-up.	Improvements in SCAS (d=-0.50*) and CFSEQ (d=0.58*) from T1 to T3 for whole sample; not between T2 and T3 (across intervention). Improvements on both measures (d=-1.26*; d=-1.27*) for 'high risk' group between T2-T3.

<p>Stallard et al., 2014 [34] (75%)</p>	<p>Cluster randomised controlled trial randomised through computer tool.</p> <p>Health-led FRIENDS (n=489) x School led FRIENDS (n=472) x Controls (n=401).¹</p>	<ul style="list-style-type: none"> • RCADS 30 - child & parent. • Penn State Worry Questionnaire. • RSES. • Bully / victim questionnaire. • Subjective wellbeing assessment. • SDQ- Parent version; teachers completed 'Impact scale'. 	<p>Baseline;6 months f-up; 12 months follow-up.</p>	<p>Improvement on total RCADS (d=0.20*) and social (d=-0.09*) & general anxiety subscales (d=-0.20*) - not depression. Smaller effect sizes in school led group (d=0.02*; d=0.11*; d=0.01*);. No statistical improvements on secondary outcome measures or teacher / parent rating scales.</p>
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¹ Study sufficiently powered to detect change. ² Power calculation provided but proportion lost to follow up (>15%) reduced sample required for adequate power. *Significant at p<0.5 level.

SCAS = Spence Children's Anxiety Scale; SDQ – Strength and Difficulties Questionnaire; PATHS = Promoting Alternative Thinking Strategies; PTRS = Paths teacher rating scale; T-POT = Teacher Pupil Observation Tool; CFSEQ = Culture-free Self-esteem questionnaire; RCADS = Revised Child Anxiety and Depression Scale; CSI = Coping Strategy Indicator

Table 3. Design and outcome characteristics of Secondary school-based studies.

Study (% quality rating)	Study Design	Measures	Follow-up	Effects / outcomes
Boniwell et al. 2016 [35] (37.5%)	Non-randomised control group pre-post design. 'Personal Wellbeing' intervention group (n=211) x control group (n=85).	<ul style="list-style-type: none"> • SLSS. • MSLSS. • PNASC. • Qualitative interviews. 	Baseline; Post-intervention (10 month f-up)	No significant improvement on SLSS or MSLSS. Decrease in 'satisfaction with school'(d=0.4*) and 'friends' (d=-0.17) scores for whole sample. Decrease in positive affect for both intervention and control groups (d=-0.24*; -0.79*); increase in negative affect (d=0.54*) for control group. NB: Those lost to follow up (n=103) not accounted for in analysis.
Challen et al. 2014 [36] (78.1%)	Non-randomised pragmatic controlled trial. UKRP intervention (n=1016) group x Control (n=1894) group. ¹	<ul style="list-style-type: none"> • CDI. • RCMAS. • SDQ. 	Baseline; post intervention (4-9 months); 1 yr follow-up; 2 year follow-up.	Small significant impact on CDI post-intervention (d=0.093*); not maintained at 1 or 2 years follow up. No significant effects on RCMAS or SDQ scores.
Chisholm et al. 2016 [37] (75%)	Pragmatic cluster randomised controlled trail, randomised by independent researcher. 'Contact and MH Education' (n=354) group x MH Education (n=303) group. ² No 'as usual' controls.	<ul style="list-style-type: none"> • RIBS (not validated for adolescents). • MAKs (not validated for adolescents). • SDQ. • Resilience scale. • Helpseeking Q. • Focus groups. 	Baseline - 2 weeks prior to intervention day; 2 weeks post-intervention day.	Statistical sig. improvements on several scales post intervention day for both groups - 'contact and education' and 'education only': Attitudinal based stigma (d=0.23*; d=0.25*), knowledge based stigma (d=0.54*; d=0.59*), mental health literacy (d=0.05; d=0.13*); emotional wellbeing (d=0.16*; d=0.14*), and resilience (d=0.07; d=0.22*). No change in 'helpseeking'.

¹ Study sufficiently powered to detect change.

² Power calculation provided but proportion lost to follow up (>15%) reduced sample required for adequate power. *statistically significant at p < 0.05 level.

SLSS – Student’s Life Satisfaction Scale; MSLSS = Multidimensional Students Life Satisfactions Scale; PNASC = Positive and Negative Affect Schedule for Children; CDI = Children’s Depression Inventory; RCMAS = Revised Children’s Manifest Anxiety Scale; SDQ = Strength and Difficulties Questionnaires; RIBS = Reported and Intended Behaviour Scale; MAKs = Mental Health Knowledge Schedule; WEMWBS = Warwick Edinburgh Mental Wellbeing Scale;

<p>Kuyken et al. 2013 [38] (59%)</p>	<p>Non-randomised controlled feasibility study. MiSP intervention group (n=256) x control (n=266).</p>	<ul style="list-style-type: none"> • WEMWBS. • PSS. • CES-D. • Mindfulness practice. 	<p>Baseline; Post-intervention (9 weeks); 3 month follow-up.</p>	<p>Lower depression scores post-intervention (d=-0.29*). Improvement on all measures at 3 month follow-up (WEMWBS: d=0.15*; PSS: d=-0.09*; CES-D: d=-0.24*). Mindfulness practice significantly associated with greater gains across all measures (unable to calculate E.S.).</p>
<p>Rice et al. 2015 [39] (50%)</p>	<p>Non-randomised longitudinal design with three intervention conditions. TRY intervention group (n=50) x CBT group (n=53) x MBCT group (n=54) x PHSE controls (n=99).</p>	<ul style="list-style-type: none"> • SMFQ. • CGT to measure reward seeking. • DASC and corresponding response time. • SCEPT to measure overgeneral memory. 	<p>Baseline; 9 week follow-up.</p>	<p>Statistical sig. changes in reward seeking in TRY group (d=0.12*); no change after CBT or MBCT. No statistically significant decrease in SMFQ across groups compared to PHSE controls. When comparing treatment groups only, TRY showed statistical reduction in SMFQ when compared with MBCT and CBT (d=-0.8*); reward-seeking moderated reductions in SMFQs scores (d=1.62*).</p>
<p>Naylor et al. 2009 [40] (56.3%)</p>	<p>Non-randomised pre-post control group study. MH intervention group (n=175) x Control group (n=242).¹</p>	<ul style="list-style-type: none"> • Mental Health Questionnaire (unvalidated). • SDQ. 	<p>Baseline (1 week before intervention); 6 months post-intervention.</p>	<p>Improvement in MHQ with regards to awareness of depression causes (d=0.21*) and bullying (d=0.31*). Changes in specific SDQ subscales: 'conduct' (d=0.22*) and 'prosocial' (d=0.11*) but not on total difficulties.</p>
<p>Stallard et al. 2013 (81.3%)</p>	<p>Cluster randomised controlled trial, randomised by computer. UK-RAP intervention group (n=1753) x Attention controls (n=1673) x PHSE controls (n=1604)¹</p>	<ul style="list-style-type: none"> • SMFQ. • CATS. • RSES. • RCADS. • School connectedness. • Attachment Questionnaire. • European Quality of Life-5 dimensions. 	<p>Screening - SMFQ only; Baseline; 6 months follow-up; 12 months follow-up.</p>	<p>No significant effect on SMFQ at 12 months follow-up. Some effect of intervention on bullying status at 12 months, and Cannabis use at 6mo and 12 months follow-up. Intervention less useful than usual PHSE or attention controls for panic; less useful than usual PHSE on CATS 'personal failure' and general anxiety. Signs of benefits and harm of intervention found, all reported to be small effect sizes (data unavailable to calculate effect size).</p>

PSS = Perceived Stress Scale; CES-D = Center for Epidemiologic Studies Depression Scale; SMFQ = Short Mood and Feelings Questionnaire; CGT = Cambridge Gambling Task; DASC = Dysfunctional Attitudes Scale for Children; SCEPT = Sentence completion for Events from the Past (SCEPT); CATS = Children's Automatic Thoughts Scale; RSES = Rosenberg Self Esteem Scale.

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¹ Study sufficiently powered to detect change. ² Power calculation provided but proportion lost to follow up (>15%) reduced sample required for adequate power. *Significant at p<0.5 level.

For peer review only

382 Implementation Issues

383 Common issues relating to implementation were found across all studies.

384 *Fidelity*

385 Fidelity to intervention delivery was highlighted as an issue in terms of both
386 measurement and outcome. Studies used self-rated fidelity methods [32], external
387 fidelity ratings on a proportion of sessions [31,34,36,37,41] or no fidelity rating
388 methods reported at all. Studies commented variably on the possible effect of
389 fidelity and ‘treatment dosage’ on outcomes. In Stallard et al.’s [37] study the
390 health-led condition with 100% fidelity (i.e. administered all pieces of homework
391 and activity tasks), was associated with significantly better outcomes than the
392 school-led group who achieved 60-80% fidelity. ‘High quality’ workshops were also
393 found to be related to greater declines in CDI measures [36]. Conversely, Berry et
394 al. [31] found that fidelity (when applying an arbitrary ‘80%’ rate of ‘high’ fidelity)
395 was not found to be related to outcome.

396 *Attrition*

397 Investment from schools was raised as an issue as demonstrated by school
398 participation and attrition [31,41] and failure to administer follow up measures as
399 per study procedures [32,35]. All studies, with the exception of Stallard et al. [41]
400 provided little information about school or participant characteristics of those who
401 dropped out. This confounding factor may have positively biased results. For
402 instance, in Kuyken et al’s [38] study, teachers who delivered the mindfulness
403 intervention had been invested in the intervention for approximately 2 years
404 before the beginning of the study and attended regular supervision, demonstrating
405 good motivation throughout the study which found positive outcomes.

406 *Costs*

407 Two studies actively explored health economic costs involved [31,41]. Cost-
408 effectiveness was not calculated by Berry et al. [31] due to lack of impact, and
409 Stallard et al. [41] concluded that the intervention was not cost-effective. Of
410 note, both studies may have sustained high costs due to employing external
411 facilitators to lead the intervention rather than teachers [41] and hiring ‘coach
412 consultants’ to monitor delivery [31].

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3 413 **DISCUSSION**

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5 414 This review aimed to explore the effectiveness and study quality of
6 415 universally delivered school-based interventions within the UK which aim to
7 416 promote mental and emotional wellbeing, or prevent mental ill health. Several
8 417 clear conclusions can be drawn from this review, while other issues require further
9 418 clarity from future research.

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16 420 ***How effective are universal school-based interventions in the UK that promote***
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18 421 ***mental health, emotional wellbeing, or psychological resilience?***

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20 422 Based on the studies included in this review, the effectiveness of universal
21 423 school based interventions remains mixed, and at best, modest. Where there were
22 424 several positive outcomes, effect sizes were small and methodological issues
23 425 rendered many results to be interpreted with caution. This prudent finding echoes
24 426 the somewhat mixed results from worldwide reviews [10 - 23], where while several
25 427 positive evaluations exist, this finding is not consistent when applied across diverse
26 428 settings and populations, which calls into question the overall generalisability of
27 429 school based interventions in the literature to real world environments.

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30 430 Notwithstanding, this current review focussing on UK schools only found that
31 431 studies based in Primary schools seemed to find more encouraging results from
32 432 CBT-based interventions on measures of anxiety, although most studies had
33 433 methodological limitations relating to use of appropriate controls, and failure to
34 434 include those lost to follow up in analysis. Positive results tended to fall in the
35 435 older age range of Primary school pupils (9-12 years old).

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44 436 Within the Secondary school population, the most positive results were
45 437 obtained when delivering mental health education sessions, behavioural or
46 438 mindfulness interventions. Two high powered, good quality studies evaluating CBT
47 439 based interventions within secondary populations found few significant results and
48 440 one study indicated possible detrimental impacts of the intervention compared to
49 441 controls, although any effect sizes related to these findings were small.

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54 442 It is curious that studies fail to detect promising effects in the older,
55 443 secondary school, population. It could be argued that a 2 year follow-up is not

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3 444 sufficient to truly detect change or prevention during the developmentally-
4 445 sensitive time that is adolescence. Arguably, the demands placed on adolescents
5 446 merely change in nature rather than impact over time. Adolescent psychosocial
6 447 development [42] is particularly vulnerable as individuals are required to manage
7 448 academic demands as they progress through their school career, navigate
8 449 friendships, seek to develop self-identities and deal with the physiological changes
9 450 that occur as they transition through puberty. It could be that the existence of
10 451 such pervasive and fluctuating stressors juxtaposed with measurement issues,
11 452 discussed below, contribute to the failure to detect significant results in secondary
12 453 school populations. Or, that such interventions simply have less impact for this
13 454 population.
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24 456 ***What methodologies are being applied in UK schools when trialling***
25 457 ***interventions and what is the quality of these studies?***
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28 458 Methodological issues were predominant in this review. Only four of the
29 459 studies were of 'excellent' quality and findings indicated a trend towards higher
30 460 quality papers finding fewer positive results. Studies were weakened largely due to
31 461 their lack of randomisation and blinding of researchers, and small sample sizes
32 462 which likely rendered them underpowered to detect true effects.
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36 463 While it was encouraging that initial consenting rates were high and
37 464 remained reasonable throughout, study quality would benefit from better
38 465 reporting of those lost to follow up who, possibly, could be a population of
39 466 particular interest when considering the objective of promoting mental and
40 467 emotional wellbeing for all within the school setting. Further, statistical methods
41 468 used to account for such missing data require careful consideration to ensure that
42 469 more stringent and conservative methods - for example, intent-to-treat analyses -
43 470 are applied in school-based research. Otherwise, studies that instead apply a
44 471 'defined completers' or 'completers' analysis expose themselves to the risk of
45 472 yielding false positives.
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53 473 Another issue was the use of controls. Few studies explicitly provided
54 474 details of the content controls groups received. Some indicated that controls may
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3 475 have already received materials available in the school around social and
4 476 emotional wellbeing, which could reasonably have confounded results.
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6 477 Additionally, considering the demographic data provided, it is unlikely that the
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8 478 included studies accurately represent the cultural diversity of schools across the
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10 479 UK, therefore caution should be taken when considering the generalizability of
11 480 results.

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13 481 The last prominent issue highlighted in this study was the diverse use of
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15 482 measures and length of follow up across studies, making it difficult to ascertain a
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17 483 coherent picture of measurement and effects in the current research base.

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19 484 As commented in one study [36] and further afield [21], measurement issues
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21 485 within universal populations are particularly problematic due to common floor
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23 486 effects, particularly when using measures pertaining to the existence of mental
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25 487 health conditions. As has been well-documented, demonstrating improvement in
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27 488 'high risk' groups is somewhat easier as baseline scores are often elevated
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29 489 providing scope for reduction [41]. Demonstrating change within a universal
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31 490 population is therefore inherently more difficult and requires careful thought when
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33 491 moving forward. Is it sufficient that the absence of a mental health condition
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35 492 equates to greater wellbeing or resilience as suggested by Boniwell et al. [35], or
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37 493 should researchers direct attention to explicitly measuring wellbeing and resilience
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39 494 and mechanisms of change within such constructs in order to truly operationalise
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41 495 factors relating to the prevention of mental health difficulties?

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43 496 Few studies in this review used wellbeing or resilience measures. However,
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45 497 those that did [37, 38] found positive effects. While any meaning of these results
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47 498 must be taken with caution due to methodological issues, this nevertheless
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49 499 suggests that such measures are at least able to detect change within a universal
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51 500 population.

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53 501 Only one study explored mechanisms of change [39] by using cognitive
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55 502 reasoning tests when comparing several interventions, and found that a
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57 503 behavioural intervention led to more reward-seeking and a reduction in mood
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59 504 symptoms. It would be of value to explore this further given the
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61 505 neurodevelopmental stage of early adolescence when frontal lobes are still
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63 506 maturing and neuronal connections continue to grow [43]. Consequently, the

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3 507 adolescent's ability to plan, problem solve and manipulate abstract information, as
4 508 is arguably necessary in cognitive-based interventions, may be overridden by more
5 509 disinhibited, emotionally driven impulses and the seeking of concrete rewards, as
6 510 may be seen in earlier adolescence and would potentially explain increased
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8 511 receptiveness to a behavioural rather than cognitive intervention.
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12 It could also be of value that future studies take a more holistic perspective
13 512 of general wellbeing during evaluation of universal populations. Such indicators
14 513 may include school attendance, exam completion, referrals rates to local CAMHS,
15 514 academic outcomes, long-term mental and physical health outcomes, occupational
16 515 or further education uptake, as well as important qualitative components.
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23 518 ***What are the identified barriers in delivering and evaluating universal school***
24 519 ***based interventions?***
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27 520 Implementation barriers relating to fidelity to intervention delivery and
28 521 costs were also raised within this review. Variance in fidelity measurement to
29 522 confirm reliable manualised delivery was a recurring issue, which is of particular
30 523 salience when delivery has been consistently argued to be related to outcome
31 524 [10,12]. Intervention delivery itself varied between studies where school staff or
32 525 external researchers delivered the courses. While results were mixed when
33 526 comparing the effectiveness of teacher-led versus externally-led interventions,
34 527 overall within this review the results were neutral suggesting, at best, that there is
35 528 no negative impact of teacher delivery. While issues relating to treatment fidelity
36 529 may be more prominent with teacher delivery, considering sustainability, it could
37 530 be argued that this would be the optimal approach in school settings, especially
38 531 considering the financial costs involved in employing external facilitators as
39 532 demonstrated by two studies in this review [31, 41]. Further, research has
40 533 indicated that pupils prefer both that mental health education be delivered by
41 534 someone with a thorough knowledge of the subject, and for it to be delivered by
42 535 someone they know e.g., a teacher [44].
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53 536 No study in this review explored the impact on any allied services such as
54 537 CAMHS. For instance, it may be useful to audit local CAMHS referral-rates whilst
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3 538 reviewing the effectiveness of school-based interventions, and whether an increase
4 539 or decrease in referrals would be observed. Considering the absence of reliable
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6 540 positive outcomes at the individual level at this point, a systemic perspective
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8 541 could be of value when considering any cost benefits to the wider health and social
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10 542 care services.

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12 543 Further, it was unclear from the review what local or national political or
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14 544 strategic drivers instigated each study, and indeed, the extent to which children
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16 545 and young people were consulted in the process, design and delivery of the
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18 546 interventions. It was outside the scope of this review to explore the qualitative
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20 547 findings from the few studies that employed focus groups. Therefore, it is
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22 548 recommended that future qualitative reviews of school-based research are
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24 549 conducted in order to ensure that children's and young people's views as
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26 550 stakeholders in this work are sufficiently represented.

25 551 **Limitations**

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28 552 This study was limited in its ability to source evaluations representative of
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30 553 the entire UK as the majority of studies were based in England. While efforts were
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32 554 made to source evaluations from elsewhere in the UK, the lack of validated
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34 555 measures or application of pre-post methodology meant that such evaluations from
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36 556 the 'grey literature' could not be included in this review. It should therefore be
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38 557 noted that there is much relevant work being conducted in schools across the UK.
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40 558 However, schools and local authorities should be urged to reliably evaluate their
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42 559 valuable efforts and contribute to the published literature, thereby demonstrating
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44 560 the important work being driven by teachers and policymakers nationwide.

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46 561 This study was also limited in its date source in that only studies from the
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48 562 year 2000 were included in this review. While results from other systematic
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50 563 reviews suggested that little relevant research was done in the UK before this
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52 564 time, it could still be that some studies were missed due to this limit.

50 565 **Implications**

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53 566 This review highlighted the need to employ robust methodological designs
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55 567 within school-based research in order for any effects to be interpreted
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57 568 meaningfully. Measurement issues exist where they do not adequately detect

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3 569 change in universal populations, and there is a wide variety of measures used
4 570 ranging from ‘clinical’ to wellbeing measures. This review concludes that school-
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6 571 based researchers across the UK should attempt to come together to discuss ways
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8 572 to address this issue and improve coherence in the literature.

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10 573 An additional, imperative implication from this review is the proactive
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12 574 inclusion and involvement of teachers in this work. As has been commented
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14 575 elsewhere [45] without the ‘buy-in’ from teachers, any school-based intervention
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16 576 is less likely to sustain or achieve positive outcomes. In a time of additional
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18 577 pressures on teachers, the need to feel in control of initiatives is key. Of note, two
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20 578 of the studies in this review included adult-focussed exercises for the teachers
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22 579 themselves as an adjunct to the intervention training. This approach may go
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24 580 further to assist teachers’ stress management and understanding of mental health
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26 581 whilst attending to the needs of their pupils.

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28 583 **Conclusions**

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30 584 The current evidence suggests there are neutral to small effects of
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32 585 universal, school-based interventions in the UK that aim to promote emotional or
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34 586 mental wellbeing or prevention of mental health difficulties. Whilst the real-world
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36 587 limitations of conducting research in schools exists, robust, long-term
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38 588 methodologies need to be attempted when conducting research in this area in
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40 589 order to explore the longitudinal impact of school-based interventions on
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42 590 wellbeing. Academic attainment, school attendance and rates of high-risk
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44 591 presentations also need to be further explored. This requires adequate recording
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46 592 of fidelity, the use of validated measures sensitive to mechanisms of change,
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48 593 reporting of those lost to follow up and any adverse effects, and the use of
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50 594 qualitative data to supplement quantitative outcomes. Interventions in the existing
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52 595 UK-based literature include educational, behavioural, cognitive and mindfulness
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54 596 components, each demonstrating variable results. Nevertheless, national and local
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56 597 policy [25, 26, 27, 46] indicates that there remains an appetite to develop work in
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58 598 this area in order to promote wellbeing outcomes for children and young people. In
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60 599 this case, further research collaborations are required across the UK to robustly
600 demonstrate any benefits for pupils or on the wider system.

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3 601 **CONTRIBUTORSHIP**

4
5 602 This piece of research was submitted in part fulfilment for a Doctorate
6 603 degree in Clinical Psychology. KM (Dr Karen Mackenzie) was the main researcher
7
8 604 and responsible for developing the research questions, conducting the search
9
10 605 strategy and analysing results. CW (Professor Chris Williams) supervised this
11
12 606 research and acted as co-rater during the search process.

13
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15
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17
18 609 process.

19
20 610 **COMPETING INTERESTS**

21
22 611 CW is President of BABCP- the lead body for CBT in the UK, and a CBT
23
24 612 researcher and trainer. He is also author of a range of CBT-based resources
25
26 613 including some aimed at primary and secondary school populations. These are
27
28 614 available commercially as books, online courses, and classes. He receives royalty,
29
30 615 and is shareholder and director of a company that commercialises these resources.

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32
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34
35 618 commercial or not-for-profit sectors.

36
37 619 **DATA SHARING**

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39 620 Supplementary data available upon request to the author.

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41 621 **FIGURE LEGEND**

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43 Figure 1: PRISMA flow diagram

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45 Table 1: Overview of interventions

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47 Table 2: Study design and outcomes - Primary schools

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49 Table 3: Study design and outcomes - Secondary schools

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624 **REFERENCES**

- 625 1. Kieling C, Baker-Henningham H, Belfer M, et al. Child and adolescent mental
626 health worldwide: evidence for action. *Lancet* 2011;378:1515-25.
- 627 2. Costello EJ, Mustillo S, Erkanli A, et al. Prevalence and development of
628 psychiatric disorders in childhood and adolescence. *Arch Gen Psychiatry* 2003;
629 60:837-44.
- 630 3. Kendall, P. C., Safford, S., Flannery-Schroeder, E., & Webb, A. Child anxiety
631 treatment: Outcomes in adolescence and impact on substance abuse and
632 depression at 7.4 year follow-up. *Journal of Consulting and Clinical Psychology*
633 2004;72:276-287.
- 634 4. Collins, K. A., & Dozois, D. J. A. What are the active ingredients in preventative
635 interventions for depression? *Clinical Psychology: Science and Practice*
636 2008;15:313-330.
- 637 5. Patel V, Flisher AJ, Hetrick S, McGorry P. Mental health of young people: a
638 global public-health challenge. *The Lancet* 2007;369(9569):1302-13.
- 639 6. World Health Organization. Atlas: Child and Adolescent Mental Health
640 Resources: Global Concerns, Implications for the Future. WHO, 2005.
- 641 7. Masia-Warner, C., Nangle, D. W., & Hansen, D. J. Bringing evidence-based child
642 mental health services to the schools: General issues and specific populations.
643 *Education and Treatment of Children* 2006;29:165-172.
- 644 8. Domitrovich CE, Bradshaw CP, Greenberg MT, Embry D, Poduska JM, Ialongo NS.
645 Integrated models of school-based prevention: logic and theory. *Psychology in*
646 *Schools*. 2010;47(1):71-88.
- 647 9. Vostanis, P., Humphrey, N., Fitzgerald, N., Deighton, J., & Wolpert, M. (2013).
648 How do schools promote emotional wellbeing among their pupils? Findings from a
649 national scoping survey of mental health provision in English schools. *Child and*
650 *Adolescent Mental Health* 2013;18:151-157.

- 1
2
3 651 10. Durlak, JA, Weissberg, RP, Dymnicki, AB, Taylor, RD & Schellinger, KB. The
4 652 Impact of Enhancing Students' Social and Emotional Learning: A Meta-Analysis of
5 653 School-Based Universal Interventions. *Child Development* 2011;82(1):405-432.
6
7
8 654 11. Wells, J, Barlow, J & Stewart-Brown. A systematic review of universal
9 655 approaches to mental health promotion in school. *Health Education* 2003;103(4):
10 656 197-220.
11
12
13 657 12. Neil, A.L. & Christensen, H. Efficacy and effectiveness of school-based
14 658 prevention and early intervention programs for anxiety. *Clinical Psychology Review*
15 659 2009; 29(3):208-215.
16
17
18 660 13. Mychailyszyn. M.P., Brodman, D.M., Read, K.L., et al. Cognitive Behavioural
19 661 School-based interventions for anxious and depressed youth: a meta-analysis of
20 662 outcomes. *Clinical Psychology Science and Practice* 2012;19:129-153.
21
22
23 663 14. Weare, K & Nind, M. Mental health promotion and problem prevention in
24 664 schools: what does the evidence say? *Health Promotion International* 2011;26(1):
25 665 29-69.
26
27
28 666 15. Merry, S., Hetrick, S., Cox, G.R., et al. Psychological and educational
29 667 interventions for preventing depression in children and adolescents. *Cochrane*
30 668 *Database of Systematic Reviews* 2011;12.DOI:10.1002/14651858.CD003380.pub3.
31
32
33 669 16. Corrieri, S., Heider, D., Conrad, I., et al. School-based prevention programs for
34 670 depression and anxiety in adolescence: a systematic review. *Health Promotion*
35 671 *International* 2013;29(3):427-441.
36
37
38 672 17. Spence, S.H., & Shortt, A.L. Research review: Can we justify widespread
39 673 dissemination of universal based interventions for the preventions of depression
40 674 among children and adolescents? *Journal of Child Psychology and Psychiatry*
41 675 2007;48(6):526-542.
42
43
44 676 18. Calear, al. & Christensen, H. Review of internet-based prevention and
45 677 treatment programs for anxiety and depression in children and adolescents. *The*
46 678 *Medical Journal of Australia* 2010;192(11):12-14.
47
48
49
50
51
52
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58
59
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2
3 679 19. Kavanagh, J., Oliver, S., Lorenc, T., et al. School based cognitive-behavioural
4 680 interventions: A systematic review of effects and inequalities. *Health Sociology*
5 681 *Review* 2009;18: 61-78.
6
7
8 682 20. Stallard, P. School-based intervention for depression and anxiety in children
9 683 and adolescents. *Evidence-based Mental Health* 2013;16(3):60-61.
10
11
12 684 21. Reavley, N., Bassilos, B., Ryan, S., et al. Interventions to build resilience in
13 685 Young People: a literature review. *Victorian Health Promotion Foundation* 2015.
14 686 Melbourne.
15
16
17 687 22. Sancassiani, F., Pintus, E., Holte, A., et al. Enhancing the Emotional and Social
18 688 Skills of the Youth to promote their Wellbeing and Positive Development: A
19 689 systematic review of Universal School-based Randomised Controlled Trials. *Clinical*
20 690 *Practice & Epidemiology in Mental Health* 2015;11:21-40.
21
22
23 691 23. National Institute of Clinical Excellence. *Promoting children's social and*
24 692 *emotional well-being in primary education*. 2008. Retrieved from
25 693 <http://www.nice.org.uk/guidance/index>. Accessed June 2016.
26
27
28 694 24. Cheney, G., Schlosser, A., Nash, P., et al. Targeted group-based interventions
29 695 in schools to promote emotional well-being: A systematic review. *Clinical Child*
30 696 *Psychology & Psychiatry* 2014;19(3):412-438
31
32
33 697 25. Department of Education. *Mental health and behaviour in schools:*
34 698 *Departmental advice for school staff*. 2016.
35 699 www.nationalarchives.gov.uk/doc/open-government-licence/version/3. Accessed
36 700 June 2016.
37
38
39 701 26. Education Scotland (no publication date). Curriculum for Excellence. *Health*
40 702 *and Wellbeing Across Learning: Responsibilities for All. Experience and Outcomes*.
41 703 [www.educationscotland.gov.uk/health_wellbeing_experiences_outcomes_tcm4-](http://www.educationscotland.gov.uk/health_wellbeing_experiences_outcomes_tcm4-540031.pdf)
42 704 [540031.pdf](http://www.educationscotland.gov.uk/health_wellbeing_experiences_outcomes_tcm4-540031.pdf) Accessed June 2016.
43
44
45 705 27. CYMRU. 'Thinking positively: Emotional health and well-being in schools and
46 706 Early Years settings'. 2010 www.wales.gov.uk/educationandskills. Accessed June
47 707 2016.
48
49
50
51
52
53
54
55
56
57
58
59
60

- 1
2
3 708 28. Downs, S. H., & Black, N. The feasibility of creating a checklist for the
4 709 assessment of the methodological quality both of randomized and non-randomized
5 710 studies of health care interventions. *Journal of Epidemiological Community Health*
6 711 1998;52:377-384.
- 7
8
9
10 712 29. Popay, J., H. Roberts, A. Sowden, F et al. *Guidance on the Conduct of*
11 713 *Narrative Synthesis in Systematic Reviews: Final Report*. Swindon: ESRC Methods
12 714 Programme 2006.
- 13
14
15 715 30. Attwood, M., Meadows, S., Stallard, P., et al. Universal and targeted
16 716 computerised cognitive behavioural therapy (Think, Feel, Do) for emotional health
17 717 in schools: Results from two exploratory studies. *Child and Adolescent Mental*
18 718 *Health* 2012;17(3):173-178.
- 19
20
21
22 719 31. Berry. F., Axford, N., Blower, S., et al. The effectiveness and micro-costing
23 720 analysis of a Universal, School based, Social-Emotional Learning programme in the
24 721 UK: A cluster-randomised controlled trial. *School Mental Health* 2016;8:238-256.
- 25
26
27
28 722 32. Collins, S., Woolfson, L. M., & Durkin, K. Effects on coping skills and anxiety of
29 723 a universal school-based mental health intervention delivered in Scottish primary
30 724 schools. *School Psychology International* 2013; 35(1):85-100.
- 31
32
33
34 725 33. Stallard, P., Simpson, N., Anderson, S., et al. The FRIENDS Emotional Health
35 726 Programme: Initial Findings from a School-Based Project. *Child & Adolescent*
36 727 *Mental Health* 2007;12(1):32-37.
- 37
38
39 728 34. Stallard, P., Skyrabina, E., Taylor, G., et al. Classroom-based cognitive
40 729 behaviour therapy (FRIENDS): A cluster randomised controlled trial to Prevent
41 730 Anxiety in Children through Education in Schools (PACES). *The Lancet Psychiatry*
42 731 2014;1(3):185-192.
- 43
44
45
46 732 35. Boniwell. I., Osin, E.N., & Martinez, C. Teaching Happiness at school: non-
47 733 randomised controlled mixed-methods feasibility study on the effectiveness of
48 734 well-being lessons. *The Journal of Positive Psychology* 2016;11(1):85-98.
- 49
50
51
52 735 36. Challen, A. R., Machin. S.J., & Gillham J.E. The UK Resilience Programme: a
53 736 school-based universal nonrandomized pragmatic controlled trial. *Journal of*
54 737 *Consulting & Clinical Psychology* 2014;82(1):75-89.

- 1
2
3 738 37. Chisholm, K. E., Patteron, P., Torgerson, C., et al. Impact of contact on
4 739 adolescents' mental health literacy and stigma: the SchoolSpace cluster
5
6 740 randomised controlled trial. *BMC Open* 2016,6:e009435.
7
8 741 38. Kuyken, W., Weare, K., Obioha, C., et al. Effectiveness of the Mindfulness in
9 742 Schools Programme: Non-randomised controlled feasibility study. *The British*
10 743 *Journal of Psychiatry* 2013; 203(2):126-131
11
12
13 744 39. Rice, F., Rawal, A., Riglin, L., et al. Examining reward-seeking, negative self-
14 745 beliefs and over-general autobiographical memory as mechanisms of change in
15 746 classroom prevention programs for adolescent depression. *Journal of Affective*
16 747 *Disorders* 2015;186:320-327.
17
18
19 748 40. Naylor, P., Cowie, H.E., Watters, S.J., et al. Impact of a mental health
20 749 teaching programme on adolescents. *The British Journal of Psychiatry*
21 750 2009;194:365-370.
22
23
24 751 41. Stallard. P., Phillips. R., Montgomery, A.A., et al. A cluster RCT to determine
25 752 the clinical effectiveness and cost-effectiveness of classroom-based cognitive-
26 753 behavioural therapy (CBT) in reducing symptoms of depression in high-risk
27 754 adolescents. *Health Technology Assessment* 2013;17(47).
28
29
30 755 42. Erikson, Erik H. Identity, Youth and Crisis. New York: Norton. 1968.
31
32
33 756 43. Spear, L.P. Adolescent Neurodevelopment. [Journal of Adolescent Health 2013;](#)
34 757 [52\(2\):S7-13](#). doi:[10.1016/j.jadohealth.2012.05.006](#)
35
36
37 758 44. Woolfson, R, Woolfson, L, Mooney, L, Bryce, D. Young people's views of mental
38 759 health education in secondary schools: A Scottish study. *Journal of Child: care,*
39 760 *health and development* 2008;35(6):790-798.
40
41
42 761 45. Weare, K. Editorial: Child and adolescent mental health in schools. *Child and*
43 762 *Adolescent Mental Health* 2015;20(2):6-8.
44
45
46 763
47
48
49 764 46. Department for Education, Department of Health and Social Care.
50 765 Transforming children and young people's mental health: a Green paper.
51 766 December 2017. <https://www.gov.uk/government/consultations/transforming->

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767 [children-and-young-peoples-mental-health-provision-a-green-paper](#) accessed June
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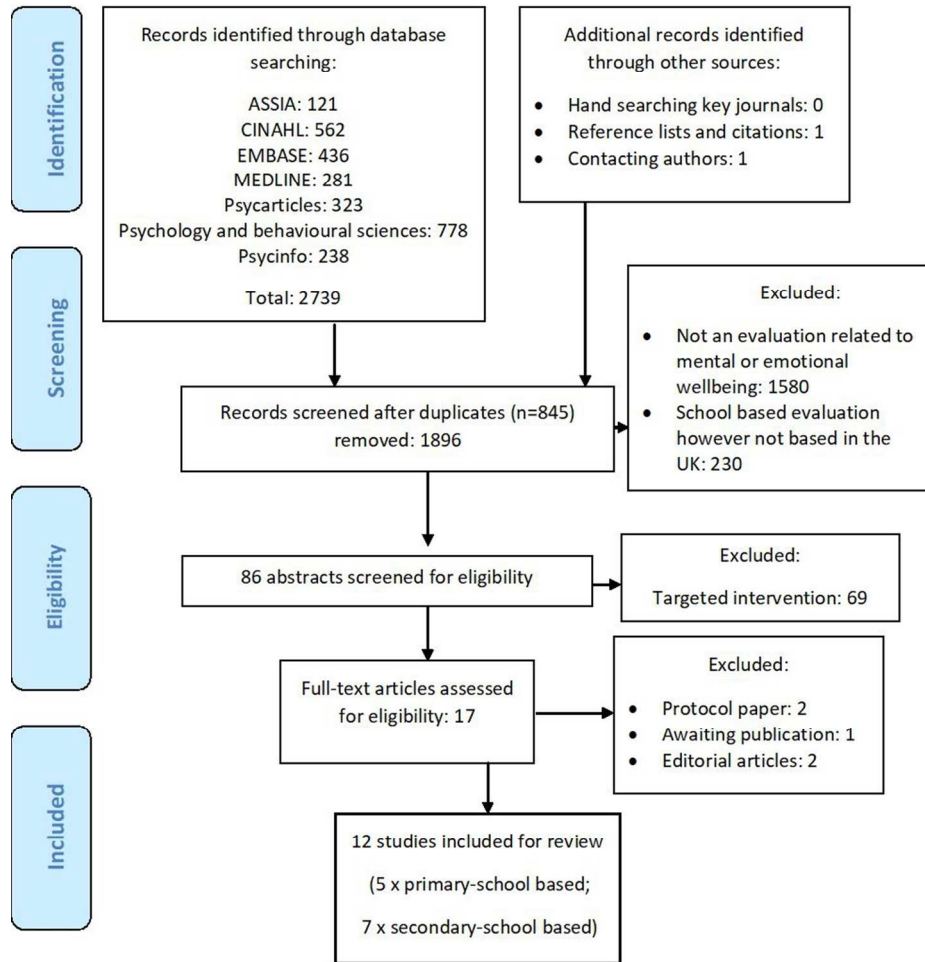


Figure 1: PRISMA diagram of systematic search process.

PRISMA diagram

83x107mm (300 x 300 DPI)

Search strategy database examples, including MeSH terms
(* indicates truncation of words).

ASSIA

((mental health) OR (mental health intervention OR early intervention)) AND ((school based) OR (scho* OR educat*)) AND (united kingdom OR sco* OR eng* OR northern Ir* OR wales OR wel* OR great britain)) AND (Adolescen* OR child* OR teen* OR youth OR young pe* OR pupil* OR student* OR learner* OR scho*)) AND (Anxi* OR depress* OR resilien* OR emotion* OR stress* OR psycho* OR wellbeing*) AND (Evaluation OR (pilot OR trial) OR (comparison OR effective)) AND (yr(2000-2016) AND PEER(yes)) AND "SCHOOL BASED" or "SCHOOL"

EMBASE

adolescent health services; adolescent*; anxi*; based; brit*; child*; community mental health services; depress; depress *; early intervention (education); emotion* engl*; health promotion; ir*; kingdom; learner*; mental health; mental health services; northern; pe*; psycho*; pupil*; resilien*; scho*; school; school based; school health services; schools; scot*; stress*; student*; teen*; uk; wales; wel*; wellbeing*; young; young pe*; youth.



PRISMA 2009 Checklist

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	1
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	2
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	5
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	6
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	na
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	7
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	7-8
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	Supp. file
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	8
Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	8
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	8
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	8
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	8
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	8



PRISMA 2009 Checklist

Page 1 of 2

Section/topic	#	Checklist item	Reported on page #
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	8
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	n/a
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	9
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	10-13
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	17-20
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	17-20
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	n/a
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	n/a
Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	n/a
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	22-25
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	26
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	26-27
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	28

From: Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

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