The role of implicit theories in mental health symptoms, emotion regulation, and hypothetical treatment choices in college students

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Abstract

Beliefs about how much people can change their attributes – implicit theories – influence affective and cognitive responses to performance and subsequent motivation. Those who believe their attributes are fixed view setbacks as threatening and avoid challenging situations. In contrast, those who believe these attributes are malleable embrace challenges as opportunities to grow. Although implicit theories would seem to have important mental health implications, the research linking them with clinical applications is limited. To address this gap, we assessed how implicit theories of anxiety, emotion, intelligence, and personality related to various symptoms of anxiety and depression, emotion-regulation strategies, and hypothetical treatment choices (e.g., medication versus therapy) in two undergraduate samples. Across both samples, individuals who believed their attributes could change reported fewer mental health symptoms, greater use of cognitive reappraisal, and were more likely to choose individual therapy over medication. These findings suggest that implicit theories may play an important role in the nature and treatment of mental health problems.

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Keywords

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Introduction

Emotional problems including anxiety and depression are associated with poorer life satisfaction, lost work productivity, and impair the ability of individuals to attain their personal goals (Kazdin & Blase, 2011). Maladaptive beliefs or schemas have long been known to relate to the onset and maintenance of these problems (Beck, Rush, Shaw, & Emery, 1979). In short, beliefs about the self are important factors in understanding depression and anxiety. The current work examines the potential associations between mental health symptoms and *implicit theories* or "mindsets", belief constructs that have been studied primarily in social-psychological and educational contexts. Nonetheless, we suggest that these constructs are highly relevant for mental health research and thus represent an important area of synergy for different branches of psychological science. Accordingly, the goal of the present work is to provide evidence that implicit theories are relevant for clinical psychology in terms of mental health symptoms, emotion regulation strategies, and hypothetical treatment choices for clinical problems.

Decades of research suggest implicit theories have substantial effects on academic and psychological functioning during challenging conditions and life transitions (e.g., Blackwell, Trzesniewski, & Dweck, 2007; Dweck, 1999). The transition to adulthood (or emerging adulthood as referred to in some areas of developmental psychology; see Arnett, 2007) is one such period characterized by important challenges and changes. Individuals are faced with the task of figuring out who they are and how they will fill the roles expected of mature members of society (Arnett, 2000). This is a phase in the life span characterized by demographic transitions in terms of education, residence, and romantic partnerships (see Rindfuss, 1991). Psychological research suggests that the transition to adulthood involves maturation in terms of personality (e.g., Roberts, Caspi, & Moffitt, 2001; Hopwood et al., 2011) as well as changes in identity and well-being (see Schwartz, Donnellan, Ravert, Luyckx, & Zamboanga, 2012).

In light of these social and psychological considerations, it is also unsurprising the young-adult years are also a time of increased risk for many mental health disorders (e.g., Blanco et al., 2008; Hunt & Eisenberg, 2010; Kessler, Berglund, Demler, Jin, & Walte, 2005). In particular, young adulthood is the time in the life span in which many common psychological disorders begin to manifest, such as panic disorder (median age of onset 24 years) and obsessive-compulsive disorder (median age of onset 19 years), as well as more severe mental disorders such as schizophrenia (e.g., Kessler et al., 2005; Kessler, et al., 2007). Thus, young adult participants (including college students) are a particularly well-suited population for evaluating the role of implicit theories and mental health.

Implicit Theories or "Mindsets" [1]

Individuals differ in terms of how much they believe self-attributes such as intelligence and personality can change – some believe these attributes are fixed and immutable whereas others believe these attributes change with effort and learning. These kinds of beliefs are referred to as implicit theories (Dweck, 1999). The "entity theory" construes abilities and traits as relatively set-in-stone and unable to change. Entity theorists typically attribute their capacities to genetic and biological causes (Dweck, 2006; Keller, 2005). In contrast, the "incremental theory" holds that self-attributes are responsive to improvement and growth with learning and effort. Incremental theorists typically attribute their performance to situational factors such as motivation and effort.

These contrasting mindsets about the nature of attributes influence how individuals approach tasks, interpret their performance, and change their behaviors according to situational demands (Dweck et al., 1995; for a meta-analysis, see Burnette, O'Boyle, VanEpps, Pollack, & Finkel, 2013). Accumulating evidence indicates that incremental theorists are motivated to engage and master challenging tasks, view mistakes as opportunities to learn, and show adaptive reactions to correct errors, whereas entity theorists are more concerned about their performance, view mistakes as threatening to their abilities, and disengage from tasks when setbacks occur (Diener & Dweck, 1978; Dweck, 1975; Dweck & Leggett, 1988; Hong, Chiu, Dweck, Lin, & Wan, 1999; Mangels, Butterfield, Lamb, Good, & Dweck, 2006; Moser, Schroder, Heeter, Moran, & Lee, 2011).

Individuals can hold implicit theories about any self-attribute (e.g., intelligence, math ability, morality, personality), and can hold different implicit theories for different self-attributes (e.g., Chiu, Hong, & Dweck, 1997; Dweck et al., 1995). For instance, a person can believe that intelligence can change, but that personality is relatively fixed. Research suggests that implicit theories in one domain (e.g., intelligence) relate most strongly to outcomes in the same domain (e.g., academic achievement; see Romero, Master, Panesku, Dweck, & Gross, 2014; Yeager et al., 2014).

Most of the focus on implicit theories is found in the developmental, educational, and social psychological literatures. Early work linking attribution theory, implicit beliefs, and achievement motivation among children (e.g., Diener & Dweck, 1978; Diener & Dweck, 1980; Dweck, 1975; Dweck & Leggett, 1988) lead naturally into the study of how implicit theories of intelligence related to academic performance (e.g., Dweck, 1999; Rattan, Good, & Dweck, 2012) and resilience to difficult academic transitions (e.g., Blackwell et al., 2007; Romero et al., 2014; Yeager et al., 2014). Converging evidence from these studies indicates that implicit theories have their largest effects during challenging conditions (Blackwell et al., 2007; Dweck, Chiu, & Hong, 1995; Yeager et al., 2014), which suggests they may apply to psychological problems.

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[1]Note that the terms "implicit theories" and "mindsets" are typically used interchangeably. The "incremental theory" is equivalent to the "growth mindset" and the "entity theory" is equivalent to the "fixed mindset".

Implicit Theories and Psychological Symptoms

Although research on implicit theories is not prominent in clinical psychology, there are several reasons to posit connections between implicit theories and symptoms of psychological distress. Entity theorists are prone to experience helplessness – a harbinger of depression - when challenges or setbacks arise (Da Fonseca et al., 2009; Dweck & Leggett, 1988; Heyman, Dweck, & Cain, 1992). For entity theorists, performance is directly indicative of overall ability and thus failure in a culturally or personally valued context such as academics reflects poorly on the person as a whole. This link between performance and ability often promotes unobtainable standards and maladaptive perfectionism (Dweck, 2006; Shih, 2011), which is in turn associated with anxiety and depression (Egan, Wade, & Shafran, 2011).

Notably, recent research in social psychology has shifted the focus from implicit theories of *intelligence* to implicit theories of *emotion and personality attributes* including shyness. The initial theory of emotion study (Tamir, John, Srivastava, & Gross, 2007) found that students entering college with an entity theory of emotion experienced more depressive symptoms by the end of their first year (see also De Castella et al., 2013; Romero et al., 2014). Miu and Yeager (in press) found that students entering high school showed increasing depressive symptoms over the nine-month academic period. However, a brief intervention (30 minutes) teaching the incremental theory of personality – the idea that personality can change - reduced the incidence of clinically elevated depression by 40%.

Studies have also found that the entity theory of *shyness* is associated with more social anxiety (Valentiner, Mounts, Durik, & Gier-Lonsway, 2011; Valentiner, Jencius, Jarek, Gier-Lonsway, & McGrath, 2013). Individuals who believe their shyness is fixed interpret their 'performance' in social situations as indicative of their underlying personality (e.g., Erdley, Cain, Loomis, Dumas-Hines, & Dweck, 1997; Erdley & Dweck, 1993). Consequently, awkward or imperfect social encounters are interpreted as evidence of a lack of social competence and this might promote social anxiety and increased depression (Rapee & Heimberg, 1997; Rudolph, 2010).

Just two studies of mental health have examined implicit theories among clinical populations. Patients with social anxiety disorder endorsed more of an entity theory both about their emotions and about their social anxiety, compared to non-clinical participants (De Castella et al., 2014). In the other clinical study, patients with an anxiety disorder who endorsed more of the entity theory of shyness before treatment began were more symptomatic in terms of social performance anxiety following an average of three weeks of intensive exposure therapy (Valentiner et al., 2013).

In sum, investigations of the link between implicit theories and mental health symptoms such as anxiety and depression are just beginning to emerge in the literature. These initial findings indicate that the entity theory may relate to suboptimal mental health and may even predict poorer treatment outcomes in clinical settings. These studies have typically focused on difficult transitions or academic periods including middle school, high school, and college. However, one outstanding issue is that past studies have not examined an extremely relevant implicit theory domain for mental health – namely, general anxiety.

Therefore, in this study, we examined how implicit beliefs of psychological distress –*anxiety* specifically – related to common psychological symptoms.

A critical issue is which domain is most relevant to particular mental health constructs (e.g., Romero et al., 2014; Yeager et al., 2014). No study has examined three or more theories simultaneously in this regard to evaluate the specificity of different implicit theories to clinically-relevant dimensions. Therefore, the question of which implicit theory is most relevant for psychological distress symptoms remains an open one. Addressing this question was one of the goals of the current study.

Implicit Theories and Emotion Regulation

Emotion regulation is thought to reflect an important aspect of psychological well being and its dysfunction cuts across psychological disorders (e.g., Gross, 2013; Gross & John, 2003). Although many different emotion regulation strategies have been examined, two of the most commonly studied include *cognitive reappraisal* – or changing the way one thinks about a particular event – and *emotional suppression* – or attempting to hide any sign of outward emotional expression (e.g., Gross, 1998, 2002). Reappraisal is considered to be an "antecedent-focused" strategy in which the response to the event is altered before the emotional episode is fully experienced whereas suppression is considered a "response-focused" strategy that occurs only after the emotional response is fully generated. Trait reappraisal, more so than trait suppression, is typically associated with psychological health (e.g., Carlson, Dikecligil, Greenberg, & Mujica-Parodi, 2012; Gross, 1998; Hofmann, Heering, Sawyer, & Asnaani, 2009; Moser, Hartwig, Moran, Jendrusina, & Kross, 2014).

Recent studies indicate the incremental theory of emotions is positively associated with increased habitual use of cognitive reappraisal (De Castella et al., 2013; Tamir et al., 2007). In a laboratory study in which students watched an aversive movie clip, greater incremental theory of emotion was associated with less discomfort while viewing the clip, less avoidance of the aversive film stimuli, and less negative affect after watching the clip -characteristics that are similar to those of cognitive reappraisal (Kappes and Schikowski, 2013). Importantly, although these studies have linked implicit theories of emotion with habitual use of reappraisal, just one study (Tamir et al., 2007) evaluated how implicit theories of emotion related to suppression, and found that neither theories of intelligence nor emotion related to suppression. Thus, another open question is how distinct implicit theories differentially relate to both reappraisal and suppression.

Beliefs and Treatment Preferences

In addition to the possibility that implicit theories may contribute to symptoms of psychological distress and different emotion regulation strategies, implicit theories might be important to consider for psychological treatment purposes. Accordingly, we evaluated the link between implicit theories and treatment-relevant processes by assessing hypothetical treatment preferences in college students. Individuals seeking mental health services often have preconceived notions regarding therapeutic options (e.g., psychotherapy vs. medication), and may have preferences before they present to the clinic. Research has shown that these preferences reflect underlying beliefs about the origins of mental illness.

For instance, individuals who view antidepressant treatment as more efficacious compared to traditional psychotherapy may believe depression is due primarily to a chemical imbalance (Deacon & Baird, 2009; Kemp, Lickel, & Deacon, 2014). Indeed, other research shows that individuals who endorse genetic beliefs of their mental illness are at a greater risk to experience stigma, expect less positive change from treatment, and believe they require more extreme treatments such as hospitalization or biological intervention to alleviate mental health symptoms (Dar-Nimrod & Heine, 2011; Easter, 2012; Lebowitz, Ahn, & Nolen-Hoeksema, 2013; Phelan, 2005; Phelan, Yang, & Cruz-Rojas, 2006).

Treatment preferences also play a role in treatment outcomes. In a randomized clinical trial, Kwan, Dimidjian, and Rizvi (2010) found higher attrition rates, more missed sessions, and less positive working alliance among individuals with major depressive disorder whose treatment assignment mismatched their pre-treatment preference (e.g., individuals preferring psychotherapy but who received antidepressant medication). In that study, assignment-preference mismatch indirectly influenced depressive symptoms at the end of treatment. Indeed, several studies have shown preference effects on outcome-relevant variables (e.g., Kocsis et al., 2009; Lin et al., 2005; Mergl et al., 2011; Moradveisi, Huibers, Renner, & Arntz, 2014) as well as a greater likelihood for continuing treatment (Elkin et al., 1999), but in other studies, assignment-preference mismatch did not relate to outcomes (Dobscha, Corson, & Gerrity, 2007; Dunlop et al., 2012; Leykin et al., 2007; Leykin, DeRubeis, Shelton, & Amsterdam, 2007).

In sum, treatment preferences likely reflect underlying beliefs and conceptualizations about illnesses that may be important for optimizing treatment response (e.g., Dunlop et al., 2012). Such findings linking preferences with beliefs about the origins of mental illness have direct implications for implicit theories, because entity theorists also tend to attribute abilities and personality to their genetic make-up (Dweck, 2006; Dweck et al., 1995; Keller, 2005), and may therefore have similar thoughts about treatment choices (i.e., medication). However, this association between implicit theories and preferences for treatment has not yet been evaluated.

The Current Investigation

The findings reviewed above indicate beliefs about the malleability of self-attributes, particularly attributes such as emotion and shyness, are related to fewer mental health problems, greater use of cognitive reappraisal, and theoretically might bias individuals toward certain treatment preferences such as individual therapy. The current study was designed to more thoroughly address these relations in several ways. First, we evaluated how these mental health variables related to multiple implicit theories, including intelligence, emotion, and personality theories, as well as a novel "theory of anxiety" scale that assessed the degree to which individuals believe anxiety is malleable. Only one previous study has evaluated theory of anxiety, but this was specific to *social anxiety* among patients with social anxiety disorder (De Castella et al., 2014). Evaluating multiple implicit theories allowed us to clarify the specific belief domain (e.g., anxiety vs. intelligence) that most strongly related to psychological symptoms. Second, as most of the previous studies evaluated how implicit theories relate only to one or two mental health symptoms, we assessed how implicit

theories related to a wide array of mental health symptoms including several symptoms of anxiety, depression, maladaptive perfectionism, and interpersonal problems. Third, we examined how these different implicit theories related to emotion regulation strategies, as the incremental theory of emotion has been related to greater use of cognitive reappraisal (e.g., De Castella et al., 2013; Kappes & Schikowski, 2013; Tamir et al., 2007). Finally, we evaluated how implicit theories related to preference for a hypothetical mental health treatment (e.g., individual therapy versus medication), which is a novel research question.

On the basis of past research on implicit theories, we made three key predictions. First, we predicted that incremental theory endorsement would be related to fewer psychological symptoms of anxiety, depression, perfectionism, and interpersonal problems. As noted above, implicit theories are most predictive of outcomes in the same domain; we therefore expected the theory of anxiety to be most predictive of these symptoms. Second, we predicted individuals with more of an incremental theory of emotion would be more likely to engage in cognitive reappraisal, and less likely to engage in expressive suppression, which would be more typical of entity theorists. For predictions 1 and 2, we used correlations to evaluate how each implicit theory domain related to the variables of interest overall, as well as multiple linear regressions to evaluate the unique relations between each implicit theory and the mental health variables, controlling for the other implicit theories. Finally, we predicted that individuals who chose the medication option (vs. individual therapy) would endorse more entity theory of anxiety, given that entity theorists are more likely to perceive their abilities and attributes – such as anxiety - as biological in nature (Haslam, Bastian, Bain, & Kashima, 2006; Keller, 2005; Phelan et al., 2006).

Study 1

Study 1 tested how implicit theories (of anxiety, intelligence, and emotion) related to psychological symptoms of anxiety, depression, and perfectionism, emotion regulation strategies, and hypothetical treatment preferences (no treatment, medication, individual therapy). We also assessed how implicit theories related to an existing measure of motivation for change. This measure was included in this study to differentiate the implicit theories concerning *global* attributes (anxiety, intelligence, emotion) from motivation for change about a *personal* goal (e.g., smoke less, worry less).

Method

Participants—Participants were undergraduates ($N = 477$) at a large Midwestern university who enrolled for partial course credit. Completed questionnaires were available from 430 participants. A further 42 participants were excluded prior to analysis due to a failure to respond to attention items that were dispersed throughout the questionnaire. The final sample consisted of 388 participants (284 female, 102 male, 6 unreported; M age = 19.42, SD =1.31)[2]. Most of the sample was made up of freshmen and sophomores

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[2]Note that similar rates of excluded data from self-report measures have been reported before (Thomas et al., 2013; Yalch, Lannert, Hopwood, & Levendosky, 2013; see Meade & Craig, 2012 for a thorough discussion). Results were virtually identical when analyses were conducted on the full sample of participants with available data (N=430).

(39.7% and 24.7%, respectively), whereas 15.7% were juniors and 17.3% were seniors (2.6% missing).

The racial/ethnic makeup of the sample was primarily European American (86.6%), African-American (5.7%), Biracial (3.1%), Asian (2.8%), Latino/Hispanic (2.6%), and Native American (0.5%). In terms of socioeconomic status, participants were asked to report either their annual income or their parents' combined annual income if they relied on their parents' financial support. Participants ranged in their self-reported annual income: under $20,000 (20.6%), $20,000-$40,000 (6.2%), $40,000-$60,000 (12.1%), $60,000-$80,000 (24.0%), and over $100,000 (31.7%; 5.4% missing). All participants consented to the study prior to data collection, and the university's Institutional Review Board approved all procedures.

Measures

Implicit theories measures: Three implicit theories were assessed drawing on existing measures: implicit theories of intelligence (TOI; Hong et al., 1999), implicit theories of emotion (TOE; Tamir et al., 2007), and implicit theories of anxiety (TOA). All implicit theory items are listed in the Appendix. On each of the implicit theory measures, participants rate the degree to which they agree or disagree with each of four statements on a scale of 1 (Strongly Disagree) to 6 (Strongly Agree). The TOI scale consisted of four entity-theory statements (e.g., "You have a certain amount of intelligence and you really cannot do much to change it"). Items from the TOI are well validated and previous studies have reported on their acceptable psychometric properties including internal consistency and test-retest reliability (e.g., Dweck et al., 1995; Hong et al., 1999). Implicit theories scales are often assessed using only statements in the entity framework because incrementally worded statements are highly compelling and may bias responding in an incremental manner (e.g., Boyum, 1988; Dweck et al., 1995; Dweck, 1999; Leggett, 1985).

The TOA scale consisted of the first three items as the TOI scale, except that the word "intelligence" was replaced with the word "anxiety". The fourth item on the TOA scale was modified from the TOE scale: "No matter how hard you try, you can't really change the level of anxiety that you have." This "find-and-replace" method is commonly used to create new implicit theories measures of self-attributes (e.g., Burnette, 2010; Chiu et al., 1997; Valentiner et al., 2011). Finally, the TOE scale (Tamir et al., 2007) had two incremental statements and two entity statements. After reverse-coding, higher scores on all of the implicit theory measures indicated greater incremental theory endorsement. An exploratory factor analysis of these items is described in the Results section.

Penn State Worry Questionnaire (PSWQ; Meyer et al., 1990): The PSWQ is a 16-item measure of trait worry. Participants rate statements related to worry (e.g., "I worry all the time") using a scale of 1 (Not like me at all) to 5 (Very much like me). The PSWQ is the most well studied measure of worry and shows excellent psychometric properties in college, community, and clinical samples (Brown, 2003; Zlomke, 2009). The PSWQ has also been used to screen individuals for generalized anxiety disorder (Behar, Alcaine, Zuellig, &

Borkovec, 2003; Fresco, Mennin, Heimberg, & Turk, 2003), as worry is considered the characteristic feature of this disorder (APA, 2013).

Mood and Anxiety Symptom Questionnaire (MASQ; Watson & Clark, 1991): The MASQ asks participants to rate how much they have experienced symptoms of anxiety and depression in the past week (including today) on a scale of 1 to 5. The Anxious Arousal (MASQ-AA) and Anhedonic Depression (MASQ-AD) subscales were administered in the present study. The MASQ-AA is composed of 17 items related to physiologic anxiety (e.g., "Hands were cold or sweaty"); the MASQ-AD subscale is composed of 22 items related to feelings of anhedonia (e.g., "Felt really happy; reverse-scored). We omitted one suicide item per the University's IRB stipulations.[3] Therefore, scores on this measure may underrepresent the true severity of the sample.

State and Trait Anxiety Inventory – Trait (STAI-T; Spielberger et al., 1983): The STAI-T is a 20-item measure of trait anxiety. Participants rate each statement describing anxious or non-anxious (reverse-coded) statements (e.g., "I feel pleasant") on a scale of 1 (Almost Never) to 4 (Almost Always). The STAI-T typically demonstrates excellent psychometric properties, although it has been found to relate to depression as well as anxiety (Bados, Gomez-Benito, & Balaguer, 1998; Bieling, Antony, & Swinson, 1998).

The Beck Depression Inventory –II (BDI-II; Beck, Steer, & Brown, 1996): The BDI-II is a 21-item measure of depressive symptoms. Per the university's IRB requirements, the suicide item was removed from the BDI-II. The BDI-II has been found to be reliable in clinical, community, and college-age student samples (e.g., Beck, Steer, & Carbin, 1988).

Multidimensional Perfectionism Scale (MPS; Frost, Marten, Lahart, & Rosenblate, 1990): The MPS is a 35-item measure encompassing six domains of perfectionism: concern over mistakes, personal standards parental expectations, parental criticism, doubts about actions, and organization. Previous studies find adequate psychometric properties of the MPS across various types of samples (e.g., Parker & Stumpf, 1995; Purdon, Antony, & Swinson, 1999). In this study, the MPS total score (the sum of all of the items) was used as an index of overall perfectionism.

Emotion Regulation Questionnaire (ERQ; Gross & John, 2003): The ERQ is a 10-item measure of emotion regulation strategies. Participants use a scale of 1 (Strongly Disagree) to 7 (Strongly Agree) to rate the degree to which they engage in two emotion-regulation strategies: reappraisal, which is assessed with six items (e.g., "When I want to feel less negative emotion, I change the way I'm thinking about the situation"), and suppression, which is assessed with four items (e.g., "When I am feeling negative emotions, I am careful not to express them"). Previous work has documented adequate psychometric properties of the ERQ (Melka, Lancaster, Bryant, & Rodriguez, 2011).

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[3]Our IRB stipulates that studies not including clinical screening/interviewing and trained staff to manage emergency situations should omit suicide item(s). We complied with this policy despite the importance of screening for suicidality and identifying those who could benefit from intervention.

The *Change Questionnaire* (CQ; Miller & Johnson, 2008) was administered to evaluate how the implicit theories assessed in the current study related to measures of motivation for change. The CQ is a 12-item questionnaire encompassing multiple motivations for change (desire, ability, reasons, need, commitment, and taking steps). It was developed from psycholinguistic research on natural motivation language used by clients (Amrhein, Miller, Yahne, Palmer, & Fulcher, 2003). Participants first describe something about themselves they wanted to change (e.g., worry less, drink less often, study more). Participants then rated their motivations to change this behavior using the following scale: Definitely Not (0–1), Probably Not (2–3), Maybe (4–6), Probably (7–8) and Definitely (9–10).

Hypothetical Treatment Choice: Hypothetical treatment choice was measured using one item: "If you struggle or if you were to struggle with mental health problems (e.g., anxiety, depression) and had a choice between individual therapy, medication, or no treatment to help you with your mental health problems, which would you choose?" The item was modified slightly from previous work (Cochran, Pruitt, Fukuda, Zoellner, & Feeny, 2008). This one item assesses participants' *pre-existing* notions of medication and individual therapy. That is, unlike some previous studies (e.g., Zoellner, Feeny, Cochran, & Pruitt, 2003), we did not provide participants with a more detailed hypothetical scenario/vignette, nor did we provide information on what each treatment might entail (cf. Kemp et al., 2014). Treatment choice data from one participant was missing.

Results

Sample Description—Table 1 shows descriptive statistics for all measures in Study 1. There was a range of psychological distress symptoms across the sample. For instance, 128 individuals (33% of the sample) scored above a 61 on the PSWQ, which is considered the cutoff for generalized anxiety disorder in college samples (Behar et al., 2003). This prevalence is higher than national prevalence estimates of generalized anxiety disorder (5.7% total and 4.1% among adults 18–29, Kessler et al., 2005). Moreover, although we excluded the suicide item from the BDI-II, the average score was similar to other studies of college students (Storch, Roberti, & Roth, 2004) and approximately 23.8% ($n = 92$) of the sample exceeded the clinical cutoff in college students for a major depressive episode (Sprinkle et al., 2002). It should be noted that this is higher than 12-month prevalence estimates of major depressive episodes (10.3%; Kessler et al. 1994) and major depressive disorder (e.g., 2.2%; Reiger et al., 1988). The MASQ scores in this sample were similar to those from other college samples (e.g., Nitschke, Heller, Imig, McDonald, & Miller, 2001) and 13.7% of the participants exceeded the clinical cutoff for a depressive disorder (Bredemeier et al., 2010). The STAI-T scores (males: $M = 38.58$, $SD = 9.03$; females: $M = 42.36$, $SD = 11.25$) were quite similar to the norms reported for college students (Spielberger, 1983; males: $M = 38.30$, $SD = 9.18$; females: $M = 40.40$, $SD = 10.15$), indicating a normative spread of trait anxiety across the sample. Thus, there was considerable variability in the mental health reports in this sample.

Factor structure of the implicit theory measures—Past research indicates that despite highly similar item content, individual implicit theory scales reliably fall onto separate factors. Nonetheless, given the highly overlapping item content between the TOI

and TOA scales, we tested whether each scale was indeed capturing beliefs regarding a unique self-attribute (i.e., anxiety, vs. intelligence vs. emotion). Accordingly, we conducted an exploratory factor analysis (EFA; Fabrigar, Wegener, MacCallum, & Strahan, 1999) using principal axis factoring on all 12 implicit theory items (from the TOA, TOI, and TOE scales). Factors were extracted using both oblique (Promax) and orthogonal (Varimax) rotations. The factor loadings and eigenvalues from the EFA are depicted in Table 2. The items loaded cleanly onto three separate factors (regardless of using either an oblique or orthogonal rotation). The first five eigenvalues were: 4.98, 2.68, 2.09, 0.66, and 0.46. Examination of the scree plot and a parallel analysis (first five simulated eigenvalues: 1.30, 1.21, 1.16, 1.11, and 1.06) suggested we retain three factors. We therefore created three subscales: TOA, TOI, and TOE, by averaging across the items that made up each scale. Table 3 shows that correlations between the implicit theory scales were small to moderate in size (rs ranged from .13 to .30) thus speaking to their independence.

Associations with mental health variables[4]—Table 3 shows correlations between the implicit theory measures and the mental health symptoms assessed in Study 1. Of the implicit theories measures, the TOA scale was most strongly correlated (negatively) with mental health problems, including symptoms of worry, physiologic anxiety, anhedonic and general depression, and perfectionism, such that greater incremental theory of anxiety endorsement was associated with fewer symptoms. The CQ-Total was only weakly correlated (i.e., rs = .05, .08, and .12, for TOA, TOI, and TOE, respectively) with the implicit theories measures, suggesting that the implicit theories measures were not redundant in content with this existing motivational measure.

Table 4 presents results of a series of multiple linear regressions predicting the mental health variables with the three implicit theories scales as independent variables. This analysis provides estimates of how each of the implicit theories is uniquely associated with mental health symptom variables, controlling for the other implicit theories measures. The regression analyses show that the theory of anxiety scale most consistently uniquely predicted psychological symptom variables. Although the theory of emotion scale significantly predicted many of these symptoms as well, the standardized regression coefficients (β) were almost always smaller compared to those with the theory of anxiety scale. Nevertheless, it is interesting that both anxiety and emotion theories independently predicted variance in these symptoms. Theories of anxiety and intelligence each predicted unique variance in the perfectionism measure (i.e., the MPS), which is likely due to the more academic content on this measure (e.g., Shih, 2011).

In terms of emotion regulation strategies, the incremental theory of emotions (TOE) was uniquely associated with more cognitive reappraisal, replicating past findings (De Castella et al., 2013; Tamir et al., 2007). TOA was also uniquely associated with more reappraisal. TOA and TOI both uniquely predicted less suppression.

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[4]Controlling for self-reported annual income and minority status did not significantly impact any of the results reported here. However, European-American participants endorsed more of an entity theory of intelligence compared to non-European-American participants ($t(386) = 2.69$, $d = .38$, $p < .01$). No significant differences were found for theories of anxiety ($t(386) = 1.25$, $d = .17$, $p = .21$) or emotion ($t(386) = .10$, $d = .02$, $p = .92$).

Hypothetical Treatment Choice—Overall, a total of 65 participants (16.8%) indicated they would prefer "No Treatment", 106 participants (27.4%) selected the "Medication" option, and 216 participants (55.7%) preferred the "Individual Therapy" option. This pattern is consistent with previous studies of treatment preferences indicating that psychotherapy is a more popular treatment choice compared to medication (e.g., Deacon & Abramowitz, 2005; Houle et al., 2013; Lauber et al., 2001; Zoellner et al., 2003)

A multivariate analysis of variance (MANOVA) was conducted to assess how the implicit theories scales (TOA, TOI, TOE) related to hypothetical treatment preference, the results of which are presented in Table 5. The MANOVA was significant for TOA and TOE, but not for TOI. As expected, individuals who chose the Medication option had lower TOA scores (indicative of more of an entity theory) compared to those who chose the No Treatment option and those who chose the Individual Therapy option, the latter of which was a significant difference using Bonferroni correction ($d = .26$, $p = .02$). Individuals who chose the No Treatment option also had higher TOA scores (less entity theory of anxiety) compared to those who chose the Medication option, although this difference did not attain statistical significance at the .05 level ($p = .08$). Together, these data support our prediction that individuals who chose the Medication option endorsed more entity scores on the TOA compared to those who chose Individual Therapy.

Interim Discussion

In line with past findings (Dweck et al., 1995), the factor analysis showed that the implicit theories items loaded onto separate factors, suggesting they tap into largely distinct beliefs of regarding anxiety, intelligence, and emotion. The results supported our first prediction – the implicit theory of anxiety measure would be most predictive of psychological symptoms (in terms of the consistency of relationships and general pattern of effect sizes), although it was interesting that both implicit theories of anxiety and emotion each predicted unique variance in many of the symptoms assessed. The correlation and regression analyses also supported our second prediction, which replicated previous findings relating entity theories of emotion to less frequent use of cognitive reappraisal (De Castella et al., 2013; Tamir et al., 2007). The novel finding here was that implicit theories of *anxiety* was uniquely related both to cognitive reappraisal *and* to emotional suppression – in opposite directions. That is, the incremental theory of anxiety predicted more frequent reappraisal and less frequent suppression. Finally, our third prediction was also supported – individuals who chose the medication option had significantly higher endorsement of the entity theory of anxiety, compared to those who chose the individual therapy option.

Study 2

The purpose of Study 2 was to replicate and extend the findings from Study 1 in three ways. First, we assessed relations between implicit theories and different measures of psychological symptoms, including a measure of social phobia and a measure of interpersonal distress to further evaluate the clinical breadth of the relations of the implicit theories measures. As mentioned earlier in the Introduction, several studies have evaluated how implicit theories relate to social anxiety or shyness (e.g., Beer, 2002; De Castella et

al., 2014; Valentiner et al., 2011; Valentiner et al., 2013), yet only one of these studies assessed how beliefs of anxiety (specifically, social anxiety) related to symptoms (De Castella et al., 2014). Thus, an explicit goal of Study 2 was to assess how our new implicit theories of anxiety measure would relate to social anxiety symptoms. Toward this end, we evaluated participants' self-reported social phobia symptoms as well as a measure of their problems in relationships with others (interpersonal problems). Second, we assessed hypothetical treatment preference with an additional treatment option (combined medication and therapy), as this is a common option in clinical settings. Finally, we examined how these variables related to *implicit theories of personality* (TOP; Chiu et al., 1997). Recent work has shown that an intervention teaching the incremental theory of personality (the idea that personality is malleable) is associated with resilience to challenging situations (Miu & Yeager, in press; Yeager et al., 2014). Study 2 assessed whether implicit theories of personality also predicted mental health symptoms, emotion regulation strategies, and treatment preferences.

Method

Participants—Participants were female undergraduates ($N = 298$) drawn from a study of mental health in college women at the same large Midwestern university as Study 1 who enrolled for partial course credit. Data from 88 participants were excluded prior to analysis because of a failure to respond adequately to items designed to identify accurate responding. The final sample consisted of 210 participants (M age = 20.82 years, $SD = 3.50$). No further demographic information was collected in Study 2. All participants consented to the study prior to data collection, and the university's Institutional Review Board approved all procedures.

Measures—Participants completed the same three implicit theories measures from Study 1 (TOA, TOI, and TOE) as well as an additional three-item measure to assess implicit theories of personality (TOP; Chiu et al., 1997). Participants also completed the PSWQ, MASQ-AA, MASQ-AD, ERQ-Reappraisal, and ERQ-Suppression. In addition, participants completed the following questionnaires that were not collected in Study 1:

Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988): On the BAI, participants rate the extent to which each of 21 symptoms of anxiety bothered them over the past week on a four-point scale (Not at all, Mildly, Moderately, or Severely). Past research suggests the BAI exhibited adequate psychometric properties (Fydrich, Dowdall, & Chambless, 1992) and relates to somatic/physiologic anxiety, as opposed to the cognitive component of anxiety (Beck & Steer, 1991).

Social Phobia Inventory (SPIN; Connor et al., 2000): The SPIN is a 17-item measure of social phobia symptoms. Participants use a scale of 0 (Not at all) to 4 (Extremely) to rate how much statements related to social phobia apply to them (e.g., "I am bothered by blushing in front of people"). Previous research indicates the SPIN is a useful screener for social anxiety disorder symptoms across college, community, and clinical samples (Antony, Coons, McCabe, Ashbaugh, & Swinson, 2006; Osorio, Crippa, & Loureiro, 2010).

Inventory of Interpersonal Problems – Short Circumplex (IIP-SC; Soldz, Budman, Demby, & Merry, 1995): The IIP-SC is a 32-item version of the inventory of interpersonal problems circumplex scales (Horowitz, Alden, Wiggins, & Pincus, 2000) and evaluates an individual's interpersonal problems along eight different scales: Domineering, Vindictive, Cold, Socially Inhibited, Nonassertive, Overly Accommodating, Self-Sacrificing, and Intrusive. Participants respond to each item using a scale ranging from 0 (Not at all) to 4 (Extremely).The IIP-SC has been shown to possess adequate psychometric properties among college students (Hopwood, Pincus, DeMoor, & Koonce, 2008). In this study, we used the elevation score from the IIP-SC (sum of all subscales) to index overall interpersonal problems.

The same item from Study 1 was used for hypothetical treatment choice (Cochran et al., 2008), except that an additional response option was added: Medication *and* Individual Therapy.

Results

Sample Description—Table 6 presents descriptive statistics for the measures used in Study 2. As can be seen from this table, the sample in Study 2 also reported a wide range of psychological symptoms. For instance, the average PSWQ score was 55.70, slightly higher than the average in Study 1, and 75 participants (36%) would have exceeded the clinical cutoff score (Behar et al., 2003) – again higher than national prevalence estimates (Kessler et al., 2005). Using Beck and Steer's (1993) guidelines for the BAI, 72 participants (34%) reported minimal anxiety, 73 (35%) reported mild anxiety, 44 (21%) reported moderate anxiety, and 21 (10%) reported severe anxiety. The scores on the MASQ-AA and MASQ-AD were similar to those in Study 1, with 21 (14.8%) exceeding the MASQ-AD cutoff for a depressive disorder (Bredemeier et al., 2010). The average SPIN score (20) was actually above the clinical cutoff for social anxiety disorder using this measure (Connor et al., 2000), and 45 participants (21%) scored above the more severe cutoff of 30 on the SPIN (e.g., Moser, Hajcak, Huppert, Foa, & Simons, 2008). Thus, like Study 1, participants in Study 2 reported on a wide range of psychological symptoms.

Factor structure of the implicit theory measures—The same EFA approach from Study 1 was used in Study 2, and the factor loadings and eigenvalues for the 15 implicit theory items are presented in Table 7. As can be seen from the table, the items loaded cleanly onto four separate factors, although one item from the TOA scale had a cross-loading above .40 on the Personality factor. The first five eigenvalues were 5.61, 2.51, 1.84, 1.49, and 0.81. Examination of the scree plot and a parallel analysis (first five simulated eigenvalues: 1.49, 1.38, 1.30, 1.22, 1.15) suggested we retain four factors. Average implicit theory scales were created, as in Study 1.

Associations with mental health variables—Table 8 presents descriptive statistics and the correlation matrix from Study 2. In terms of the relations between implicit theories and these symptoms, the incremental theory of anxiety was negatively related to symptoms of anxiety, depression, interpersonal problems, and positively related to cognitive

reappraisal. The interpersonal problem measure (IIP-SC) was the only measure negatively correlated across all of the implicit theories measures.

Table 9 presents the regression analyses from Study 2. TOA scores were uniquely associated with fewer symptoms of worry, anxious arousal / physiologic anxiety, social phobia, and depression. TOA, TOI, and TOE each contributed unique variance to fewer interpersonal problems. These results were generally consistent with predictions and results from Study 1. Surprisingly, the regression with BAI indicated greater incremental TOP scores were associated with higher BAI scores[5].

In terms of emotion regulation, greater incremental theory of emotion (TOE) was again positively and uniquely associated with cognitive reappraisal, but was also positively predictive of increased suppression, suggesting it was linked with the engagement of emotion regulation strategies in general. Although incremental theory of anxiety (TOA) was uniquely associated with lower frequency of suppression, it was not uniquely associated with cognitive reappraisal. The incremental theory of personality (TOP) was associated with less use of suppression.

Hypothetical Treatment Choice—Table 4 presents the results from the hypothetical treatment choice analyses. Overall, eight individuals (3.8%) preferred "No Treatment", 22 (10.5%) preferred "Medication", 87 (41.4%) preferred "Individual Therapy", and 93 (44.3%) preferred the combination of "Medication and Individual Therapy". In Study 2, the treatment choice MANOVA revealed a significant effect for TOA only, with the significant Bonferroni-corrected follow-up test indicating that individuals who chose the individual therapy only option had higher TOA scores compared to those who chose the medication only option. Moreover, those who chose the combined therapy and medication option had higher TOA scores compared to those who chose the medication only option. The sizes of these effects ranged from medium ($d = 0.68$ for combined therapy vs. medication only) to large ($d = 0.82$ for individual therapy vs. medication only).

General Discussion

Although decades of work have established that implicit theories are associated with a number of motivational outcomes and responses to challenge (Yeager & Dweck, 2012), only recently has it been shown that these beliefs also relates to mental health, with an increasing focus on beliefs about emotion and social concerns (Beer, 2002; Da Fonseca et al., 2009; De Castella et al., 2013; De Castella et al., 2014; Romero et al., 2014; Rudolph, 2010; Tamir et al., 2007; Valentiner et al., 2011, 2013). The goal of this research was to more thoroughly examine the associations between implicit theories and mental health symptoms and emotion regulation strategies, as well as to assess the relation between implicit theories and hypothetical treatment preferences.

Psychological Symptoms—We hypothesized that a novel *theory of anxiety* measure developed in this study would be most closely associated with mental health symptoms,

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[5]This finding should be interpreted cautiously, as there was no overall zero-order correlation between TOP and BAI ($r = -.02$, see Table 8).

given past work indicating domain specificity for implicit theories (Dweck et al., 1995). In line with this expectation, we found that the entity theory of anxiety was associated with more symptoms of anxiety, depression, maladaptive perfectionism, and more interpersonal problems, even after controlling for the other implicit theories. At the same time, theories of emotion also predicted unique variance of many of these psychological symptoms. These findings suggest that future work could explore how different types of 'psychological distress' theories– for example, how much individuals view their depression or their substance use behavior as fixed or malleable - are related to both domain-specific and global outcomes.

Emotion Regulation—Consistent with past research (e.g., De Castella et al., 2013; Tamir et al., 2007), we found that the entity theory of emotion was most closely associated with less frequent use of cognitive reappraisal across both studies, even after controlling for the other implicit theories. In Study 2 only, we also found that the entity theory of emotion was associated with decreased use of suppression (only after controlling for the other implicit theories), which might suggest that this belief is associated with decreased use of regulatory strategies to change emotional experience more generally. However, past research indicates that the entity theory of emotion was not associated with suppression (Tamir et al., 2007), and as we only found this relation in one of the two studies, further research will be needed to evaluate the extent to which emotion beliefs are associated with different emotion regulation strategies.

A novel finding here was that the entity theory of anxiety was associated with *more frequent suppression* across both studies. That is, individuals who thought anxiety was fixed were more likely to adopt the suppressive emotion regulation strategy, which is associated with poorer mental health outcomes (e.g., Gross & John, 2003). As outlined in the Introduction, suppression is a *reactive* emotion regulation strategy, in which attempts to change the experience of emotions are initiated after the emotion is experienced. Theories of emotion and anxiety suggests these beliefs relate to different emotion-regulation strategies. Therefore, whereas an implicit theory of anxiety is predictive of mental health problems and emotional suppression, an implicit theory of emotion is most predictive of cognitive reappraisal. Given the benefits of cognitive reappraisal mentioned earlier, one implication of these findings is that cultivation of incremental theories of anxiety *and* emotion may be most beneficial in terms of mental health functioning.

Treatment Preference—An important research question we addressed in this study was whether preferences for different hypothetical treatment choices would be associated with differential endorsement of implicit theories. Just one study has examined implicit theories in treatment outcomes, and that study only evaluated implicit theories of shyness (Valentiner et al., 2013). One of the goals of the current studies was to provide additional information on the relation between implicit theories and treatment-relevant processes. We found that individuals who chose the medication-only option endorsed more entity theory beliefs of anxiety compared to those who chose the individual therapy option as well as the individual therapy and medication option in Study 2. Beliefs of emotion emerged in the overall treatment preference analysis in Study 1 and a significant follow-up comparison indicated

that entity beliefs of emotion were greater for individuals who chose the medication option compared to those who chose the "no treatment" option. However, this was not replicated in Study 2. Beliefs of anxiety were most sensitive to differences in hypothetical treatment preferences measured here across both studies.

The finding that the entity theory of anxiety was greatest among those who chose the medication only option is consistent with previous research indicating that the entity theory (of personality) is positively associated with genetic essentialism, or the tendency to reduce many human experiences to biological and genetic factors (e.g., Keller, 2005). As previous work also indicates that individuals who endorse high genetic essentialist beliefs are more likely to opt for biological treatments for mental health problems (Dar-Nimrod & Heine, 2011; Deacon, 2013; Easter, 2012; Kvaale, Haslam, & Gottdiener, 2013; Phelan, 2006), the current findings suggest that implicit theories of psychological distress may play an important role in the relation between essentialist beliefs and treatment choice. Further evaluation of the associations between implicit theories, treatment preferences, essentialist beliefs, and treatment outcomes is clearly an area for future studies.

Clinical Implications—Our finding that implicit theories are associated with symptom severity raises the distinct possibility that changing implicit theories more toward incremental beliefs may lead to reductions in symptoms. In this way, work on implicit theories may have implications for clinical practice. Although the cross-sectional nature of our studies constrains inferences about the causal link between implicit theories and psychopathology, such an idea is consistent with research indicating that changes in implicit theories are associated with changes in behavior. For example, a number of intervention studies indicate that the induction of the incremental theory leads to improvements in academic achievement (Blackwell et al., 2007), interpersonal relations (Yeager et al., 2014; Yeager, Trzesniewski, Tirri, Nokelainen, & Dweck, 2011) and other domains of psychosocial functioning (Burnette et al., 2013; Miu & Yeager, in press; Walton, 2014).

It is also worth noting that implicit theory interventions appear to be relatively domain-specific: Yeager et al (2014) found no improvement in psychological well-being for students in an athletics-focused incremental theory intervention. Our findings dovetail nicely with this notion of specificity in that implicit theories of anxiety were most consistently predictive of psychological symptoms. This suggests future research could adjust the methods of successful implicit theories interventions that targeted broader implicit theory domains such as personality and intelligence (e.g., Blackwell et al., 2007; Miu & Yeager, in press; Yeager et al., 2014) to develop interventions that target implicit theories more specific to psychological distress, in order to maximize the mental health benefits. For instance, clients presenting to an outpatient clinic might be asked to read an article about the malleability of anxiety (cf. Hong et al., 1999).

Limitations and Conclusions—A number of limitations in the present studies should be addressed in future research. First, our samples were drawn from a college population, and the extent to which the individuals in the samples met formal diagnostic criteria for psychological disorders (APA, 2013) is unknown. Moreover, we did not have information on participants' history or experience with psychological diagnosis and/or treatment, so we

are uncertain of the extent to which personal treatment experiences may have influenced the hypothetical treatment preference findings. However, our college student sample consisted mostly of young adults, a demographic group at heightened risk for psychological problems (Kessler et al., 2005). Likewise, a critical consideration was whether we had sufficient variability in our sample to be clinically interesting. As we described, participants in the current studies reported a wide range of both annual income and psychological symptoms, and in some cases the severity of problems was more prevalent than in national estimates (Kessler et al., 2005). Indeed, college students are not immune to the distress associated with mental health problems (Blanco et al., 2008; Hunt & Eisenberg, 2010; Wright et al., 2012). In sum, the participants in the current samples exhibited a range of psychological symptoms.

A related limitation is that the samples were drawn from a relatively homogenous population of primarily European American middle-class young adult students (and primarily female). Given that implicit theories research suggests that beliefs of malleability have particularly strong effects among those who come from disadvantaged backgrounds (e.g., Dweck, 2006; Yeager et al., 2014), future studies will need to evaluate how implicit theories relate to the mental health variables assessed here in more ethnically diverse samples.

A third limitation is that we only assessed participants' *preconceived notions* about medication and individual therapy in this study. That is, we did not provide descriptions of these treatments (e.g., Kemp et al., 2014; Zoellner et al., 2009) or measure actual treatment-relevant behavior. In this way, however, we presumably measured a more "naturalistic" interpretation of what individuals conceived of these treatments, which in fact dovetails nicely with the nature of implicit theories (also referred to as "lay theories"; Chiu et al., 1997). Accordingly, our hypothetical treatment choice findings may have more relevance for the public understanding of treatment options for psychological problems than for clinical populations, who would presumably have more knowledge abut treatment options. At any rate, future studies examining how implicit theories relate to actual treatment preference, adherence, process, and outcome in clinical samples are an important next step in this line of work.

A final limitation is that the cross-sectional nature of our studies precludes any definitive inferences regarding effect directions. Nonetheless, we believe the current work provides the groundwork for future investigations of implicit theories and mental health in that they clarify that more specific beliefs of psychological distress (anxiety in this study) may be most closely associated with the mental health symptoms of anxiety, depression, perfectionism, and interpersonal distress. Future studies could track participants' beliefs and symptoms longitudinally to assess whether beliefs predate the onset of symptoms. Future research should also assess whether implicit theory interventions like those used in previous studies (e.g., Chiu et al., 1997; Yeager et al., 2014) have an effect on psychological symptoms, emotion regulation strategies, and hypothetical treatment preferences.

Despite these important limitations, the current study provides an initial glimpse into the fruitful integration of research on implicit theories from social and educational psychology and phenomena from clinical psychology. We believe one next step is to apply the implicit theories framework into clinical psychological research to assess the effects of these beliefs

on the course, treatment, and perceptions of mental illnesses. Indeed, work on implicit theories could represent a critical area of synergy in psychological science that provides a theoretically-grounded and empirically-supported approach for reducing psychological distress and promoting adaptive functioning in multiple domains of life.

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Appendix

Theories of Anxiety Scale (TOA)

Please indicate the extent to which you agree or disagree with each of the following statements.

Strongly Disagree   1   2   3   4   5   6   Strongly Agree

1. ___ You have a certain amount of anxiety and you really cannot do much to change it.

2. ___ Your anxiety is something about you that you cannot change very much.

3. ___ To be honest, you cannot really change how anxious you are.

4. ___ No matter how hard you try, you can't really change the level of anxiety that you have.

Theories of Intelligence Scale (TOI)

Please indicate the extent to which you agree or disagree with each of the following statements.

Strongly Disagree   1   2   3   4   5   6   Strongly Agree

1. ___ You have a certain amount of intelligence and you really cannot do much to change it.

2. ___ Your intelligence is something about you that you cannot change very much.

3. ___ To be honest, you cannot really change how intelligent you are.

4. ___ You can learn new things, but you cannot really change your basic intelligence.

Theories of Emotion Scale (TOE)

Please indicate the extent to which you agree or disagree with each of the following statements.

Strongly Disagree   1   2   3   4   5   6   Strongly Agree

1. ___ Everyone can learn to control their emotions.

2. ___ If they want to, people can change the emotions that they have.

3. ___ No matter how hard they try, people can't really change the emotions that they have.

4. ___ The truth is, people have very little control over their emotions.

Theories of Personality Scale (TOP)

Please indicate the extent to which you agree or disagree with each of the following statements.

Strongly Disagree   1   2   3   4   5   6   Strongly Agree

1. ___ The kind of person someone is is something very basic about them and it can't be changed very much.

2. ___ People can do things differently, but the important parts of who they are can't really be changed.

3. ___ Everyone is a certain kind of person and there is not much that can be done to really change that.

Table 1

Descriptive statistics of measures collected in Study 1.

Measure	TOA	TOI	TOE	CQ	PSWQ	MASQ-AA	STAI-T	MASQ-AD	BDI-II	MPS	ERQ-R	ERQ-S
M	4.23	4.26	3.93	96.62	53.84	29.48	41.34	51.87	10.72	85.58	28.79	14.41
SD	1.38	1.29	1.10	17.22	14.70	11.30	11.30	14.68	10.01	17.99	6.58	4.56
Observed Range	1–6	1–6	1–6	20–120	18–80	16–67	20–75	21–98	0–50	36–145	11–42	4–28
Possible Range	1–6	1–6	1–6	20–120	16–80	17–85	20–80	21–105	0–60	35–175	7–42	4–28

Note: Missing items contributed to observed minimum values that are lower than the possible minimum value for the MASQ-AA. Coefficient alphas for each measure are presented along the diagonal in parentheses. TOA: Theory of Anxiety; TOI: Theory of Intelligence; TOE: Theory of Emotion; CQ: Change Questionnaire; PSWQ: Penn State Worry Questionnaire; MASQ: Mood and Anxiety Symptom Questionnaire (AA: Anxious Arousal; AD: Anhedonic Depression); STAI-T: State and Trait Anxiety Inventory-Trait version; BDI-II: Beck Depression Inventory-II; MPS: Multidimensional Perfectionism Scale; ERQ: Emotion Regulation Questionnaire – (R: Reappraisal; S: Suppression).

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Table 2

Factor loadings for the implicit theory items in Study 1 (N=388).

	Implicit Theory Domain					
	Anxiety		Intelligence		Emotion	
Item	Promax	Varimax	Promax	Varimax	Promax	Varimax
TOA 1	**.86 (.88)**	**.85**	.04 (.31)	.17	.02 (.29)	.16
TOA 2	**.98 (.97)**	**.95**	−.02 (.28)	.13	−.01 (.29)	.14
TOA 3	**.96 (.96)**	**.94**	−.01 (.28)	.13	−.01 (.28)	.14
TOA 4	**.95 (.95)**	**.93**	.003 (.29)	.15	.003 (.29)	.15
TOI 1	−.03 (.25)	.11	**.91 (.90)**	**.89**	.01 (.14)	.06
TOI 2	−.02 (.26)	.12	**.94 (.93)**	**.92**	−.02 (.12)	.04
TOI 3	−.002 (.29)	.14	**.94 (.94)**	**.93**	.02 (.16)	.08
TOI 4	.06 (.31)	.18	**.85 (.87)**	**.85**	−.02 (.13)	.04
TOE 1	.05 (.21)	.12	−.05 (.05)	−.003	**.58 (.59)**	**.58**
TOE 2	−.05 (.18)	.07	−.02 (.08)	.03	**.78 (.76)**	**.76**
TOE 3	−.04 (.23)	.09	.02 (.14)	.07	**.84 (.83)**	**.83**
TOE 4	.06 (.29)	.17	.05 (.18)	.11	**.72 (.75)**	**.72**
Eigenvalue	4.98		2.68		2.09	
Variance (%)	40.08		20.65		13.93	

Note. Factors extracted using principal axis factoring. For Promax-rotated loadings, values of the Pattern matrix are shown, with values from the Structure matrix in parentheses. Loadings greater than .40 are shown in bold. TOA: Implicit Theories of Anxiety; TOI: Implicit Theories of Intelligence; TOE: Implicit Theories of Emotion. Scale items are listed in the Appendix.

Table 3

Correlations between measures used in Study 1.

Measure	TOA	TOI	TOE	CQ	PSWQ	MASQ-AA	STAI-T	MASQ-AD	BDI-II	MPS	ERQ-R	ERQ-S
TOA	(.97)											
TOI	.30**	(.95)										
TOE	.28**	.13**	(.82)									
CQ	.05	.08	.12*	(.90)								
PSWQ	−.44**	−.12*	−.25**	−.02	(.95)							
MASQ-AA	−.34**	−.11*	−.23**	−.10*	.32**	(.92)						
STAI -T	−.40**	−.16**	−.29**	−.22**	.63**	.50**	(.93)					
MASQ-AD	−.28**	−.12*	−.24**	−.28**	.44**	.36**	.81**	(.93)				
BDI-II	−.30**	−.09	−.31**	−.18**	.48**	.47**	.80**	.73**	(.94)			
MPS	−.30**	−.20**	−.08	−.08	.40**	.25**	.50**	.39**	.37**	(.91)		
ERQ-R	.18**	.08	.16**	.16**	−.28**	−.17**	−.40**	−.41**	−.33**	−.20**	(.90)	
ERQ -S	−.13**	−.17**	.02	−.13*	.04	.11*	.17**	.22**	.08	.20**	−.09	(.71)

Note: Coefficient alphas for each measure are presented along the diagonal in parentheses. TOA: Theory of Anxiety; TOI: Theory of Intelligence; TOE: Theory of Emotion; CQ: Change Questionnaire; PSWQ: Penn State Worry Questionnaire; MASQ: Mood and Anxiety Symptom Questionnaire (AA: Anxious Arousal; AD: Anhedonic Depression); STAI-T: State and Trait Anxiety Inventory-Trait version; BDI-II: Beck Depression Inventory-II; MPS: Multidimensional Perfectionism Scale; ERQ: Emotion Regulation Questionnaire – (R: Reappraisal; S: Suppression).

*
$p < .05$;

**
$p < .01$.

Table 4

Regression analyses from Study 1.

	Incremental Theory Domain (Independent Variable)								
	Anxiety			Intelligence			Emotion		
Dependent Variable	b [95% CI]	SE	β	b [95% CI]	SE	β	b [95% CI]	SE	β
CQ	−.09 [−1.43, 1.25]	.68	−.01	.89 [−.50, 2.28]	.71	.07	1.80* [.18, 3.43]	.83	.12
PSWQ	−4.27** [−5.30, −3.24]	.52	−.40	.23 [−.84, 1.29]	.54	.02	−1.86** [−3.10, −.61]	.64	−.14
MASQ-AA	−2.47** [−3.29, −1.65]	.42	−.30	.03 [−.82, .88]	.44	.004	−1.51** [−2.51, −.51]	.51	−.15
STAI-T	−2.65** [−3.42, −1.88]	.39	−.34	−.30 [−1.10, .49]	.41	−.04	−1.85** [−2.78, −.92]	.47	−.19
MASQ-AD	−2.35** [−3.44, −1.26]	.55	−.22	−.37 [−1.50, .76]	.57	−.03	−2.33** [−3.65, −1.01]	.67	−.17
BDI-II	−1.67** [−2.39, −.94]	.37	−.23	.11 [−.65, .86]	.39	.01	−2.22** [−3.11, −1.34]	.45	−.24
MPS	−3.51** [−4.86, −2.16]	.69	−.27	−1.82* [−3.21, −.42]	.71	−.13	.29 [−1.33, 1.92]	.83	.02
ERQ-R	.65* [.15, 1.16]	.26	.14	.11 [−.41, .63]	.27	.02	.74* [.12, 1.35]	.31	.12
ERQ-S	−.36* [−.71, −.01]	.18	−.11	−.53** [−.89, −.16]	.19	−.15	.27 [−.15, .70]	.22	.07

*
$p < .05$,

**
$p < .01$

Table 5

Implicit theory scores, shown as M (SD) for each hypothetical treatment choice in Studies 1 and 2. Statistics reported are from a Multivariate Analysis of Variance (MANOVA)

Implicit Theory	No Treatment	Medication	Individual Therapy	Therapy & Medication	Analysis			
					F	df	p	η_p^2
Study 1	$N = 65$	$N = 106$	$N = 216$	--				
Anxiety	4.37 (1.29)	3.89 (1.45)	4.25 (1.36)	--	4.41*	2, 384	.01	.02
Intelligence	4.15 (1.27)	4.07 (1.33)	4.39 (1.27)	--	2.52	2, 384	.08	.01
Emotion	4.12 (1.06)	3.70 (1.09)	4.00 (1.10)	--	3.66*	2, 384	.03	.02
Study 2	$N = 8$	$N = 22$	$N = 87$	$N = 93$				
Anxiety	4.13 (1.30)	3.60 (1.02)	4.50 (1.12)	4.33 (1.16)	3.73*	3, 206	.01	.05
Intelligence	4.31 (1.31)	3.64 (1.05)	4.39 (1.15)	4.13 (1.22)	2.51	3, 206	.06	.04
Emotion	4.11 (0.59)	3.69 (0.69)	4.00 (0.98)	3.90 (0.95)	0.80	3, 206	.50	.01
Personality	3.79 (1.17)	3.20 (0.67)	3.66 (1.15)	3.57 (1.12)	1.14	3, 206	.34	.02

Table 6

Descriptive statistics for measures used in Study 2.

Measure	TOA	TOI	TOE	TOP	PSWQ	MASQ-AA	BAI	SPIN	MASQ-AD	IIP-SC	ERQ-R	ERQ-S
M	4.33	4.19	3.93	3.58	55.70	27.59	12.56	20.14	53.98	−.03	27.94	13.98
SD	1.16	1.19	0.93	1.10	14.40	9.02	10.22	11.78	14.80	0.66	7.24	5.05
Observed Range	1–6	1–6	1–6	1–6	16–80	16–67	0–59	0–55	22–91	−1.17–1.63	7–42	4–28
Possible Range	1–6	1–6	1–6	1–6	16–80	17–85	0–63	0–68	21–105	−2.00–2.00	7–42	4–28

Note: Missing items contributed to observed minimum values that are lower than the possible minimum value for the MASQ-AA. TOA: Theory of Anxiety; TOI: Theory of Intelligence; TOE: Theory of Emotion; TOP: Theory of Personality; PSWQ: Penn State Worry Questionnaire; MASQ: Mood and Anxiety Symptom Questionnaire (AA: Anxious Arousal; AD: Anhedonic Depression); BAI: Beck Anxiety Inventory; SPIN: Social Phobia Inventory; IIP-SC: Inventory of Interpersonal Problems – Short Circumplex Elevation; ERQ: Emotion Regulation Questionnaire – (R: Reappraisal; S: Suppression).

Table 7

Factor loadings for the 15 implicit theory items from Study 2 (N = 200).

| Item | Implicit Theory Domain | | | | | | | |
| | Anxiety | | Intelligence | | Personality | | Emotion | |
	Promax	Varimax	Promax	Varimax	Promax	Varimax	Promax	Varimax
TOA 1	**.86 (.87)**	**.83**	−.05 (.31)	.13	.11 (**.41**)	.23	−.05 (.26)	.10
TOA 2	**.95 (.94)**	**.90**	−.003 (.36)	.18	−.01 (.36)	.15	−.01 (.29)	.13
TOA 3	**.90 (.92)**	**.87**	.03 (.37)	.20	−.02 (.36)	.14	.05 (.32)	.18
TOA 4	**.95 (.95)**	**.90**	.02 (.37)	.19	−.04 (.35)	.13	.03 (.31)	.17
TOI 1	−.03 (.33)	.14	**.95 (.93)**	**.91**	−.03 (.29)	.11	.01 (.08)	.02
TOI 2	−.03 (.35)	.15	**1.00 (.98)**	**.96**	−.01 (.32)	.13	−.01 (.08)	.01
TOI 3	.03 (.38)	.19	**.93 (.94)**	**.91**	.01 (.33)	.15	−.04 (.07)	−.01
TOI 4	.02 (.38)	.16	**.67 (.70)**	**.67**	.05 (.31)	.16	.04 (.13)	.06
TOP 1	.05 (.30)	.17	.07 (.29)	.18	**.62 (.63)**	**.59**	−.07 (.17)	.04
TOP 2	−.02 (30)	.13	−.01 (.27)	.13	**.85 (.82)**	**.80**	−.02 (.26)	.11
TOP 3	.01 (.33)	.16	−.02 (.26)	.12	**.80 (.82)**	**.77**	.05 (.33)	.18
TOE 1	.12 (.20)	.15	−.03(.01)	−.02	−.15 (.06)	−.05	**.49 (.47)**	**.47**
TOE 2	−.19 (.05)	−.08	−.04 (−.03)	−.05	.02 (.20)	.11	**.78 (.72)**	**.74**
TOE 3	.04 (.28)	.14	.01 (.11)	.05	.03 (.29)	.15	**.69 (.72)**	**.69**
TOE 4	.12 (.38)	.23	.08 (.21)	.13	.06 (.36)	.19	**.63 (.70)**	**.65**
Eigenvalue	5.61		2.51		1.84		1.49	
Variance (%)	37.41		16.72		12.24		9.96	

Note. Factors extracted using principal axis factoring with Kaiser normalization. For Promax-rotated loadings, values of the Pattern matrix are shown, with values from the Structure matrix in parentheses. Loadings greater than .40 are shown in bold. TOA: Implicit Theories of Anxiety; TOI: Implicit Theories of Intelligence; TOE: Implicit Theories of Emotion. TOP: Implicit Theories of Personality. Scale items are listed in the Appendix.

Table 8

Correlations between measures used in Study 2 (N=210).

Measure	TOA	TOI	TOE	TOP	PSWQ	MASQ-AA	BAI	SPIN	MASQ-AD	IIP-SC	ERQ-R	ERQ-S
TOA	(.96)											
TOI	.37**	(.93)										
TOE	.30**	.10	(.74)									
TOP	.37**	.33**	.27**	(.80)								
PSWQ	−.26**	−.05	−.23**	−.15*	(.95)							
MASQ-AA	−.37**	−.09	−.14*	−.09	.34**	(.87)						
BAI	−.40**	−.09	−.19**	−.02	.50**	.68**	(.93)					
SPIN	−.25**	−.23**	−.09	−.12	.41**	.32**	.43**	(.90)				
MASQ-AD	−.28**	−.11	−.24**	−.17*	.44**	.36**	.50**	.43**	(.93)			
IIP-SC	−.31**	−.24**	−.24**	−.15*	.36**	.45**	.53**	.63**	.37**	(.82)		
ERQ-R	.24**	.20**	.33**	.16*	−.38**	−.25**	−.26**	−.21**	−.33**	−.27**	(.88)	
ERQ -S	−.23**	−.17*	.03	−.26**	.11	.15*	.22**	.37**	.08	.30**	−.06	(.76)

Note: Coefficient alphas for each measure are presented along the diagonal in parentheses. TOA: Theory of Anxiety; TOI: Theory of Intelligence; TOE: Theory of Emotion; TOP: Theory of Personality; PSWQ: Penn State Worry Questionnaire; MASQ: Mood and Anxiety Symptom Questionnaire (AA: Anxious Arousal; AD: Anhedonic Depression); BAI: Beck Anxiety Inventory; SPIN: Social Phobia Inventory; IIP-SC: Inventory of Interpersonal Problems – Short Circumplex; ERQ: Emotion Regulation Questionnaire – (R: Reappraisal; S: Suppression).

*
 p<.05;

**
 p<.01.

Table 9

Regression analyses from Study 2.

	Incremental Theory Domain (Independent Variable)											
	Anxiety			Intelligence			Emotion			Personality		
Dependent Variable	b [95% CI]	SE	β	b [95% CI]	SE	β	b [95% CI]	SE	β	b [95% CI]	SE	β
PSWQ	−2.63 ** [−4.51, −.76]	.95	−.21	.72 [−1.03, 2.47]	.89	.06	−2.42 * [−4.58, −.25]	1.10	−.16	−.64 [−2.57, 1.28]	.98	−.05
MASQ-AA	−3.04 ** [−4.18, −1.90]	.58	−.39	.31 [−.76, 1.38]	.54	.04	−.45 [−1.77, .87]	.67	−.05	.47 [−.71, 1.64]	.60	.06
BAI	−4.01 ** [−5.26, −2.77]	.63	−.46	.22 [−.94, 1.39]	.59	.03	−1.13 [−2.57, .31]	.73	−.10	1.52 * [.23, 2.80]	.65	.16
SPIN	−1.91 * [−3.45, −.37]	.78	−.19	−1.6 * [−2.99, −.11]	.73	−.16	−.26 [−2.04, 1.52]	.90	−.02	.10 [−1.48, 1.69]	.80	.01
MASQ-AD	−2.64 ** [−4.55, −.73]	.97	−.21	−.08 [−1.87, 1.71]	.91	−.01	−2.62 * [−4.83, −.40]	1.12	−.16	−.60 [−2.56, 1.37]	1.00	−.04
IIP-SC	−.12 ** [−.20, −.03]	.04	−.21	−.08 * [−.16, −.01]	.04	−.15	−.12 * [−.22, −.02]	.05	−.17	.02 [−.07, .10]	.04	.02
ERQ-R	.64 [−.28, 1.55]	.46	.10	.84 [−.01, 1.70]	.43	.14	2.27 ** [1.22, 3.33]	.54	.29	−.04 [−.97, .90]	.48	−.01
ERQ-S	−.73 * [−1.38, −.08]	.33	−.17	−.22 [−.83, .39]	.31	−.05	.81 * [.06, 1.56]	.38	.15	−1.02 ** [−1.69, −.35]	.34	−.22

*
p<.05,

**
p<.01