Cognitive Therapy and Research (2019) 43:312–323
https://doi.org/10.1007/s10608-018-9985-7

ORIGINAL ARTICLE

Beliefs About the Malleability of Anxiety and General Emotions and Their Relation to Treatment Outcomes in Acute Psychiatric Treatment

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Published online: 28 November 2018

Abstract
Beliefs about the malleability of self-attributes—mindsets—may have important relevance to clinical psychology. Individuals with growth mindsets of anxiety and general emotions (the belief that these attributes are changeable) report fewer psychological symptoms, more adaptive emotion regulation strategies, and prefer effortful treatments. However, most research has been conducted in unselected student samples, limiting understanding of clinical utility. Thus, we evaluated mindsets of anxiety and emotion in patients attending an intensive psychiatric partial hospitalization program using cognitive-behavior therapy, acceptance–commitment therapy, and dialectical-behavior therapy. Growth mindsets of anxiety and emotion were negatively correlated with psychological distress. Baseline growth mindset of anxiety, but not general emotion, predicted fewer anxiety symptoms at discharge, even after controlling for psychiatric symptoms, number of inpatient hospitalizations, and treatment expectations. Moreover, patients became significantly more growth-minded about anxiety at discharge, especially those with elevated psychiatric symptoms at baseline. Findings highlight the clinical potential of mindsets and point to intervention targets.

Keywords Mindsets · Growth mindset · Implicit theories · Partial hospital program

Mindsets, also called implicit theories of self-attributes, refer to a set of beliefs about the malleability of certain personal characteristics such as intelligence, personality, emotions, and morality, among others (Dweck 1999). Mindsets lie along a spectrum from the growth mindset or incremental theory, which holds that an attribute is malleable and susceptible to change with learning and development, to the fixed mindset or entity theory, which holds that attributes are immutable. The goal of the present study was to assess mindsets, which historically have been measured in academic settings, in a clinical context. Mindsets may be particularly relevant for mental health because they relate to an array of goals, expectancies, attributions, and motivations. Here we briefly review the literature on mindsets, discuss their connections with mental health, and describe the current study.

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Mindsets and Mental Health

Although much of the foundational mindset research examined how mindsets of intelligence and personality related to academic achievement in educational settings, there is much precedent for their relevance to mental health. For instance, children with fixed mindsets of intelligence tend to gravitate toward performance goals, the goal to outperform others (Dweck and Leggett 1988; Elliot and Dweck 1988), and early studies hinted that these children may be prone to depressive and helpless responses especially in the face of setbacks and failure (e.g., Dweck 1975). Because the fixed mindset of intelligence may lead to performance goals, some individuals holding this belief come to equate performance with their self-worth and feel the need to continually compare their performance with others (see also Dykman 1998). It is not surprising then that the fixed mindset of intelligence has been linked to maladaptive perfectionism (Chan 2012;

Shih 2011), social and generalized anxiety symptoms (e.g., Cury et al. 2008; Rosenberg et al. 2016; Schroder et al. 2015) and depression (e.g., Da Fonseca et al. 2009). Fixed mindsets of personality are also correlated with mental health problems across development (Miu and Yeager 2015; see Schleider and Schroder 2018 for a review). Findings from two meta-analyses link fixed mindsets of intelligence and personality with mental health problems (Burnette et al. 2013; Schleider et al. 2015).

Importantly, mindsets are domain-specific, meaning that an individual, for example, can hold a fixed mindset of intelligence and a growth mindset of personality (see Dweck et al. 1995; Hughes 2015; Schroder et al. 2016). Moreover, mindsets in one domain tend to correlate with outcome measures in that same domain. For instance, intelligence mindsets are more related to academic performance than are personality mindsets (e.g., Romero et al. 2014). Given that mindsets are domain-specific, recent studies have examined mindsets that are more related to emotion and mental health (see Howell 2017 for a review).

Emotion and Anxiety Mindsets

Tamir et al. (2007) examined a novel "emotion mindset"—the belief that emotions are either malleable or not—among students transitioning to college. They found that students endorsing more of a growth mindset of emotions tended to use cognitive reappraisal, an effortful emotion regulation strategy that relies on cognitive strategies to reduce uncomfortable emotions (Gross and John 2003). Subsequent studies have replicated the finding that the growth mindset of emotion is positively correlated with cognitive reappraisal (De Castella et al. 2013; Ford et al. 2018; Kneeland et al. 2016a, b; Schroder et al. 2015) and negatively related to maladaptive emotion regulation strategies such as avoidance (De Castella et al. 2018). Tamir and colleagues also found that students who were growth-minded about their emotions tended to be less depressed by the end of the first year of college, which has been replicated in a larger adolescent sample (Ford et al. 2018).

Studies have also specifically examined the *anxiety mindset*—the belief that anxiety is either changeable or fixed. The anxiety mindset is distinct from the emotion mindset and other mental-health related mindsets in both exploratory and confirmatory factor analyses (Schroder et al. 2015, 2016). The growth mindset of anxiety is negatively related to anxiety, depression, interpersonal problems, and borderline personality disorder symptoms (Schroder et al. 2015, 2016; Yalch et al. 2017; Sung et al. 2017). Other studies have examined more specific mindsets of shyness (Beer 2002; Valentiner et al. 2011) and social anxiety (De Castella et al. 2013) and have found those with growth mindsets are less prone to anxiety than those with fixed mindsets. Like the more general emotion mindset, the growth mindset of anxiety is also positively related to cognitive reappraisal (Schroder et al. 2015), and it is negatively related to maladaptive emotion-regulation strategies, including alcohol use, substance abuse, and self-injury in college student samples (Schroder et al. 2017). Finally, when participants were asked to choose between individual therapy or medication, the growth mindset of anxiety was associated with a preference for therapy (Schroder et al. 2015). Because individuals in therapy must learn to change the way they think about their thoughts and feelings, and change their behaviors, psychotherapy might be considered the more effortful treatment option compared to medication.

Mindsets in Treatment Settings

Given the links between growth mindsets of general emotion and anxiety with positive mental health-related outcomes and preference for more effortful and adaptive emotion regulation strategies, they may play an important role in mental health treatment. For instance, growth mindsets at the beginning of treatment might predict superior treatment outcomes—potentially because growth-minded individuals may be more willing to put the work in that therapy requires (i.e., learn and implement new skills in the presence of uncomfortable emotions). It is also likely that treatment itself may result in an increase in growth mindset endorsement. We are aware of just three studies examining mindsets in a treatment setting. In one study, Valentiner et al. (2013) assessed shyness mindsets in 60 patients with anxiety disorders (obsessive–compulsive, generalized anxiety, social anxiety, and panic disorders) attending either an intensive exposure-based outpatient program or a partial hospital program (average treatment length was 3 weeks). They found that pre-treatment growth mindset of shyness predicted greater change in social performance anxiety symptoms at discharge. They also found that the entire sample became more growth-minded about their shyness after treatment. In another study, De Castella et al. (2015) examined social anxiety mindsets among 53 individuals with social anxiety disorder randomized to 16 weekly CBT sessions or to a waitlist control group. De Castella et al. (2015) found that post-treatment growth mindset of social anxiety mediated CBT-related changes in social anxiety symptoms and predicted fewer social anxiety symptoms up to 12 months after treatment, even when controlling for baseline symptom severity. Moreover, like the Valentiner et al. findings, this study also found that patients in the CBT group had a greater endorsement of the growth mindset of social anxiety following CBT than in the waitlist condition.

Finally, Westra et al. (2007) examined a very similar construct to the anxiety mindset—called anxiety change expectancy—in the context of an intensive study of CBT for anxiety disorders. In this study, patients with generalized anxiety disorder (n = 26) social phobia (n = 18), and panic disorder (n = 23) underwent twice-weekly 2-h group therapy sessions of CBT for a total of 10 sessions. The authors found that for individuals with generalized anxiety disorder or panic disorder, higher baseline expectancy scores were correlated with homework compliance and initial change in primary symptoms. Moreover, homework compliance mediated the relationship between expectancy and initial CBT outcomes. Although no study has compared this measure with the anxiety mindset scale, the items appear to be very similar and the Westra et al. (2007) results are therefore informative for the mindset literature. Taken together, these treatment studies of the shyness mindset, social anxiety mindset, and anxiety change expectancy indicate that growth mindsets before treatment may predict greater symptom reduction and indicate that individuals become more growth minded after a course of treatment.

The Current Study

The current study was designed to extend these previous treatment studies of mindsets in three ways. First, whereas the previous studies (De Castella et al. 2015; Valentiner et al. 2013; Westra et al. 2007) exclusively examined anxiety-disordered patients, our study examined patients with a variety of presenting problems, including anxiety, depressive, personality, eating, substance use, bipolar, and psychotic disorders. Our intention was to examine how mindsets relate to outcomes in a much more heterogeneous and therefore generalizable psychiatric population. Second, we examined two mindsets, anxiety and general emotion, both of which relate to a wide range of mental health-related outcomes (Kneeland et al. 2016; Schroder et al. 2015, 2016). We aimed to distinguish between the predictive ability of anxiety and emotion mindsets. Finally, we also controlled for several potentially confounding variables in the analysis, including number of previous inpatient hospitalizations, baseline symptoms, and treatment expectancies.

Our overall aim was to better establish the clinical relevance of the general emotion mindset and anxiety mindset in a larger, more representative and heterogeneous sample of psychiatric patients. To this end, we tested four hypotheses in a sample of adults receiving acute psychiatric care in a naturalistic (non-experimental) partial hospital setting. First, we expected that growth mindsets of both anxiety and general emotion at admission would be concurrently associated with fewer symptoms at admission (Hypothesis 1). Based on past research (Schroder et al. 2015, 2016), we also expected the anxiety mindset to be more predictive of symptoms than the general emotion mindset (Hypothesis 1a). Second, we expected that growth mindsets of anxiety and general emotion at admission would prospectively predict fewer symptoms at discharge, even after controlling for number of previous inpatient hospitalizations, baseline symptoms, and treatment expectancies (Hypothesis 2). Again, we expected the anxiety mindset would be more predictive of discharge symptoms than the emotion mindset (Hypothesis 2a). Third, we expected that patients would endorse higher growth mindsets of both anxiety and general emotions at discharge compared to admission (Hypothesis 3). We conducted an exploratory moderation analysis examining whether patients with more baseline psychiatric symptoms showed the largest increase in growth mindset over the course of treatment (Hypothesis 3a). Finally, we examined whether changes in anxiety and emotion mindsets would correlate with changes in symptoms, again predicting that symptoms would track with changes in the anxiety mindset more robustly (Hypothesis 4).

Method

Participants

Patients ($N = 274$) attending an intensive behavioral health partial hospital program provided written informed consent to participate in this study. The average age of the sample was 32.5 (*SD* 13.5, range 18–71). See Table 1 for demographic information.

Materials

Estimates of internal consistency for all self-report measures are presented in Table 2.

The *Implicit Theories of Emotion Scale* (TOE; Tamir et al. 2007) is a 4-item measure of implicit theories of emotion. Participants rate two fixed-minded and two growth-minded statements about the extent to which they believe emotions are changeable on a scale of 1 (strongly disagree) to 6 (strongly agree). The two fixed-minded items are reverse-scored, and all items are averaged such that higher scores on the TOE reflect greater growth mindset endorsement.

The *Implicit Theories of Anxiety Scale* (TOA; Schroder et al. 2015) is a 4-item measure of implicit theories of anxiety. Participants rate fixed minded statements (e.g., "No matter how hard you try, you really can't change the level of anxiety that you have") on a scale of 1 (strongly disagree) to 6 (strongly agree). Items are reverse scored and then averaged such that higher scores on the TOA are associated with more endorsement of the growth mindset.

Table 1 Demographic and diagnostic information of the sample

Variable	*M* (*SD*)
Age	32.6 (13.48)
Gender identity	N (%)
Female	146 (53.3)
Male	122 (44.5)
Not listed, write-in	
Gender fluid	1 (0.36%)
Gender nonconforming	1 (0.36%)
Non-binary	2 (0.73%)
Unknown/missing	2 (0.73%)
Latinx	17 (6.2%)
Race	
White	240 (87.6)
Black	5 (1.82)
Asian	9 (3.28)
Multiracial	13 (4.75)
Other/unknown	7 (2.55)
Diagnostic module	N (%) meeting criteria
Major depressive episode	
Current	177 (64.6%)
Lifetime	252 (92.0%)
Manic episode	
Current	9 (3.3%)
Lifetime	62 (22.6%)
Borderline personality disorder	65 (23.7%)
Panic disorder	
Current	51 (18.6%)
Lifetime	75 (27.4%)
Agoraphobia current	27 (9.9%)
Social anxiety disorder current	99 (36.1%)
Obsessive–compulsive disorder current	32 (11.7%)
Alcohol use disorder current	64 (23.4%)
Substance use disorder current	64 (23.4%)
Mood disorder with psychotic features	
Current	10 (3.6%)
Lifetime	36 (13.1%)
Psychotic disorder	
Current	10 (3.6%)
Lifetime	11 (4.0%)
Binge episode current	22 (8.0%)
Bulimia nervosa current	9 (3.3%)
Generalized anxiety disorder current	129 (47.1%)

Diagnostic information collected from the MINI. Comorbidity was high, so percentages of diagnostic criteria being met exceed 100

Behavior and Symptom Identification Scale (BASIS-24; Eisen et al. 2004). The BASIS-24 is a self-report measure of psychopathology and functioning. It covers a wide range of psychosocial difficulties including depression, relationship functioning, self-harm, emotional lability, psychosis, and substance abuse. Participants use a 5-point scale to rate their symptoms.

Generalized Anxiety Disorder Scale (GAD-7; Spitzer et al. 2006). The GAD-7 is a well-validated measure of symptoms of generalized anxiety disorder. Participants use a scale from 0 (Not at all) to 3 (Nearly every day) to rate the frequency of their experience of seven GAD symptoms (e.g., "Feeling nervous, anxious or on edge") over the last 2 weeks.

The *Patient Health Questionnaire-9* (PHQ-9; Kroenke et al. 2001) is a 9-item measure of depression symptoms. Participants use a scale of 0 (not at all) to 3 (nearly every day) to rate various depression symptoms (e.g., "Feeling down, depressed, or hopeless") over the last 2 weeks.

Credibility/Expectancy Questionnaire (CEQ; Devilly and Borkovec 2000). The CEQ is a 6-item measure assessing treatment credibility and expectancy. The three credibility items (e.g., "At this point, how logical does the therapy offered to you seem?") are rated from 1 to 9, with higher scores indicating greater credibility of treatment beliefs. The three expectancy items (e.g., "How much improvement in your symptoms do you think will occur?") are rated from 1 to 11, corresponding with 0–100%.

Mini-International Neuropsychiatric Interview v. 6.0 (MINI; Sheehan et al. 1998). The MINI is a structured interview assessing *Diagnostic and Statistical Manual of Mental Disorders* (5th ed; DSM-5; APA 2013) disorders (e.g., anxiety, depression, mania, substance abuse, psychosis). Each MINI diagnostic module consists of a series of screening items followed by questions about specific symptoms. Due to the acute and intensive nature of the program, the posttraumatic stress disorder module was not administered. Moreover, the borderline personality disorder (BPD) section of the SCID-II (First et al. 1997) was included in the interview. The MINI was administered by psychology practicum and pre-doctoral intern students who were trained to reliability. The MINI was used here to provide diagnostic information on the sample and was not used in the analyses. Past reliability research in this setting indicated high inter-rater reliability between the MINI and the program psychiatrists (Kertz et al. 2012).

We also included the self-reported number of psychiatric inpatient hospitalizations as a covariate in the analyses. We included this variable because we reasoned that greater inpatient hospitalizations (indicating worse chronicity) might be associated with less growth-mindedness about psychological distress.

Study Procedure and Treatment Description

Self-report measures were administered at admission and at discharge, and the MINI was administered on the second day of the program. For the present study, the BASIS-24

Table 2 Descriptive statistics and bivariate correlations between study variables

	M	SD	Range	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
1. Inpatient Hx	1.58	2.79	0–20	–											
2. CEQ credibility	20.09	4.53	6–27	0.11	(0.77)										
3. CEQ expectancy	15.18	5.35	3–27	0.21**	0.63**	(0.88)									
4. BASIS-24	1.73	0.63	0.02–3.17	−0.11	−0.14*	−0.24**	(0.86)								
5. T1 GAD-7	11.82	5.39	0–21	−0.12	−0.11	−0.12*	0.68**	(0.88)							
6. T1 PHQ-9	15.27	5.55	0–27	−0.06	−0.14*	−0.26**	0.80**	0.66**	(0.85)						
7. T1 TOA	3.87	1.47	1–6	0.06	0.25**	0.17**	−0.31**	−0.38**	−0.31**	(0.96)					
8. T1 TOE	3.84	0.98	1–6	−0.04	0.31**	0.33**	−0.22**	−0.13*	−0.24**	0.40**	(0.74)				
9. T2 GAD-7	8.16	4.43	0–19	−0.04	−0.10	−0.16*	0.50**	0.62**	0.47**	−0.39**	−0.17*	(0.85)			
10. T2 PHQ-9	10.65	4.87	0–23	−0.07	−0.11	−0.25**	0.61**	0.53**	0.67**	−0.30**	−0.19*	0.75**	(0.84)		
11. T2 TOA	4.62	1.07	1–6	−0.02	0.22**	0.18**	−0.22**	−0.21**	−0.21**	0.52**	0.29**	−0.37**	−0.27**	(0.93)	
12. T2 TOE	3.73	0.96	1–6	−0.04	0.13	0.18**	−0.15*	−0.08	−0.16*	0.10	0.43**	−0.09	−0.15*	0.30**	(0.71)

*N*s range from 226 to 270

Inpatient Hx number of past inpatient hospitalizations, *CEQ* credibility/expectancy questionnaire, *BASIS* behavior and symptom identification scale, *T1* time 1 (admission), *T2* time 2 (discharge), *GAD-7* generalized anxiety disorder scale, *PHQ-9* patient health questionnaire-9 (measure of depression), *TOA* theories of anxiety (anxiety mindset), *TOE* theories of emotion (emotion mindset); mindsets scored such that higher scores reflect greater growth mindset endorsement. Coefficient alphas are presented along the diagonal in parentheses

*$p < 0.05$, **$p < 0.01$

at admission was analyzed to serve as a proxy of baseline psychiatric symptoms. Study data were collected and managed using REDCap (Research Electronic Data Capture) tools hosted at the psychiatric hospital. REDCap is a secure, web-based application designed to support data capture for research studies (Harris et al. 2009).

The partial hospital program employed a daily group-therapy model consisting of Cognitive Behavioral Therapy (CBT) skills (e.g., cognitive restructuring, exposure therapy), Dialectical Behavior Therapy (DBT) skills (e.g., distress tolerance, interpersonal effectiveness), and Acceptance and Commitment Therapy (ACT) principles (e.g., cognitive defusion, acceptance). Many groups had at least some overlapping content to enhance repetition and learning potential. The program consisted of five 1-h groups per business day and in addition to groups, patients met individually with a case manager, a psychiatrist, a program therapist, and a vocational counselor two to three times per week. Patients first met with a case manager to help choose which groups would be most beneficial for their presenting problems. In this way, each patient's treatment was unique, but patients received very similar content across the groups on the aggregate. To maintain treatment fidelity, group leaders were rated for adherence to the protocols twice per year by a trained research assistant. Overall, group leaders addressed 90% of protocol components during each group, confirming that most necessary components are covered. On average, patients completed 12.7 days of treatment (SD 3.9, median = 13, range 2–24).

Results

Sample Information, Correlations and Descriptive Statistics

Diagnostic information for the sample is presented in Table 1. Mirroring national prevalence rates (Kessler et al. 2005), depression and anxiety were the most commonly endorsed problems. There was also a wide representation of other problems. For example, many patients met criteria for borderline personality disorder (23.7%), alcohol abuse (22.6%), reported a history of a manic episode (22.6%), or a mood disorder with psychotic features (13.1%). Thus, the sample was quite heterogeneous in terms of mental health history.

Descriptive statistics and bivariate correlations of all study variables are presented in Table 2. In terms of mindset endorsement, the entire range from fixed to growth mindset was endorsed for both the anxiety and general emotion mindset measures. That is, even in a relatively severe psychiatric sample, there was high variability in these measures. The anxiety and general emotion mindsets were modestly correlated with one another at admission ($r = 0.40$) and at discharge ($r = 0.31$). Moreover, both growth mindsets of anxiety and emotion were positively correlated with treatment credibility and treatment expectancy.

In line with our first hypothesis, the growth mindsets of anxiety and emotion were negatively related to all psychological distress variables (Table 2). Moreover, as expected, coefficients were of stronger magnitude for correlations involving the mindset of anxiety, compared to the mindset of emotion. The correlation between anxiety mindset and GAD-7 ($r = -0.38$) was significantly higher than the correlation between emotion mindset and GAD-7 ($r = -0.13$; Steiger's Z-test = 3.61, $p = 0.0003$ two-tailed). Although the correlation between anxiety mindset and depression symptoms ($r = -0.31$) was higher in magnitude, it was not significantly different than the correlation between emotion mindset and depression symptoms ($r = -0.24$; Steiger's Z = 1.01, $p = 0.31$ two-tailed).

Changes in Symptoms Across Treatment

Before testing hypotheses 2 and 3, which are related to discharge outcomes, we first aimed to establish whether symptoms changed from admission to discharge. To evaluate changes in symptom measures, we conducted a 2 Time (Admission vs. Discharge) repeated-measures analysis of variance (ANOVA) on the generalized anxiety (GAD-7) and depression (PHQ-9) symptom measures. There was a significant main effect of Time for both the GAD-7 ($F(1,229) = 145.28$, $p < 0.001$, $\eta^2_p = 0.39$) and for the PHQ-9 ($F(1,225) = 246.99$, $p < 0.001$, $\eta^2_p = 0.52$). These data indicate there was a significant decrease in anxiety and depression symptoms from admission to discharge (See Table 2).

Predictors of Treatment Outcome

Next, to test hypothesis 2, multiple linear regression analyses were conducted to assess whether mindsets assessed at admission predicted outcomes at the end of treatment, over and above known predictors of treatment response. Data from 208 participants were available for this analysis. Of the 35 individuals with documented reasons for attrition, 46% were sent to the on-site clinical evaluation center (typically to step up to an inpatient level of care), 37% discharged from home and did not complete the discharge assessment, and 17% were coded as missed. We conducted *t* tests on baseline measures to evaluate systematic differences between those with missing discharge data and those with complete data. The only significant difference was that those with missing discharge data reported a higher number of past inpatient hospitalizations ($t(268) = 2.89$, $p = 0.004$). The remaining 31 participants did not have reasons for attrition listed but had missing data for one or more of the study variables in

the regression analyses (regression analyses were conducted using list-wise deletion).

Generalized anxiety (GAD-7) and depression (PHQ-9) symptom scores at the discharge assessment were used as outcome variables, and the following admission assessments were used as predictors: number of inpatient hospitalizations, treatment credibility, treatment expectations, general symptoms and functioning (BASIS-24), generalized anxiety symptoms (GAD-7), depression symptoms (PHQ-9) (Step 1), and anxiety mindset (TOA) and emotion mindset (TOE) were entered in Step 2. The results of the regression analyses are presented in Table 3.

In line with predictions, for the model predicting GAD-7 symptoms at discharge, the predictor variables in Step 1 predicted 37.4% of the variance in GAD-7 discharge scores ($p < 0.001$) and adding TOA and TOE in Step 2 accounted for an additional 3% of the variance in Step 2 ($p = 0.016$). In examining individual predictors, only psychological symptoms (BASIS-24), GAD symptoms (GAD-7) and, important for the present study, anxiety mindset predicted unique variance in GAD-7 discharge scores. The emotion mindset did not predict unique variance. For the model predicting discharge depression symptoms (PHQ-9), variables in Step 1 predicted 43.5% of the variance, and the TOA and TOE variables in Step 2 did not predict significant unique variance (adjusted R^2 change = 0.006, $p = 0.33$). Thus, the growth mindset of anxiety predicted unique variance in discharge anxiety symptoms but not depression symptoms.

Change in Mindsets Across Treatment

To test hypothesis 3, that the sample would be more growth-minded after treatment, a 2 Time (Admission vs. Discharge) ANOVA was conducted on the TOA and TOE questionnaires to assess changes in mindset endorsement. For the TOA, a significant main effect of Time ($F(1,225) = 86.38$, $p < 0.001$, $\eta^2_p = 0.28$) indicated that individuals were more growth-minded about anxiety at discharge than at admission. To test hypothesis 3a, admission BASIS-24 scores were added as a covariate to assess whether the changes in anxiety mindset were moderated by baseline psychological symptoms. A significant interaction between Time and BASIS-24 emerged ($F(1,215) = 8.28$, $p = 0.004$, $\eta^2_p = 0.037$). A correlation between admission BASIS-24 score and the change between discharge and admission TOA scores ($r = 0.20$, $p = 0.004$) indicated that

Table 3 Regression analyses showing admission measures predicting symptom outcomes at discharge

Independent variables (predictors) at admission	Dependent variables (outcomes) at discharge					
	GAD symptoms (GAD-7)			Depression symptoms (PHQ-9)		
	b [95% CI]	SE	B	b [95% CI]	SE	B
Step 1						
Number of inpatient hospitalizations	0.12 [−0.08, 0.31]	0.10	0.07	0.06 [−0.15, 0.26]	0.11	0.03
Treatment credibility (CEQ)	0.09 [−0.14, 0.15]	0.07	0.01	0.04 [−0.11, 0.19]	0.08	0.04
Treatment expectancy (CEQ)	−0.06 [−0.19, 0.06]	0.07	−0.08	−0.11 [−0.24, 0.03]	0.07	−0.11
Psychological symptoms (BASIS-24)	1.45** [0.06, 2.84]	0.71	0.21	1.06 [−0.39, 2.51]	0.74	0.14
GAD symptoms (GAD-7)	0.43** [0.30, 0.56]	0.07	0.51	0.12 [−0.01, 0.26]	0.07	0.13
Depression symptoms (PHQ-9)	−0.06 [−0.21, 0.10]	0.08	−0.07	0.39** [0.23, 0.55]	0.08	0.43
Step 2						
Anxiety mindset (TOA)	−0.55** [−0.93, −0.16]	0.20	−0.18	−0.31 [−0.72, 0.10]	0.21	−0.09
Emotion mindset (TOE)	0.04 [−0.54, 0.60]	0.29	0.01	0.14 [−0.46, 0.75]	0.31	0.03

$N = 208$

CEQ credibility/expectancy questionnaire, *BASIS* behavior and symptom identification scale, *GAD-7* generalized anxiety disorder scale, *PHQ-9* patient health questionnaire, *TOA* theories of anxiety (anxiety mindset), *TOE* theories of emotion (emotion mindset); mindsets scored such that higher scores reflect greater growth mindset endorsement

**$p < 0.01$

those with more severe baseline psychiatric symptoms experienced a greater increase in growth mindsets at discharge. For the TOE, the main effect of Time showed a trend (F (1,225) = 3.56, $p = 0.061$, $\eta^2_p = 0.02$) indicating that the sample was less growth-minded about emotions at discharge compared to admission. When BASIS-24 scores were added as a covariate, the interaction between Time and BASIS-24 was not significant ($F(1,215) = 2.24$, $p = 0.14$, $\eta^2_p = 0.01$).

Relations Between Changes in Mindsets and Changes in Symptoms

To test hypothesis 4, that changes in mindset would track with changes in symptoms, we correlated treatment-related change (Discharge minus Admission) in anxiety and emotion mindsets with changes in symptoms (GAD-7 and PHQ-9). First, the change in TOA and TOE were correlated with one another ($r = 0.28$, $p < 0.001$); those who became more growth-minded about their anxiety tended to also become more growth-minded about their emotions. Moreover, change in TOA was associated with change in GAD-7 ($r = -0.20$, $p = 0.003$) and PHQ-9 ($r = -0.14$, $p = 0.037$), meaning those who became more growth-minded after treatment tended to have greater improvements in anxiety and depression after treatment as well. Change in TOE was not associated with change in GAD-7 ($r = -0.01$, $p = 0.88$) nor change in PHQ-9 ($r = -0.10$, $p = 0.16$).

Discussion

The goal of the current study was to continue to bridge mindset theory with mental health. To this end, we evaluated mindsets of anxiety and emotion among patients with a variety of presenting problems attending an intensive partial hospital program. To our knowledge, this is the largest study to date evaluating mindsets in a psychiatric treatment setting. We were interested in evaluating how strongly the mindsets of anxiety and emotion relate to psychiatric symptoms, predict treatment outcomes, and change over the course of treatment.

Correlations with Psychiatric Symptoms

Growth mindsets of anxiety and emotion were both negatively correlated with anxiety, depression, and overall psychiatric symptoms. These findings replicate previous studies (De Castella et al. 2013, 2015; Kneeland et al. 2016; Schroder et al. 2015, 2016) and demonstrate that these correlations hold in a more severe psychiatric sample with a wider range of presenting problems. Of note, the magnitudes of the correlations between mindsets and symptoms were similar to previous studies in unselected student samples (e.g. Schroder et al. 2016). As in past research, correlations with symptoms tended to be of higher magnitude with the mindset of anxiety, compared to the more general mindset of emotion.

Predicting Treatment Response

The growth mindset of anxiety at admission was associated with fewer symptoms of anxiety at discharge. This was true even after controlling for baseline anxiety, depression, and general psychiatric symptoms, treatment expectations, perceived treatment credibility, and the number of previous inpatient hospitalizations. These control analyses indicate it is unlikely that growth-minded individuals reported fewer symptoms at discharge simply because they were less symptomatic to begin with. These findings replicate and extend those of Valentiner et al. (2013), who found that individuals who believed shyness was changeable at admission experienced a larger shift in social anxiety symptoms at post-treatment.

Although the effect was in the expected direction, the growth mindset of anxiety did not significantly predict depression symptoms at discharge after including the above-mentioned covariates in the analysis. This suggests there is a level of specificity in terms of mindsets' abilities to predict specific types of symptoms after treatment, consistent with previous cross-sectional studies indicating that mindsets are domain-specific (Dweck et al. 1995; Hughes 2015; Schroder et al. 2016). That is, the anxiety mindset seems to be most related to symptoms of anxiety. We did not measure mindsets of depression—which have been shown in past research to predict depression symptoms (Schroder et al. 2016) due to space limitations in the questionnaire battery. It is possible that depression mindset would have predicted depression outcomes after treatment. We also found that the general emotion mindset did not significantly predict symptoms at discharge. Thus, there appears to be a specific association between mindsets of anxiety and anxiety symptoms after treatment. The specificity here speaks to the distinction between the anxiety mindset and general emotion mindset (see also Schroder et al. 2015, 2016). When participants view the word "anxiety", they may be more likely to think of psychological distress than when they view the word "emotion", which may elicit both comfortable and uncomfortable emotions. It is likely that many individuals, particularly those from the population studied here, equate anxiety with psychological distress more broadly. The general emotion mindset measure may not capture this same sense of discomfort.

Changes in Mindset Across Treatment

Growth mindset of anxiety endorsement was significantly enhanced at discharge compared to admission. These

findings are similar to both Valentiner et al. (2013) and De Castella et al. (2015), who found that shyness and social anxiety mindsets, respectively, became more growth-oriented after treatment. Of note, mindsets were not discussed or addressed explicitly in the treatment that was delivered in the program; these beliefs appear to have shifted as a function of engaging in treatment as usual at the partial hospital program. These data are also in line with studies evaluating changes in other maladaptive beliefs before vs. after treatment (e.g., Boden et al. 2012). The change in mindset endorsement was larger for those who reported more baseline psychiatric symptoms at admission. It may be that individuals who are more symptomatic have more "room to grow" in terms of their beliefs about the malleability of anxiety.

Relatedly, it is important for future research to understand the reverse relationship—changes in symptoms predicting changes in mindsets. Indeed, individuals who experience a rapid and large decrease in their symptoms might begin to question their beliefs about the fixedness of distress. Understanding the variables that impact mindsets, especially in acute psychiatric settings, is an important area of future study. Because the application of mindset theory to mental health is just beginning, the temporal associations between symptoms and mindsets is not yet well understood. Schleider and Weisz (2016) examined mindsets of "thoughts, feelings, and behaviors" in a sample of adolescents and found that internalizing symptoms predicted fixed mindsets 9 months later. A more recent study of college students found that mindsets of anxiety predicted next-week distress levels in a 5-week study, controlling for the previous week's distress (Schroder et al. in press). It is likely that the relationship between mindsets and symptoms is complicated and potentially reciprocal. Together with past findings (De Castella et al. 2015; Valentiner et al. 2013), the current results indicate that one way for growth mindset endorsement to increase is through rapid decrease in symptoms of anxiety.

Mindsets and Their Relevance to Mental Health

Taken together, the current findings add to the available evidence (Schroder et al. 2015) that the anxiety mindset is a viable construct in psychiatric settings and has relevance for mental health. Indeed, the present findings indicate that mindsets are associated with treatment outcomes above and beyond baseline psychiatric symptoms and treatment expectancies. That is, mindsets provide significant albeit modest incremental value in addition to symptom information. We believe that assessing mindsets may be useful to gauge how ready patients are to engage in therapy. When considering the broader mindset literature, growth-minded individuals may be more likely to engage in the therapeutic process, sit with uncomfortable emotions, comply with homework assignments, use the skills they learn about in treatment, and less likely to engage in avoidance behavior. Indeed, there is correlational evidence that the growth mindset of anxiety may help buffer against some negative consequences of traumatic experiences—including relying on maladaptive emotion regulation strategies (Schroder et al. 2017). Future studies will need to evaluate the mechanisms linking growth mindsets with adaptive treatment outcomes.

If this were the case—that growth mindsets of anxiety promote adaptive emotion regulation strategies and help individuals engage in treatment—it is possible that designing interventions and messages around increasing the growth mindset may help expedite treatment progress. To that end, we have recently developed and tested a brief anxiety mindset intervention and found it can increase growth mindset endorsement immediately after the intervention (Schroder and Moser 2018). Understanding how such an intervention may impact treatment engagement and response seems to be a logical next step in this line of research. We ultimately believe that bridging the rich theory of mindsets, which have been studied for decades, with clinical psychological phenomena will lead to fruitful investigations to enhance treatment engagement and treatment outcomes.

This research may also relate to how messages about the etiology of anxiety, depression and other mental health problems are disseminated and evaluated by the lay public. It is well-established that fixed mindsets can be induced when attributes are discussed as having primarily a genetic influence (e.g. Bergen 1991; Chiu et al. 1997). Given that many treatment protocols and anti-stigma campaigns discuss genetic contributions to anxiety and depression, it may be useful for future research to examine how helpful this is to treatment recipients in terms of their beliefs about their self-attributes, motivations, and willingness to engage in treatment. Indeed, the emerging research on genetic essentialism—the tendency for individuals to believe a trait is immutable if it has genetic influences—indicates that purely biological explanations of mental health problems actually have unintended side-effects such as prognostic pessimism (Dar-Nimrod and Heine 2011; Kemp et al. 2014; Lebowitz et al. 2014; Phelan et al. 2002). Understanding how messages about genetics interact with mindsets to predict treatment outcomes is another exciting line of future research. For instance, one study suggests including information about how genes themselves are susceptible to environmental influences can help alleviate some of the negative consequences of emphasizing biology and genetics (Lebowitz et al. 2013).

Finally, mindsets are just one set of beliefs about self-attributes, and there are many other belief measures that have been studied in mental health contexts (e.g., Boden et al. 2012). For instance, the Anxiety Control Questionnaire

(ACQ; Brown et al. 2004; Rapee et al. 1996) would also seem to overlap with the anxiety mindset scale (example item: "I am unconcerned if I become anxious in a difficult situation, because I am confident in my ability to cope with my symptoms"). However, the ACQ appears to focus on situational anxiety, and we believe the anxiety mindset measure taps into the malleability of fundamental, perhaps dispositional anxiety. Further scale refinement of the anxiety mindset scale is necessary, likely in conjunction with other belief measures, to confirm this suspicion. We believe the TOA is unique in that it was developed from the rich social-cognition literature on mindsets. The hope is that future studies and clinical work can leverage what is known about mindsets and their links with motivation and resilience to enhance treatment-related outcomes among individuals struggling with their mental health.

Limitations and Conclusion

The primary limitation in this study was the lack of a control condition in which no treatment was administered (see also Björgvinsson et al. 2014). This limitation precludes pointing to specific mechanisms by which the treatment program exerted its effects, over and above the effect of time. However, the population studied here reported severe psychopathology requiring a hospital level of care and it is unlikely that the significant decrease in symptoms was due to time alone. That we uncovered significant correlations between mindsets and symptoms in a severe sample with a relatively restricted range of psychiatric symptoms attests to the ability of mindsets to predict symptoms in various populations. A second limitation was that we were limited to two data points (admission and discharge), so we were unable to determine the directionality of the relationships presented here. Although a recent study among college students (Schroder et al. in press) indicates that fixed mindsets of anxiety predict weekly increases in distress across 5 weeks (i.e., five time points), future work is needed to understand the temporal nature of mindsets and distress in clinical populations, and more frequent sampling will aid this understanding. A third and related limitation is that we did not assess follow-up outcomes beyond the discharge date; thus, it is not known how long mindsets at admission predict symptom outcomes. In this realm, the findings from De Castella et al. (2015) are encouraging in that they found growth mindsets of social anxiety predicted symptom improvement 1-year post-treatment in a sample of individuals with social anxiety disorder. Fourth, we relied on self-report measures for our study and there are inherent limitations to this modality. Yet, all the measures here have been well-validated in previous research. Finally, although the sample was diagnostically heterogeneous, the sample was ethno-racially homogenous and future work will need to evaluate associations between mindsets and psychiatric symptoms in more racially diverse populations. These limitations notwithstanding, the research linking mindsets with mental health is just beginning and we believe this study, which is the largest of its kind to date, provides much needed information on how mindsets relate to outcomes in a real-world clinical setting.

Compliance with Ethical Standards

Conflict of Interest Dr. Schroder, Dr. Kneeland, Ms. Silverman, Dr. Beard, and Dr. Björgvinsson declare that they have no conflict of interest.

Informed Consent Informed consent was obtained from all participants prior to participation.

Animal Rights This article does not contain any studies with animals performed by any of the authors.

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