

# Evaluating the Domain Specificity of Mental Health–Related Mind-Sets

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## Abstract

Mind-sets are beliefs regarding the malleability of self-attributes. Research suggests they are domain-specific, meaning that individuals can hold a fixed (immutability) mind-set about one attribute and a growth (malleability) mind-set about another. Although mind-set specificity has been investigated for broad attributes such as personality and intelligence, less is known about mental health mind-sets (e.g., beliefs about anxiety) that have greater relevance to clinical science. In two studies, we took a latent variable approach to examine how different mind-sets (anxiety, social anxiety, depression, drinking tendencies, emotions, intelligence, and personality mind-sets) were related to one another and to psychological symptoms. Results provide evidence for both domain specificity (e.g., depression mind-set predicted depression symptoms) and generality (i.e., the anxiety mind-set and the general mind-set factor predicted most symptoms). These findings may help refine measurement of mental health mind-sets and suggest that beliefs about anxiety and beliefs about changeability in general are related to clinically relevant variables.

## Keywords

mind-set, implicit theories, mental health, confirmatory factor analysis, structural equation modeling

## Introduction

Mind-sets are beliefs about the malleability of particular personal characteristics (Dweck & Leggett, 1988). Mind-sets lie along a continuum, ranging from a growth mind-set, which holds that a given attribute is malleable and can develop with learning and effort, to a fixed mind-set, which holds that an attribute is immutable. Mind-sets are conceptualized as frameworks through which individuals construe their domain-relevant experiences, which lead to subsequent thoughts, emotions, goals, and behaviors (Dweck, Chiu, & Hong, 1995). For instance, individuals with a growth mind-set of intelligence are more likely to approach intellectual tasks with mastery goals, interpret mistakes as learning opportunities, and stay engaged in the face of challenges. In contrast, individuals with a fixed mind-set of intelligence adopt performance goals, interpret mistakes as evidence of a lack of ability, and tend to disengage when challenges arise.

Classic mind-set theory represents a synthesis of ideas found in the achievement goal literature (Elliot & Dweck, 1988), attribution theory (Kelley & Michela, 1980), and social cognitive models of personality (Mischel & Shoda, 1995). The basic ideas also overlap with other areas of social and personality psychology. For instance, research concerning genetic essentialism suggests that when people encounter messages about the genetic origins of attributes or behaviors, they tend to view them as innate and unchangeable (Dar-Nimrod & Heine, 2011).

Although historically studied in personality and social psychology, recent work has shown that mind-sets may play an important role in mental health. Two meta-analyses indicate the growth mind-set (of intelligence and personality) is inversely related to negative affect and psychopathology (Burnette, O’Boyle, VanEpps, Pollack, & Finkel, 2013; Schleider, Abel, & Weisz, 2015). Moreover, longitudinal and intervention studies indicate that the growth mind-set of personality leads to reductions in stress and lower rates of depression over time (Miu & Yeager, 2015; Yeager et al., 2014). In light of this emerging evidence, researchers are increasingly interested in using mind-sets to inform research and intervention related to psychological distress (De Castella et al., 2015; Schroder, Dawood, Yalch, Donnellan, & Moser, 2015; Valentiner, Jencius, Jarek, Gier-Lonsway, & McGrath, 2013). This represents an important area of potential synergy between social/personality and clinical psychology. The current investigation sought to

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extend this literature by evaluating the latent structure of different mind-sets and their relations to psychological symptoms.

Indeed, there is a long tradition of trying to understand the structure of attitudes, abilities, beliefs, and traits in both social/personality and cognitive psychology (Cattell, 1943; Fabrigar, Wegener, MacCallum, & Strahan, 1999; Goldberg, 1990) and to evaluate the domain specificity versus generality of constructs. For instance, researchers have evaluated whether well-being is best conceptualized as a domain-general sentiment that pervades specific domains of life or whether satisfaction with specific domains of life generates an overarching sense of satisfaction (Heller, Watson, & Ilies, 2004). Researchers have also investigated whether consequential life outcomes are better predicted by global as opposed to domain-specific self-evaluations (e.g., Marsh & Craven, 2006) and likewise whether global or specific attitudes are better predictors of behaviors (Ajzen & Fishbein, 1977). These questions about generality and specificity are directly relevant to mind-set research. That is, do individuals hold specific and relatively independent mind-sets about different attributes? Or do they hold a relatively global or “overall” mind-set such as a belief that *all* of one’s attributes are malleable or fixed? Or do individuals hold some combination of both possibilities? Evidence to date suggests that the more general self-attributes, such as intelligence or personality, are separable from one another (Dweck, 1999; Dweck et al., 1995; Hughes, 2015). This indicates that a person can simultaneously believe that intelligence can change, but that personality is fixed. However, much less is known about the specificity of more recently studied mind-sets regarding mental health problems (e.g., beliefs about the malleability of anxiety). This is an important gap because recent research indicates that psychological symptoms are better predicted by mental health mind-sets (e.g., anxiety mind-set) than by mind-sets of intelligence or personality (De Castella et al., 2014; Schroder et al., 2015).

Beyond improving the basic understanding of mind-sets, testing whether mental health mind-sets are general or domain-specific may have important clinical implications. Mind-set interventions are supported by decades of empirical and theoretical support (Kenthirarajah & Walton, 2015) and have documented lasting effects on resilience (Blackwell, Trzesniewski, & Dweck, 2007). These effects are especially impressive given the short administration time for many interventions (Miu & Yeager, 2015). However, if mental health mind-sets are more domain-specific, then interventions designed to specifically focus on the malleability of anxiety or depression would have greater impact on these symptoms as opposed to a more global focus on personality. Indeed, recent findings indicate that a brief message about the malleability of neurobiology related to depression improves beliefs about emotion regulation and decreases the amount of time individuals with depression believe they will suffer (Lebowitz & Ahn, 2015; Lebowitz, Ahn, & Nolen-Hoeksema, 2013).

Accordingly, the current studies were designed to address two questions regarding the domain specificity of mental health-related mind-sets. The first question was, “How do

different mind-sets (mental health mind-sets in particular) relate to one another—are they separable or more representative of a ‘general mind-set’?” In both studies, we used confirmatory factor analysis (CFA) to evaluate the structure of seven different mind-sets: anxiety, intelligence, emotion, personality, social anxiety, depression, and drinking tendencies. Using exploratory factor analysis, researchers have previously found that mind-sets of anxiety, intelligence, emotion, and personality are separable (Schroder et al., 2015). Nonetheless, mind-sets are also correlated, so there might be a generalized dimension that cuts across multiple domains. This suggested that a bifactor approach to modeling mind-sets might prove to be a useful approach for understanding the structure of mind-sets (see Chen, Hayes, Carver, Laurenceau, & Zhang, 2012).

The second question was, “Do specific mind-sets predict specific psychological symptoms (e.g., would social anxiety mind-set predict social anxiety symptoms)?” In Study 2, we assessed how the individual mind-sets predicted psychological symptoms of problematic worry, somatic anxiety, social anxiety, depression, and alcohol abuse. We used correlations and a modified form of the bifactor model to compare the predictive ability of the individual mind-set facets versus the general mind-set factor (i.e., we compared the predictive validity of the common variance among all mind-sets versus variance unique to each domain). We predicted that associations would be the strongest between mind-sets and domain-similar symptoms (e.g., depression mind-sets would be most strongly related to depression symptoms). Indeed, studies have established that domain-specific measures are stronger predictors of behaviors of the same domain (e.g., academic attitudes predict grades; Ajzen & Fishbein, 1977) than global measures.

## Study 1

### Method

#### Participants

Participants were students from a large Midwestern University who completed surveys online for partial course credit. Data were collected throughout the semester, and a total of 1,389 participants initiated the survey. We included 4 items to detect careless responding (e.g., “Please choose answer Choice 2 to ensure you are paying attention”) and excluded participants who failed to answer all 4 items correctly (Maniaci & Rogge, 2014;  $n = 363$ ). We excluded 74 additional participants because they did not respond to all mind-set items, leaving a final sample size of 952. The sample was predominantly female (70.3% female, 25.6% male, 0.4% declined to respond, and 3.7% had missing sex data). Participants self-reported their racial/ethnic makeup as predominantly European American/White (74.1%), African American/Black (8.5%), Asian (9.1%), Latino/Hispanic (4.7%), Biracial (2.6%), Native American (0.9%), and other (0.8%). The university’s institutional review board (IRB) approved all procedures, and all participants provided consent.

**Table 1.** Bivariate Correlations Between Mind-Sets Measured in Study 1.

	M	SD	Anxiety	Intelligence	Emotion	Personality	Depression	Social Anxiety	Drink
Anxiety	4.08	1.35	(.97)						
Intelligence	4.33	1.28	.33** [.39, .27]	(.95)					
Emotion	3.89	0.97	.21** [.27, .15]	.16** [.22, .10]	(.73)				
Personality	4.01	1.19	.34** [.40, .28]	.43** [.48, .38]	.20** [.26, .14]	(.91)			
Depression	4.60	1.16	.50** [.55, .45]	.38** [.43, .33]	.29** [.35, .23]	.28** [.34, .22]	(.96)		
Social anxiety	4.37	1.23	.59** [.63, .55]	.45** [.50, .40]	.27** [.33, .21]	.35** [.40, .29]	.69** [.72, .66]	(.98)	
Drink	5.56	0.78	.16** [.22, .10]	.21** [.27, .15]	.12** [.19, .06]	.11** [.17, .05]	.26** [.32, .20]	.24** [.30, .18]	(.95)

Note.  $n = 952$ . Reliability coefficients (Cronbach's  $\alpha$ ) are listed in parentheses along the diagonal. 95% confidence intervals [upper, lower] are presented in brackets.  $M =$  mean,  $SD =$  standard deviation.

\* $p < .05$ . \*\* $p < .01$ .

### Mind-Set Items

Mind-set items<sup>1</sup> captured seven potential mind-set domains: anxiety, intelligence, emotion, personality, depression, social anxiety, and drinking tendencies (see Appendix for all items). Items were rated on a scale of 1 (*strongly disagree*) to 6 (*strongly agree*). Except for the Emotion Mind-Set scale (Tamir, John, Srivastava, & Gross, 2007)—which included two growth mind-set items—all items were fixed minded, which is a standard practice in this research area (Dweck, 1999). All scales included 4 items, except for the Personality Mind-Set scale (Chiu, Hong, & Dweck, 1997), which included 3 items. Mind-set items were reverse-scored prior to analysis, such that higher scores indicate more endorsement of the growth mind-set. We calculated composite scales for each mind-set domain by using an average of items within the domain. The anxiety, intelligence, emotion, and personality mind-set items have been reported in the previous studies (Chiu, Hong, et al., 1997; Hong, Chiu, Dweck, Lin, & Wan, 1999; Schroder et al., 2015; Tamir et al., 2007). The depression, social anxiety, and drinking tendencies mind-set items were created for the present study using the “find-and-replace” method (replacing the word “intelligence” with the word “social anxiety”) as described in the previous studies (e.g., Burnette, 2010; Chiu, Hong, et al., 1997; Valentiner, Mounts, Durik, & Gier-Lonsway, 2011).

### Data Analysis

We evaluated the latent structure of mind-sets by specifying six different CFA models. CFA is appropriate once expectations for a particular structure are developed. This is unequivocally the case for mind-sets, which have historically been argued to be independent and domain-specific (Dweck, 1999; Dweck et al., 1995). Model 1 was a one-factor model in which all 27 mind-set items were represented by a general mind-set factor. Model 2 was a hierarchical model in which the general mind-set factor predicted the seven unique mind-sets. Model 3 was identical to Model 2 except that items from the social anxiety and depression mind-sets were combined in a “social anxiety/depression” latent variable so there were six mind-sets in

addition to the general mind-set factor. This model was motivated by pilot data, showing these two mind-sets are highly correlated with one another (see Tables 1 and 4). Model 4 was composed of seven correlated latent factors, each representative of an individual mind-set. Model 5 was identical to Model 4 except that the social anxiety/depression latent factor was present. Finally, Model 6 was a bifactor model in which a general mind-set latent variable was present along with seven uncorrelated mind-set latent variables. In other words, Model 6 was similar to Model 4, except that the individual mind-set facets were uncorrelated and there was an additional general mind-set factor. Given indications from exploratory factor analyses that more different mind-sets are relatively independent from one another (Chiu, Dweck, Tong, & Fu, 1997; Dweck et al., 1995; Hughes, 2015; Schroder et al., 2015), we anticipated that Models 4 and 6 would have the best fit to our data.

In all models, the error terms of the two reverse-scored items of the Implicit Theories of Emotion scale (Tamir et al., 2007) were correlated a priori to capture method effects associated with reverse-scored items (Brown, 2003). Goodness of fit was evaluated using the root mean square error of approximation (RMSEA) and its 90% confidence interval (90% CI), the standardized root mean square residual (SRMR), the comparative fit index (CFI), and the Tucker–Lewis index (TLI). Multiple indices were evaluated because they each provide complementary information regarding model fit. We used current recommendations (Brown, 2006; Hu & Bentler, 1999) to guide interpretations and considered models to have acceptable fit if RMSEA  $< .06$ , SRMR  $< .05$ , CFI  $> .95$ , and TLI  $> .95$ . Models were estimated using MPlus Version 7.3 (Muthén & Muthén, 1998–2012).

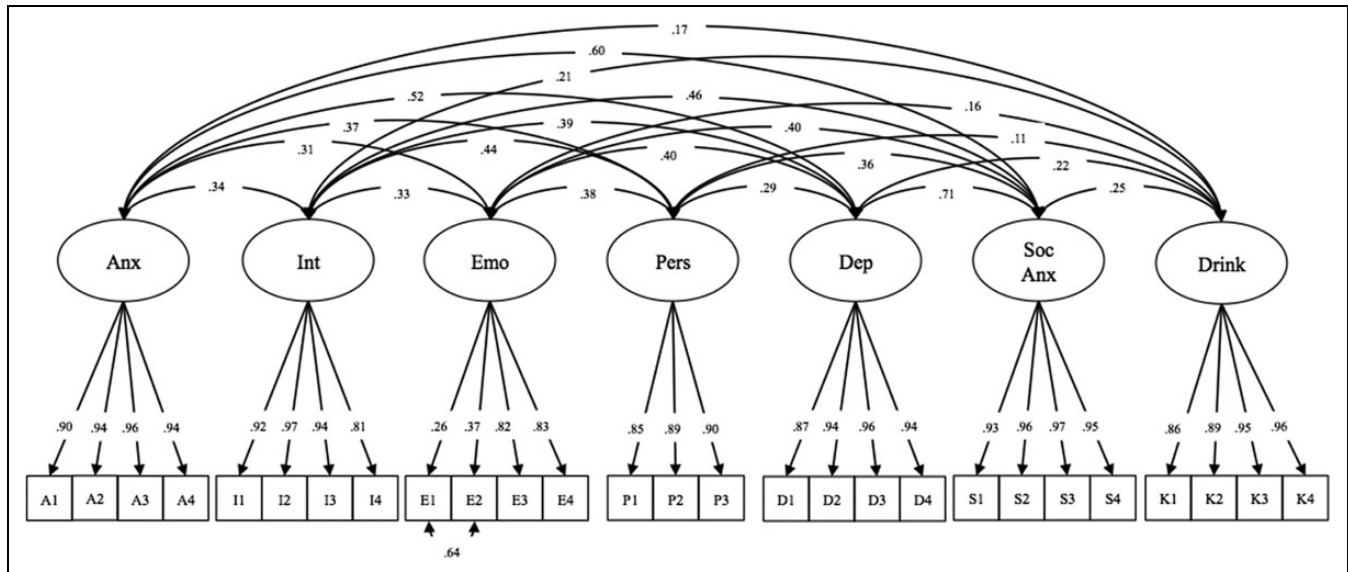
### Results and Discussion

Descriptive statistics, bivariate correlations, and internal reliabilities for the different mind-sets are presented in Table 1. All mind-sets were positively correlated with one another. Fit statistics for the CFA models are listed in Table 2. The only models with acceptable fit were Models 4 (the correlated factors model) and 6 (the bifactor model), which are illustrated in Figures 1 and 2, respectively. Overall, these results are

**Table 2.** Fit Statistics of CFA Models in Studies 1 and 2.

	$\chi^2$	df	RMSEA	90% CI [Upper, Lower]	SRMR	CFI	TLI	AIC
Study 1 (n = 952)								
Model 1	9,383.810	323	0.172	[0.169, 0.175]	0.162	0.408	0.357	71,769.639
Model 2	1,527.425	317	0.063	[0.060, 0.067]	0.170	0.921	0.912	56,360.631
Model 3	2,936.425	318	0.093	[0.090, 0.096]	0.155	0.829	0.811	58,773.295
<b>Model 4</b>	<b>825.843</b>	<b>302</b>	<b>0.043</b>	<b>[0.039, 0.046]</b>	<b>0.032</b>	<b>0.966</b>	<b>0.960</b>	<b>55,293.057</b>
Model 5	2,574.555	308	0.088	[0.085, 0.091]	0.058	0.852	0.831	58,229.188
<b>Model 6</b>	<b>859.505</b>	<b>296</b>	<b>0.045</b>	<b>[0.041, 0.048]</b>	<b>0.043</b>	<b>0.963</b>	<b>0.956</b>	<b>55,366.412</b>
Study 2 Analysis 1 (n = 376)								
Model 1	4,731.380	323	0.191	[0.186, 0.195]	0.178	0.377	0.323	28,332.986
Model 2	807.963	317	0.064	[0.059, 0.070]	0.147	0.931	0.923	22,048.048
Model 3	1,607.176	318	0.104	[0.099, 0.109]	0.138	0.818	0.799	23,131.478
<b>Model 4</b>	<b>551.004</b>	<b>302</b>	<b>0.047</b>	<b>[0.041, 0.053]</b>	<b>0.038</b>	<b>0.965</b>	<b>0.959</b>	<b>21,745.104</b>
Model 5	1,496.845	308	0.101	[0.096, 0.106]	0.073	0.832	0.809	23,006.311
<b>Model 6</b>	<b>540.707</b>	<b>296</b>	<b>0.047</b>	<b>[0.041, 0.053]</b>	<b>0.049</b>	<b>0.965</b>	<b>0.959</b>	<b>21,741.524</b>
Study 2 Analysis 2 (n= 316)								
Worry	736.940	329	0.063	[0.057, 0.069]	0.140	0.938	0.928	19,111.178
Somatic anxiety	739.045	329	0.063	[0.057, 0.069]	0.140	0.937	0.928	19,167.060
Social anxiety	745.557	328	0.063	[0.057, 0.069]	0.140	0.938	0.928	19,112.839
Depression	743.818	329	0.063	[0.057, 0.069]	0.140	0.936	0.927	19,171.318
Alcohol abuse	751.860	329	0.064	[0.058, 0.070]	0.140	0.935	0.925	19,226.281

Note. All  $\chi^2$  values are significant at  $p < .001$  due to the large sample sizes. Bolded rows indicate acceptable model fit. Model 1 = one-factor model; Model 2 = hierarchical model consisting of one general factor and seven correlated factors; Model 3 = hierarchical Model 2 with social anxiety/depression mind-set factor; Model 4 = seven correlated factors; Model 5 = six correlated factors (social anxiety and depression combined); Model 6 = bifactor model; RMSEA = root mean square error of approximation; 90% CI = 90% confidence interval for RMSEA; SRMR = standardized root mean square residual; CFI = comparative fit index; TLI = Tucker–Lewis index; AIC = Akaike information criterion; df = degrees of freedom.

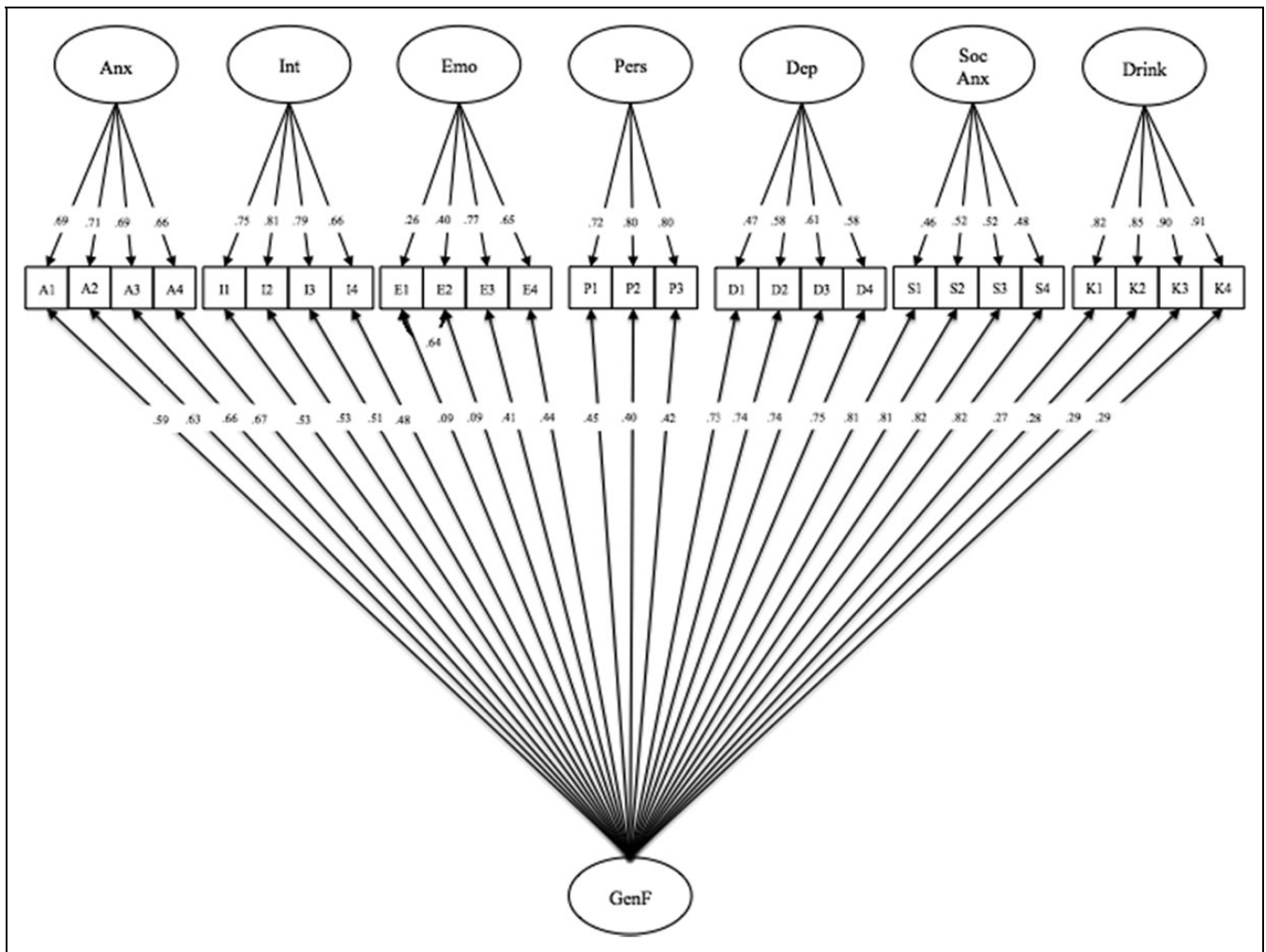


**Figure 1.** Confirmatory factor analysis results of Model 4 specified in Study 1.

consistent with the idea that the seven mind-set domains are distinguishable from one another although there is a global sentiment that cuts across specific domains.

Having evaluated a series of structural models for mind-sets, we next sought to examine the predictive specificity of these mind-sets. Thus, the purpose of Study 2 was to replicate the factor structure in a separate sample and to evaluate the

specificity of each mind-set predicting domain-relevant psychological symptoms. As we found evidence for both general and specific mind-set components, we extended the bifactor model to test relations with criterion variables (psychological symptoms). This allowed us to evaluate the predictive validity of both the overall global mind-set factor and the domain-specific facets.



**Figure 2.** Confirmatory factor analysis results of Model 6 specified in Study 1.

## Study 2

### Method

#### Participants

Participants were recruited from the same large Midwestern University but during a different semester. Like Study 1, the survey was available to participants throughout the semester. A total of 531 students initially completed the survey, and 405 respondents (20.7% males, 75.6% females, 3.7% missing sex data) were retained after checking for inattentive responding ( $n = 126$  excluded). The racial/ethnic makeup of the sample was predominantly European American/White (78.8%), African American/Black (7.9%), Asian (4.2%), Latino/Hispanic (3.0%), Biracial (4.4%), Native American (1.2%), and other (0.8%).

#### Self-Report Questionnaires

In addition to the same mind-set items measured in Study 1, participants completed multiple questionnaires for each of the

four symptom constructs—problematic worry, somatic anxiety, social anxiety, and depression—and one measure for alcohol abuse. This strategy was used to improve measurement for latent variable analyses. Scale reliability ( $\alpha$ ) is presented in Table 3.

**Problematic worry.** Problematic worry was assessed using two commonly used measures. The Penn State Worry Questionnaire (Meyer, Miller, Metzger, & Borkovec, 1990) is a 16-item questionnaire assessing general worry (e.g., “I worry all the time”). The 10-item Worry Domains Questionnaire—Short Form (Stober & Joormann, 2001) assesses worry in five specific domains: relationships, lack of confidence, aimless future, financial issues, and work (e.g., “I worry that I will not keep my workload up to date”).

**Somatic anxiety.** Somatic anxiety was measured using three well-validated measures. The 17-item Mood and Anxiety Symptom Questionnaire Anxious Arousal subscale (MASQ-AA; Watson & Clark, 1991) asks participants to rate how much they experienced symptoms of somatic anxiety (e.g., “Hands

**Table 3.** Descriptive Statistics and Bivariate Correlations Among Variables in Study 2.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.
Mean	3.99	4.34	4.00	4.00	4.64	4.44	5.52	53.49	15.20	27.60	7.50	17.12	18.14	35.39	53.58	7.35	13.49	13.24
SD	1.33	1.21	0.94	1.14	1.10	1.17	0.80	13.80	9.63	10.13	7.17	13.72	13.29	9.48	14.02	7.76	11.56	5.41
1. Anxiety	(.96)																	
2. Intelligence	.27**	(.95)																
3. Emotion	.22**	.22**	(.75)															
4. Personality	.31, .13	.31, .13	.21**	(.88)														
5. Depression	.36**	.38**	.33**	.27**	(.96)													
6. Social anxiety	.47**	.37**	.29**	.36**	.65**	(.98)												
7. Drink	.09	.07	.10*	.07	.16**	.14**	(.94)											
8. PSWQ	-.48**	-.10*	-.16**	-.06	-.06	-.14**	-.07	(.95)										
9. WDO-SF	-.32**	-.18**	-.12*	-.15**	-.16**	-.19**	-.09	.49**	(.92)									
10. MASQAA	-.23, -.40	-.08, -.27	-.02, -.22	-.05, -.24	-.06, -.25	-.10, -.28	-.26**	-.27**	.34**	(.92)								
11. DASS <sub>ANX</sub>	-.16, -.34	-.04, -.23	-.01, -.21	-.02, -.22	-.11, -.29	-.07, -.26	-.17, -.35	.36, .18	.43, .25	.48**	(.81)							
12. ASI-3	-.28, -.45	-.03, -.22	-.003, -.20	-.01, -.19	-.03, -.22	-.12, -.30	-.09, -.28	.51, .36	.55, .40	.67**	.52**	(.95)						
13. SPIN	-.18, -.36	-.06, -.26	-.03, -.23	-.03, -.17	-.07, -.26	-.12, -.30	-.13, -.32	.31**	.43, .25	.49**	.46**	.48**	(.93)					
14. BFNE	-.25**	-.22**	-.21**	-.16**	-.22**	-.31**	-.12*	.34**	.42**	.33**	.31**	.33**	.57**	(.86)				
15. MASQAD	-.21**	-.14**	-.17**	-.13*	-.10*	-.15**	-.10	.44**	.49**	.16**	.31**	.33**	.57**	.57**	(.92)			
16. DASS <sub>Dep</sub>	-.11, -.30	-.04, -.24	-.07, -.26	-.03, -.26	-.001, -.20	-.05, -.25	-.002, -.20	.52, .36	.56, .41	.25, .06	.40, .22	.42, .24	.63, .50	.28**	.70**	(.92)		
17. CESD-R	-.20, -.38	-.11, -.29	-.07, -.26	-.02, -.22	-.14, -.32	-.10, -.29	-.01, -.21	.33**	.50**	.31**	.45**	.31**	.38**	.46**	.42**	.33**	.74**	(.93)
18. PROMIS <sub>ALC</sub>	-.25**	-.19**	-.06	-.14**	-.25**	-.20**	-.15**	.31**	.56**	.45**	.65**	.37**	.42**	.42**	.42**	.31**	.61**	.74**
	-.25**	-.14**	-.07	-.15**	-.22**	-.18**	-.08	.40**	.62, .50	.40**	.52**	.37**	.41**	.41**	.40**	.31**	.67, .55	.78, .69
	-.16, -.34	-.04, -.23	-.03, -.17	-.05, -.24	-.13, -.31	-.08, -.27	[.02, -.18]	[.40, .22]	[.62, .50]	[.48, .31]	[.59, .45]	[.45, .28]	[.49, .33]	[.40, .22]	[.67, .55]	[.78, .69]	[.25**	.25**
	-.03	.01	.04	.04	-.09	-.01	-.39**	.01	.19**	.23**	.21**	.09	.04	.11**	.12*	.12*	.26**	.25**
	[.08, -.14]	[.12, -.10]	[.15, -.07]	[.15, -.07]	[.02, -.19]	[.10, -.12]	[-.30, -.48]	[.12, -.10]	[.29, .09]	[.33, .13]	[.31, .11]	[.20, -.02]	[.15, -.07]	[.22, .002]	[.23, .01]	[.36, .16]	[.35, .15]	[.35, .15]

Note. *n* Values ranged from 405 to 324. First seven rows/columns are the mind-sets of anxiety, intelligence, emotion, personality, depression, social anxiety, and drinking tendencies. Cronbach's  $\alpha$  is presented along the diagonal in parentheses. 95% confidence intervals [upper, lower] are presented in brackets. PSWQ = Penn State Worry Questionnaire; WDO-SF = Worry Domains Questionnaire – Short Form; MASQ = Mood Anxiety Symptom Questionnaire (AA = Anxious Arousal; AD = Anhedonic Depression); DASS = Depression Anxiety Stress Scales; ASI-3 = Anxiety Sensitivity Index-3; SPIN = Social Phobia Inventory; BFNE = Brief Fear of Negative Evaluation; CESD-R = Center for Epidemiological Scale for Depression-Revised; PROMIS<sub>ALC</sub> = Patient-Reported Outcome Measurement Information System Alcohol Abuse Scale.

\* $p < .05$ . \*\* $p < .01$ .

**Table 4.** Bivariate Correlations Between Mind-Sets and Symptom Composites in Study 2.

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Anxiety	—										
2. Intelligence	.23** [.33, .12]	—									
3. Emotion	.21** [.31, .10]	.21** [.31, .10]	—								
4. Personality	.21** [.31, .10]	.45** [.53, .36]	.19** [.29, .08]	—							
5. Depression	.37** [.46, .27]	.39** [.48, .29]	.35** [.44, .25]	.27** [.37, .17]	—						
6. Social anxiety	.45** [.53, .36]	.40** [.49, .30]	.32** [.42, .22]	.33** [.42, .23]	.67** [.73, .61]	—					
7. Drink	.09 [.20, -.02]	.05 [.16, -.06]	.10 [.21, -.01]	.08 [.19, -.03]	.14* [.25, .03]	.14* [.25, .03]	—				
8. Worry	.43** [.52, .34]	.11* [0, -.22]	.12* [.23, -.01]	.10 [.01, -.21]	.10 [.01, -.21]	.13* [.20, .02]	.10 [.01, -.21]	—			
9. Somatic anxiety	.32** [.42, .22]	.16** [.27, .05]	.12* [.23, -.01]	.10 [.01, -.21]	.20** [.30, .09]	.20** [.30, .09]	.27** [.37, .17]	.47** [.55, .38]	—		
10. Social anxiety	.21** [.31, .10]	.19** [.29, .08]	.21** [.31, .10]	.11* [.22, .01]	.17** [.28, .08]	.19** [.30, .09]	.17** [.28, .08]	.54** [.61, .46]	.45** [.53, .36]	—	
11. Depression	.29** [.39, .19]	.16** [.27, .05]	.10 [.21, -.01]	.13* [.24, .05]	.26** [.36, .16]	.20** [.30, .09]	.14* [.25, .03]	.57** [.64, .49]	.58** [.65, .50]	.42** [.51, .33]	—
12. Alcohol abuse	.06 [.17, .05]	.002 [.11, -.11]	.02 [.13, -.09]	.05 [.16, -.06]	.08 [.19, -.11]	.04 [.11, -.11]	.39** [.48, .29]	.15** [.26, .04]	.21** [.31, .10]	.08 [.19, -.03]	.24** [.34, .13]

Note.  $n = 316$ . First seven variables are mind-sets. 95% confidence intervals [upper, lower] are presented in brackets. Bolded values indicate the mind-set–symptom correlations in the mind-set column with the largest magnitude.

\* $p < .05$ . \*\* $p < .01$ .

were cold or sweaty”) over the past week, including today. The 7-item Depression Anxiety Stress Scales—21 Anxiety subscale (Henry & Crawford, 2005) also asks participants to rate how much each statement (e.g., “I felt I was close to panic”) applied to them over the past week. Finally, the Anxiety Sensitivity Index—3 (Taylor et al., 2007) assessed fear or apprehension about physical sensation with 18 items regarding anxiety sensitivity (e.g., “When my thoughts seem to speed up, I worry that I might be going crazy”).

**Social anxiety.** Symptoms of social anxiety were assessed using two measures. The Social Phobia Inventory (Connor et al., 2000) is a 17-item measure of social phobia symptoms (e.g., “Talking to strangers scares me”). The Brief Fear of Negative Evaluation (Leary, 1983) is a 12-item scale measuring a core mechanism related to social anxiety, the fear of negative evaluation from others (e.g., “I am afraid that people will find fault with me”).

**Depression.** Depression was assessed using three well-validated measures. The 21-item MASQ-Anhedonic Depression subscale (Watson & Clark, 1991) is similar in format to the MASQ-AA but asks about anhedonia (e.g., “Felt really happy,” reverse scored). The DASS-Depression subscale (Henry & Crawford, 2005) is a 7-item measure of depression symptoms (e.g., “I felt I wasn’t worth much as a person”) over the past week. Finally, the Center for Epidemiologic Studies Depression Scale—Revised (CESD-R; Eaton, Smith, Ybarra, Muntaner, & Tien, 2004) asked participants about 20 depression-related experiences (e.g., “I felt sad”) over the past 2 weeks. Two CESD-R items related to self-harm and suicide were removed for IRB considerations.

**Alcohol abuse.** Alcohol abuse was measured with items from the Patient-Reported Outcome Measurement Information System (PROMIS) Alcohol Use Short Form (Pilkonis et al., 2013). Participants responded to 7 items using a 5-point scale ranging from *never* to *almost always* regarding alcohol abuse (e.g., “I spent too much time drinking”) in the past 30 days. Because only participants who drank an alcoholic beverage within the last 30 days completed the measure, the sample size for this measure was slightly smaller ( $n = 330$ ).

## Data Analysis

We conducted two sets of analyses in Study 2. First, the same CFA models from Study 1 were evaluated in order to replicate the factor structure (item-level data available from  $n = 376$  participants). Second, we used a bifactor model in which both individual facet-level mind-sets (e.g., anxiety, intelligence, and emotion) and the general mind-set factor predicted different psychological symptoms to test relations between mind-sets and criterion variables. We used composite scores for each symptom domain (problematic worry, somatic anxiety, social anxiety, depression; alcohol abuse was measured with the PROMIS, created by standardizing individual measures and

averaging these together.<sup>2</sup> Each composite measure was then predicted by both individual facets and the general mind-set factor in five separate models (one for each composite measure). A total of 316 participants had all measures and were used in this second set of analyses.

## Results and Discussion

Estimates of model fit were similar to those of Study 1 (see Table 2): Only Models 4 and 6 showed acceptable fit according to our prespecified criteria. Thus, we replicated Study 1 CFA findings.

Descriptive statistics, internal reliabilities, and correlations of all Study 2 variables are listed in Table 3. Using Preacher’s (2002) method of testing differences between correlations, we found that correlations between same-domain symptom measures (correlation coefficient [ $M r$ ] = .61,  $SD = .06$ , min. = .49, max. = .74) were on average significantly larger ( $Z = 4.18$ ,  $p < .001$ ) than correlations between different-domain symptom measures ( $M r = .35$ ,  $SD = .16$ , min. = .01, max. = .65), further justifying the use of composite measures (<http://www.quantpsy.org/corrttest/corrttest.htm>). Bivariate correlations between mind-sets and symptom composites indicated mind-set domain-predictive specificity (see Table 4). For instance, the anxiety mind-set’s highest correlations were with worry and somatic anxiety, the depression mind-set’s highest correlation was with depression, and the drinking tendencies mind-set was most strongly correlated with alcohol abuse (bolded values in Table 4). The social anxiety mind-set had nearly identical correlations with somatic anxiety, social anxiety, and depression. However, there was also evidence for mind-set generality whereby mind-sets in one domain were correlated with psychological symptoms in another domain. For example, the social anxiety mind-set was associated with depressive symptoms. These results indicate there was both specificity and generality in terms of relations between mind-sets and psychological symptoms.

### The Bifactor Model

Table 5 presents the loadings of the general factor as well as the facets that were specified to predict each outcome in each of the five models we estimated (see Table 2 for fit indices). The general factor predicted a moderate amount of variance for each of the symptoms, with the exception of alcohol abuse. However, the anxiety mind-set facet also predicted substantial variance for problematic worry and social anxiety. These findings echo the correlational analyses in that there was evidence for both specificity and generality, especially with respect to anxiety-related mind-sets.

## General Discussion

We evaluated the latent structure and predictive validity of mental health–related mind-sets using two samples. Although the mind-set literature has suggested specificity for general self-attributes such as intelligence, personality, and morality



**Table 5.** Standardized Loadings of General Factor and Mind-Set Facets Predicting Symptoms.

	Worry	Somatic Anxiety	Social Anxiety	Depression	Alcohol Abuse
General factor	-.26**				
Anxiety	-.38**				
General factor		-.29**			
Anxiety		.06			
General factor			-.27**		
Anxiety			-.37**		
Social anxiety			.04		
General factor				-.27**	
Depression				-.14*	
General factor					.01
Drinking					-.41**

Note.  $n = 316$ .

\* $p < .05$ . \*\* $p < .01$ .

(Chiu, Dweck, et al., 1997; Dweck et al., 1995; Hughes, 2015), much less is known about the structure of mental health–related mind-sets. Our findings indicate that mental health–related mind-sets are distinguishable from one another but also indicate that there is a general dimension that cuts across domain-specific mind-sets. In other words, there appears to be an underlying global dimension that captures whether a person tends to adopt a growth versus fixed mind-set regardless of domain, while there is also evidence that individuals hold differing beliefs about specific domains. The CFA results from both studies indicated that the bifactor model or a correlated factor model had the best fit to the data.

A second goal of this study was to evaluate how these mind-set domains are related to psychological symptoms. The bifactor models tested in Study 2 allowed us to compare the ability of the individual mind-set facets to predict symptoms, over and above the general mind-set factor. This analysis revealed that the general “core mind-set” shared among all mind-sets was a statistical predictor of mental health symptoms, with the exception of alcohol abuse. At the same time, the anxiety mind-set was specifically predictive of problematic worry and social anxiety. All told, the results suggest that there are both specificity and generality in terms of how mind-sets relate to symptoms. Our results may help refine future research and interventions, briefly outlined here.

First, findings from this and previous studies (De Castella et al., 2015; Schroder et al., 2015) indicate the *anxiety mind-set* is a potentially important construct for clinically oriented research. Here, we demonstrated this mind-set is (1) psychometrically distinguishable from six other mind-sets and (2) predictive of a wide range of psychological symptoms. The findings from Study 2 also suggested the anxiety mind-set was most

predictive of worry. This is reasonable as worry is a cognitive process (Borkovec & Inz, 1990) and anxiety mind-sets are beliefs. It is possible that fixed-minded individuals believe that struggling with worries—something that everyone does from time to time—is a sign of an underlying mental health liability. This is akin to those with a fixed mind-set of intelligence who see mistakes as a potential indicator of a lack of intellectual ability (Dweck, 1999). Or, perhaps those who have experienced difficulties in controlling their worries develop the belief that anxiety is unchangeable. Yet another possibility is that the fixed mind-set of anxiety fosters an unwillingness to experience negative emotions and that worries are employed as an avoidance mechanism (Borkovec, 1994; Newman & Llera, 2011). To be sure, it is likely that this relationship is complex and reciprocal; thus, understanding how anxiety mind-set relates to anxiety is an important area for future study, given that anxiety-related disorders constitute the most common mental health problems worldwide (Baxter, Scott, Vos, & Whiteford, 2013).

Clarifying how the anxiety mind-set and the global mind-set factor relate to similar constructs will be an important research direction. Genetic essentialism—the idea that genetic messages convey beliefs of immutability and stagnation—is relevant here (Haslam, Bastian, & Bissett, 2004). Indeed, one of the most well-established methods of inducing a fixed mind-set is to expose participants to messages about the genetic contributions to attributes like intelligence (Hong et al., 1999). Research also suggests that genetic or neurobiological conceptions of mental health—which are becoming increasingly popular—carry unintentional negative consequences (Deacon, 2013; Haslam & Ernst, 2002; Kvaale, Haslam, & Gottdiener, 2013). Perhaps such messages induce a fixed mind-set of mental health. Reframing this message by emphasizing that biological processes are malleable has been shown to promote adaptive beliefs about emotion regulation among individuals with moderate or severe depression (Lebowitz & Ahn, 2015; Lebowitz et al., 2013). Future work should delineate the interplay between mind-sets of mental health and essentialism.

A third research direction should document the developmental changes in different mind-sets. Mind-sets of intelligence are present by early childhood (e.g., Heyman & Dweck, 1998; Kamins & Dweck, 1999), meaning these beliefs potentially shape responses in the achievement domain across the life span. Developmental research could inform roughly when the anxiety mind-set is cultivated, which may be important for understanding risk and protective factors. Research suggests that intelligence mind-sets are influenced in part by messages of ability or effort (Gunderson et al., 2013). It is possible that messages young children receive about fears and anxieties come to shape their mind-sets about anxiety, which may in turn predict children’s anxiety. Consistent with the idea that parental beliefs and behaviors influence children’s anxiety, a recent children-of-twins study found that the intergenerational transmission of anxiety symptoms is almost entirely environmental in nature, with little to no genetic influence (Eley et al., 2015).

## Limitations and Conclusions

Several limitations in the present work should be considered for future research. First, both samples were drawn from the same undergraduate population. Future research should replicate this study in community and clinical samples. Second, this was a cross-sectional study, limiting conclusions regarding directionality or causality. Experimental and longitudinal studies examining the mind-sets studied here are critical for causal inference. However, the study was designed to provide initial data on the factor structure and domain specificity of several different mental health mind-sets, in an incremental fashion from previous research (Schroder et al., 2015). We are unaware of any other study measuring these many mind-sets involving mental health-relevant domains and psychological symptoms in the same analysis. Moreover, the modified bifactor models tested in Study 2 provide a rather stringent test of the predictive capacity of specific versus general mind-set factors.

Despite these limitations, the findings from the present investigation add to the growing evidence that mind-sets have domain-specific elements (Hughes, 2015) and illustrate one approach to modeling general and domain-specific elements of mind-set. The current studies also show that beliefs of even conceptually similar symptom types (anxiety, social anxiety, and depression) are distinguishable from one another and relate to different symptoms. However, the anxiety mind-set appears to be most related to a wide range of psychological symptoms. We look forward to future investigations that can help refine the measurement and understanding of these beliefs as well as their relations to psychological health.

## Appendix

### Mind-Set Items

All mind-set scales used the following instructions:

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*

#### Anxiety mind-set

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 (Schroder et al., 2015).

#### Intelligence mind-set

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 (Hong et al., 1999).

#### Emotion mind-set

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 (Tamir et al., 2007).

#### Personality mind-set

1. The kind of person someone 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 (Chiu, Hong, et al., 1997).

#### Depression mind-set

1. You have a certain amount of depression, and you really cannot do much to change it.
2. Your depression is something about you that you cannot change very much.
3. To be honest, you cannot really change how depressed you are.
4. No matter how hard you try, you can't really change the level of depression that you have.

#### Social anxiety mind-set

1. You have a certain amount of social anxiety, and you really cannot do much to change it.
2. Your social anxiety is something about you that you cannot change very much.
3. To be honest, you cannot really change how socially anxious you are.
4. No matter how hard you try, you can't really change the level of social anxiety that you have.

#### Drinking tendencies mind-set

1. You have a certain tendency to drink, and you really cannot do much to change it.
2. Your tendency to drink is something about you that you cannot change very much.
3. To be honest, you cannot really change your tendency or predisposition to drink.
4. No matter how hard you try, you can't really change your tendency to drink.

## Authors' Note

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## Notes

1. Additional questionnaires assessed personality characteristics, emotion regulation strategies, past experiences, attitudes, and treatment history. These variables were not relevant for the present study and were not analyzed here.
2. Results were similar when individual symptom measures were used instead of composites.

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