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To cite this article: Nathan A. Huebschmann & Erin S. Sheets (2020): The right mindset: stress mindset moderates the association between perceived stress and depressive symptoms, Anxiety, Stress, & Coping, DOI: [10.1080/10615806.2020.1736900](https://doi.org/10.1080/10615806.2020.1736900)

To link to this article: <https://doi.org/10.1080/10615806.2020.1736900>



Published online: 05 Mar 2020.



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REPORT



The right mindset: stress mindset moderates the association between perceived stress and depressive symptoms

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ABSTRACT

Background and Objectives: Having a stress-is-enhancing mindset – the extent to which one believes the effects of stress are enhancing rather than debilitating – is associated with greater health and well-being, and may mitigate negative outcomes associated with experiencing stress. The present study aimed to examine stress mindset and whether it moderates the association between perceived stress and mental health outcomes.

Design and Methods: Participants ($N = 293$) completed questionnaires assessing their stress mindset, perceived stress level, and current depressive and anxiety symptoms. Perceived stress and mental health were assessed again at a follow-up session one month later.

Results: Across moderated linear regression analyses, there was a consistent pattern in which higher perceived stress was associated with higher mental health concerns, but the risk was greater for those with a stress-is-debilitating mindset. Stress mindset moderated the perceived stress-depression association at baseline ($p = .026$), at follow-up ($p = .008$), and when focusing on change in depressive symptoms from baseline to follow-up ($p = .006$).

Conclusions: These results suggest that a stress-is-enhancing mindset mitigates the development of depressive and anxiety symptoms in college students faced with high levels of stress. The benefits of introducing emerging adults to an adaptive stress mindset are discussed.

ARTICLE HISTORY

Received 23 April 2019

Revised 11 February 2020

Accepted 24 February 2020

KEYWORDS

Stress mindset; stress; depression; resilience; college

Global ratings of stress have been conceptualized as the interaction of events with appraisals of predictability, control, and coping resources related to these events, or expected future events (Cohen et al., 1983). Stress mindset is defined as the extent to which one believes stress has enhancing or debilitating effects on stress-related outcomes such as performance and productivity, health and well-being, and learning and growth (Crum et al., 2013). Individuals who generally believe stress can have positive effects have a stress-is-enhancing mindset, whereas individuals who believe stress has negative effects have a stress-is-debilitating mindset. Upon developing the Stress Mindset Measure-General (SMM-G), Crum et al. (2013) demonstrated the construct's discriminant validity such that it correlated in the expected direction with other measures of stress amount, appraisal, and coping, but only with weak to moderate strength. Preliminary work on stress mindset indicates that the way individuals conceptualize stress and its effects is malleable, and may be quite impactful.

Previous research has demonstrated that having a stress-is-enhancing mindset is associated with positive outcomes, especially within the workplace. Among a large sample of employees at a financial institution, those with a stress-is-enhancing mindset reported fewer symptoms of depression and anxiety and higher levels of energy compared to those with a stress-is-debilitating mindset (Crum

et al., 2013). Furthermore, workplace performance and satisfaction with life were both positively correlated with having a stress-is-enhancing mindset. A stress-is-enhancing mindset leads to more effective coping when anticipating a high workload, and in turn better work performance and vigor throughout the day (Casper et al., 2017). Short interventions to induce a stress-is-enhancing mindset have positive outcomes as well, including decreases in anxiety and depressive symptoms, better performance at work, and physiological thriving in stressful situations regardless of appraisal (Crum et al., 2013, 2017).

In addition to the independent influence that stress mindset has on the stress response, stress mindset may act as a moderator of the associations between stressful experiences and well-being. Park et al. (2018) followed a group of socioeconomically and ethnically diverse adolescents across a full school year. They examined the effect of stress mindset on the association between adverse life events in the prior 6 months and perceived distress at follow-up. At low levels of adversity, the adolescents with a stress-is-enhancing mindset did not significantly differ in distress from those with a stress-is-debilitating mindset. However, at high levels of adversity, adolescents with a stress-is-debilitating mindset reported significantly higher levels of distress. Similarly, Jiang et al. (2019) examined a group of Chinese rural-to-urban migrant adolescents and found that, compared to those with a stress-is-debilitating mindset, those with a stress-is-enhancing mindset were less susceptible to increased depressive symptoms when faced with stressful events.

Taken together, there is evidence that stress mindset has positive effects on well-being, and that it may act as a moderator to mitigate negative effects of stressful experiences. Prior work has examined stress mindset in the workplace (e.g., Casper et al., 2017; Crum et al., 2017) or in the lives of younger adolescents (Jiang et al., 2019; Park et al., 2018). However, to the best of our knowledge, stress mindset has not been closely examined in the college setting, despite the fact that college students are a population for which stress is common and mental health concerns are rising. In a recent national survey of college students, 45.1% of students reported more than average stress and 12.7% reported tremendous stress within the last 12 months (ACHA, 2018). Among undergraduate students at an American university, 15% of students reported severe or extremely severe levels of anxiety and 11% reported severe or extremely severe depression (Beiter et al., 2015). Furthermore, stress is strongly associated with a greater likelihood of mental health diagnoses and suicide attempts in college students (Liu et al., 2019). The purpose of the present study was to examine stress mindset among college students, and to examine how stress mindset may moderate the relationship between perceived stress and mental health symptoms. We would expect higher perceived stress to be associated with worse mental health outcomes. However, it has not yet been established if the association between perceived stress and mental health outcomes varies based on one's stress mindset.

Method

Participants

Participants were 293 students (69.3% female, $M_{\text{age}} = 19.94 \pm 1.53$ years) at Colby College, a liberal arts college in the northeastern United States. Participants reported the following racial identities: Caucasian/White (70.99%), Asian (10.58%), Multiracial (7.85%), African-American/Black (5.12%), Latinx (3.75%) and Other (1.71%). Participants were recruited into a larger project examining campus climate and health behaviors. This project was formally approved by the college's Institutional Review Board. Participants were compensated \$10 or 1 psychology research credit for each baseline and follow-up session. Data collection was terminated after 4 semesters.

Procedure

The present study comprised a baseline and a follow-up session, which were separated by one month. Prior to beginning the baseline session, all participants provided informed consent.

Participants then completed measures of stress mindset, mental health, and recent stress on a computer in a private testing room. Other measures not central to the current investigation were also completed. At the online follow-up session, participants again completed measures of mental health and recent stress over the prior month. Participants were debriefed following the completion of the follow-up session. Of the 293 participants, 269 (91.8%) completed the 1-month follow-up session.

Measures

Stress Mindset Measure-General

The Stress Mindset Measure-General (SMM-G; Crum et al., 2013) is an 8-item measure that was administered at baseline to assess the extent to which individuals believe the effects of stress are enhancing or debilitating. Participants rate the extent to which they agree with a statement about stress (e.g., The effects of stress are positive and should be utilized.) on a scale from 0 (*strongly disagree*) to 4 (*strongly agree*). The measure had good internal consistency in the present sample (Cronbach's $\alpha = .83$). Prior research has demonstrated both discriminant and criterion validity (Crum et al., 2013).

Perceived Stress Scale

The Perceived Stress Scale (PSS; Cohen et al., 1983) is a 14-item measure that was administered at both baseline and follow-up to assess stress over the previous month. Participants responded how often they have felt or thought a certain way during the last month (e.g., In the last month, how often have you felt nervous or "stressed"?) on a scale from 0 (*never*) to 4 (*very often*). The measure demonstrated internal consistency with the present sample (Cronbach's $\alpha = .67$ at baseline; Cronbach's $\alpha = .63$ at 1-month follow-up). Previous research has summarized concurrent and predictive validity for the measure (Cohen et al., 1983; Mitchell et al., 2008).

Beck Depression Inventory II

The Beck Depression Inventory II (BDI-II; Beck et al., 1996) is a 21-item measure that was administered at both baseline and follow-up to assess depressive symptoms over the previous two weeks. Items (e.g., sadness) are rated by selecting one of four statements of increasing severity, and items are scored from 0 to 3. The measure had excellent reliability in this sample (Cronbach's $\alpha = .93$ at baseline; Cronbach's $\alpha = .91$ at 1-month follow-up). Across a variety of studies, the BDI-II has been shown to have discriminant, concurrent, content, and structural validity (Wang & Gorenstein, 2013).

State-Trait Anxiety Inventory – State

The State subscale of the State-Trait Anxiety Inventory (STAI-State; Spielberger, 1983) is a 20-item measure that was administered at both baseline and follow-up to assess current levels of anxiety. Participants rate the extent to which they feel a certain way (e.g., I feel nervous.) on a 4-point scale from *not at all* to *very much so*. The measure had excellent internal consistency in the present study (Cronbach's $\alpha = .94$ at baseline; Cronbach's $\alpha = .93$ at 1-month follow-up). The STAI has been shown to have construct and concurrent validity (Spielberger, 1989).

Statistical analyses

Basic descriptive statistics are presented in Table 1. Due to outliers, a 95% windsorization was performed on the PSS, BDI-II, and STAI-State data at both the baseline and follow-up.¹ Pearson's correlations at both study sessions were calculated to examine the bivariate associations between perceived stress and the other variables of interest. Moderated linear regression analyses were performed to examine stress mindset as a moderator of the relationships of perceived stress and mental health outcomes. First, perceived stress and stress mindset were mean-centered. For each regression model, perceived stress, stress mindset, and a perceived stress X stress mindset interaction term were

Table 1. Descriptive statistics and Pearson correlation coefficients.

Variable	M (SD)	Minimum	Maximum	1	2	3	4	5	6
1. PSS, Baseline	28.84 (6.24)	16	50	–					
2. PSS, Follow-up	27.87 (5.81)	16	56	.48***	–				
3. BDI, Baseline	8.83 (8.79)	0	54	.46***	.38***	–			
4. BDI, Follow-up	7.08 (7.53)	0	49	.36***	.47***	.76***	–		
5. STAI, Baseline	39.95 (11.44)	21	80	.35***	.29***	.61***	.49***	–	
6. STAI, Follow-up	39.81 (11.44)	20	80	.26***	.42***	.46***	.60***	.52***	–
7. SMM-G	1.77 (0.67)	0	3.5	–.11	–.01	–.21***	–.16*	–.20**	–.15*

Note: PSS = Perceived Stress Scale; BDI = Beck Depression Inventory-II; STAI = State-Trait Anxiety Inventory-State. Subscale; SMM-G = Stress Mindset Measure-General. * $p < .05$, ** $p < .01$, *** $p < .001$.

entered as predictor variables, with an individual mental health outcome as the dependent variable. All statistical analyses were performed using IBM SPSS Statistics Version 25 (IBM Corp., 2017).

Results

Perceived stress was positively correlated with both depressive and anxiety symptoms at baseline and one-month follow-up. Bivariate correlations are presented in Table 1.

Depressive symptoms

Stress mindset significantly moderated the relationship between perceived stress and depressive symptoms at both baseline ($p = .026$) and follow-up ($p = .008$; see Table 2). To interpret these findings, simple slopes were tested at 1 SD below the mean, indicating a more stress-is-debilitating mindset, and 1 SD above the mean, indicating a more stress-is-enhancing mindset. Across analyses, there was a consistent pattern in which higher stress was associated with higher mental health concerns, but the risk was greater for those with a stress-is-debilitating mindset (see Figure 1). At baseline, perceived stress increased depression, but more so for those with a stress-is-debilitating ($\beta = .54$, $p < .001$) than stress-is-enhancing mindset ($\beta = .34$, $p < .001$). The same pattern was demonstrated at follow-up (stress-is-debilitating: $\beta = .63$, $p < .001$; stress-is-enhancing: $\beta = .34$, $p < .001$). Stress mindset

Table 2. Moderated linear regression analyses for depressive symptoms and state anxiety at baseline and 1-month follow-up.

Assessment session	Predictor variable	B	95% CI	SE B	β	R^2	ΔR^2
<i>Depressive symptoms</i>							
Baseline	Perceived stress	0.57***	[0.44, 0.70]	0.07	.44		
	Stress mindset	–1.75**	[–2.92, –0.58]	0.59	–.15		
	Perceived stress X stress mindset	–0.20*	[–0.37, –0.02]	0.09	–.11	.25	.01
Follow-up	Perceived stress	0.58***	[0.46, 0.71]	0.07	.48		
	Stress mindset	–1.44**	[–2.47, –0.42]	0.52	–.15		
	Perceived stress X stress mindset	–0.26**	[–0.45, –0.07]	0.10	–.14	.26	.02
Follow-up, controlling for baseline	Baseline depressive symptoms	0.57***	[0.50, 0.64]	0.04	.67		
	Perceived stress	0.27***	[0.17, 0.37]	0.05	.23		
	Stress mindset	–0.44	[–1.18, 0.30]	0.38	–.05		
	Perceived stress X stress mindset	–0.19**	[–0.33, –0.06]	0.07	–.11	.63	.01
<i>State anxiety</i>							
Baseline	Perceived stress	0.60***	[0.40, 0.80]	0.10	.33		
	Stress mindset	–2.49**	[–4.24, –0.74]	0.89	–.15		
	Perceived stress X stress mindset	–0.20	[–0.46, 0.06]	0.13	–.08	.16	.01
Follow-up	Perceived stress	0.90***	[0.67, 1.12]	0.12	.44		
	Stress mindset	–2.33*	[–4.12, –0.53]	0.91	–.14		
	Perceived stress X stress mindset	–0.38*	[–0.72, –0.05]	0.17	–.13	.22	.02
Follow-up, controlling for baseline	Baseline state anxiety	0.41***	[0.30, 0.51]	0.05	.41		
	Perceived stress	0.65***	[0.44, 0.86]	0.11	.32		
	Stress mindset	–1.23	[–2.87, 0.42]	0.84	–.08		
	Perceived stress X stress mindset	–0.33*	[–0.63, –0.03]	0.15	–.11	.36	.01

Note: CI = confidence interval. ΔR^2 indicates the change in R^2 when the perceived stress X stress mindset interaction term was included in the model. * $p < .05$, ** $p < .01$, *** $p < .001$.

remained a significant moderator of the stress and depressive symptom association at follow-up when controlling for baseline depressive symptoms ($p = .006$; stress-is-debilitating: $\beta = .33$, $p < .001$; stress-is-enhancing: $\beta = .12$, $p = .025$).

Anxiety symptoms

Although the interaction term was not significant for baseline anxiety ($p = .123$), a similar trend was seen with a stress-is-debilitating mindset ($\beta = .40$, $p < .001$) predicting greater response to perceived stress than a stress-is-enhancing mindset, ($\beta = .25$, $p = .001$). Significant moderation was found again for anxiety at follow-up ($p = .025$); perceived stress increased anxiety, but more so for those with a stress-is-debilitating ($\beta = .56$, $p < .001$) rather than stress-is-enhancing mindset ($\beta = .31$, $p < .001$). Stress mindset also remained a significant moderator of stress and anxiety at follow-up when controlling for baseline anxiety ($p = .034$; stress-is-debilitating: $\beta = .43$, $p < .001$; stress-is-enhancing: $\beta = .21$, $p = .002$).

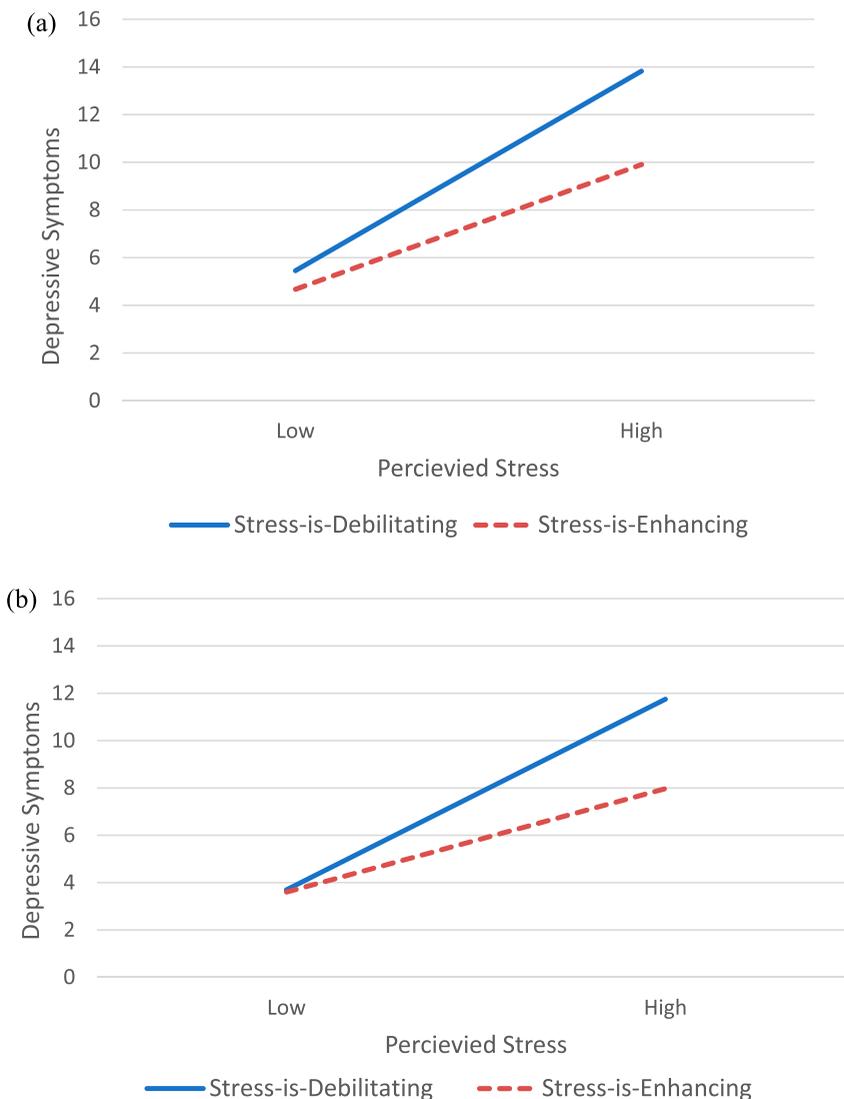


Figure 1. Stress mindset as a moderator of the association between perceived stress and depressive symptoms at (a) baseline and (b) 1-month follow-up.

Discussion

The aim of the present study was to examine the impact of stress mindset on the association between college students' stress and mental health outcomes. Perceived stress was significantly correlated with both depressive and anxiety symptoms at baseline and follow-up. At both baseline and follow-up, having a stress-is-enhancing mindset reduced the impact of perceived stress on the development of depressive symptoms. Furthermore, students with a stress-is-debilitating mindset, at high levels of stress at baseline, were predicted to experience levels of depressive symptoms above the cutoff for mild depression (≥ 13 on the BDI-II). Having a stress-is-enhancing mindset also reduced the impact of perceived stress on anxiety symptoms at follow-up, with a trend towards significance at baseline. Taken together, the results suggest that, even when controlling for baseline mental health symptoms, having a stress-is-enhancing mindset can be protective against the development of depression and anxiety in college students under higher amounts of stress.

To date, there is very little research regarding stress mindset in college settings, let alone its role in the relationship between perceived stress and mental health outcomes. However, the present findings are consistent with previous work with adolescents showing that a stress-is-enhancing mindset can mitigate the negative outcomes associated with stress. Park et al. (2018) found that number of adverse life events across a school year predicted increases in distress, but that the association between adverse life events and distress was stronger for those who had a stress-is-debilitating mindset. Similar to the present findings, Jiang et al. (2019) found that a stress-is-enhancing mindset mitigated the impact of stressful life events on depressive symptoms in younger adolescents. The present results extend these findings to emerging adults and suggest that one's stress mindset contributes to change in both depressive and anxiety symptoms.

The present findings are also compatible with previous work concerning mental toughness, a construct defined as having a psychological edge that helps one better cope with demands and remain determined, focused, confident, and in control under pressure (Jones et al., 2002). In adolescents and emerging adults, mental toughness was shown to mitigate the relationship between perceived stress and depressive symptoms, such that with high mental toughness, fewer depressive symptoms were experienced at high levels of stress (Gerber et al., 2013b). Furthermore, increased mental toughness was associated with decreased depressive symptoms over a 10-month period, despite moderate levels of stress at baseline (Gerber et al., 2013a). Stress mindset refers to one's beliefs about the enhancing or debilitating nature of stress, whereas mental toughness relates more to one's ability to be resilient to stress. The present study extends the mental toughness literature by demonstrating that viewing stress as enhancing – as opposed to solely believing in one's ability to handle stress – can also mitigate the development of depressive, as well as anxiety, symptoms during stressful periods. Future studies should compare mental toughness and stress mindset simultaneously as moderators of the association of perceived stress and depression.

It is possible that stress mindset may interact with other mindsets, such as implicit theories of personality, that impact individuals' responses to stress. After being taught an incremental theory of personality – the belief that people are able to change – adolescents had reduced threat appraisals of social stressors, in addition to improved physiological responses and task performance (Yeager et al., 2016). Given that a stress-is-enhancing mindset has similarly been shown to promote physiological responses in stressful situations, regardless of appraisal (Crum et al., 2017), future research should examine whether stress mindset amplifies the benefits of other adaptive mindsets that emphasize opportunities for growth and change.

Given that a stress-is-enhancing mindset mitigates the development of depressive and anxiety symptoms in college students faced with stress, stress mindset interventions could be a viable resource in the transition to college. Short stress mindset interventions have been effective for inducing a stress-is-enhancing mindset and achieving improvements in health, well-being, and performance (Crum et al., 2013, 2017; Jamieson et al., 2018). Additionally, Goyer et al. (2018) found that a stress-is-enhancing mindset intervention given to students in the summer prior to beginning

college predicted higher positive affect during spring exam periods of their first two years. Nevertheless, more research is needed to assess the long-term effectiveness of stress-mindset interventions in college settings, and their effects on mental health outcomes. Stress mindset appears to be an important factor in the stress response, and having a stress-is-enhancing mindset may be broadly beneficial for emerging adults.

Note

1. The moderated linear regression results did not change when raw data, rather than windsorized data, were analyzed.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This research was supported in part by Colby College Social Sciences Research Grant 01.2239.

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