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General

Growth mindset of anxiety and avoidant coping as mediators of anxiety across the first year of college: A longitudinal survey of college students in the context of the COVID-19 pandemic

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Introduction

The purpose of this study was to evaluate the mediating role of growth mindset of anxiety beliefs and avoidant coping behaviors in predicting changes in anxiety across the first year of college, drawing from a sample of first year students managing the transition to college under the COVID-19 pandemic and associated restrictions (Fall 2020-Fall 2021).

Methods

Self-report online surveys (n=122) were administered to first year students at four timepoints: the beginning (August 2020; T1), and follow up surveys at two months (October 2020; T2), three months (November 2020; T3) and twelve months (August 2021; T4).

Results

Path analysis indicate that growth mindset of anxiety and avoidant coping partially mediate the relationship between baseline anxiety and later anxiety outcomes.

Discussion

These findings have implications for mental health interventions designed to alter health attributions and mindset.

High rates of anxiety among college-age students, coupled with additional stressors experienced by the student population during the first two years of the covid-19 pandemic, point to a need for greater understanding of factors predicting anxiety increase across the first year of college. Two factors that may predict first-year students' anxiety are their mindset about anxiety, and their use of avoidant coping with stress. The purpose of this study is to investigate, using a one-year longitudinal sample, the role of anxiety mindset and avoidance in anxiety symptom change over time.

Originally proposed by Dweck,[1] mindset refers to one's perceptions of the stability/non-changeability or malleability/development of one's attributes or qualities, such as intelligence.[1,2] The belief that these attributes are unchangeable is referred to as fixed mindset, while the belief that they can be changed or developed is referred to growth mindset.[1] The concept of growth mindset was first applied within the domain of intelligence, and has been found to be related to a number of positive outcomes, including resilience following challenge or failure.[3] Students with a growth mindset of intelligence are known to be more persistent when confronted with academic challenges, and more likely to achieve greater success in their academic pursuits.[1] Among college students in China during the COVID-19 pandemic, students with a growth mindset of intelligence were more likely to engage in learning, which then predicted less perceived stress. The authors conclude that students having a growth mindset allowed them to better engage in their learning during the pandemic.[4]

While originally conceptualized within the domain of intelligence, it is now recognized that growth mindset is domain specific; that is, an individual can have growth or fixed mindsets for emotion, intelligence, anxiety, and health, as well as for other domains.[5] Research regarding the growth mindset of anxiety and its relationship to mental health outcomes is emerging, but preliminary studies suggest that its relationship to stress and coping is similar to findings in the domain of intelligence. For example, believing that one can change their own emotions is associated with lower psychological distress and more use of active emotion regulation strategies through cognitive reappraisal.[6] Similarly, growth mindset of anxiety has been found to moderate the relationship between the experience

of stressful life events and coping with such events (Schroder, et al., 2017), such that growth-oriented mindsets buffered the relationship between stressful life events and engaging in substance abuse or non-suicidal self-injury. Conversely, a low growth (or fixed) mindset of anxiety has been found to be predictive of subsequent negative mental health outcomes (Schroder, et al., 2017).[2]

The COVID-19 pandemic has brought a number of significant changes to the lives of college students, including major modifications to class structure and implementation of restrictions to student social life in the 2020-21 academic year.[7] As effective as these strategies were in minimizing the spread of the virus, they may have contributed to the level of stress and anxiety associated with the virus, and may negatively impact the mental health of college students.

High school seniors entering college in fall 2020 are uniquely impacted by the COVID-19 pandemic on both ends of the transition to college: leaving high school and entering college under significant social restrictions such as required distance learning and prohibition of extracurricular and social events (US Census Bureau, 2020). Even in non-pandemic contexts, first-year students' transition to college is considered stressful and disruptive, as evidenced by steep declines in psychological and social well-being across the first two years.[8,9] Thus, it is possible that first year college students may be uniquely vulnerable to the potentially negative mental health effects of limited social interaction and other disruptions to college life as they attempt to navigate their transition to college under circumstances of the COVID-19 pandemic. In support of this view, one study found levels of anxiety and moderate to severe depression to increase significantly in first-year college students from before the pandemic to a few months after the beginning of the pandemic.[10]

The literature surrounding the concept of growth mindset of anxiety suggests that an individual's attributions of emotion play a role in how the individual interprets and responds to emotional and health challenges. Consistent with this theory, believing that anxiety is fixed would orient individuals toward more avoidant coping strategies when facing a stressor such as the COVID-19 pandemic environment. Believing in a fixed mindset is theoretically associated with increased helplessness and avoidance,[11] which would be consistent with avoidant coping styles of stress management.

To our knowledge, the relationship among mindset, coping, and anxiety has not been explored longitudinally among first-year college students adjusting to the COVID-19 pandemic and associated college environment restrictions. The present study examined anxiety mindset and avoidant coping with the pandemic as mediators of mental health outcomes during the transition to college during the COVID-19 pandemic in a sample of first-year college students. Self-report online surveys were administered at four timepoints: the beginning of the Fall 2020 semester (T1), and one, three, and twelve month follow ups (T2, T3, T4) in a small residential college. Based upon previous literature, we hypothesize a serial mediation model (Figure 1) of anxiety change, in which endorsement of a growth mindset and the use of avoidant coping strategies mediate the relationship between baseline anxiety and later anxiety outcomes. In this model, it is expected that low endorsement of growth mindset of anxiety beliefs will predict higher ussage of avoidant coipng strategies to cope with the COVID-19 stressor. Together, growth mindset and avoidant coping are expected to mediate the relationship between baseline anxiety and anxiety scores 3 and 12 months later.

METHOD

PARTICIPANTS

Participants of this longitudinal study were incoming first year undergraduates (age 18 and older) at a small liberal arts college in the fall semester of 2020. During Fall 2020, students were mostly living residentially on campus (85.2%), with the remainder of students living at home or elsewhere and attended classes remotely due to COVID-19 for the fall 2020 semester. All participants lived on campus during the fall semester of 2021 due to the university's decision to hold only in-person learning. The majority of participants were White (68.9%) and female (72.1%). Participant characteristics are summarized in Table 1.

PROCEDURE

All procedures received University IRB approval (FA20#1) prior to the start of study recruitment. Participants were recruited through introductory psychology courses, posted flyers on campus, and community announcements. Participants were asked to complete four waves of surveys through the online platform Qualtrics. The first survey was completed at the beginning of the fall semester (Time 1, August 2020), the second survey at midterm (Time 2, October 2020), the third survey at the end of the semester (Time 3, November 2020), and the fourth survey at the beginning of the following fall semester (Time 4, September 2021). Participants provided electronic informed consent before the completion of each survey. Participants received a $5 gift card for participating in survey 1, 2, and 3, and $10 for survey 4 (introductory psychology students could elect to receive either the gift card or research participation credits). All survey information was collected through Qualtrics online survey platform using ID numbers to confidentially link survey responses across time.

MEASURES

GROWTH MINDSET OF ANXIETY

Anxiety mindset was measured with the Implicit Theories of Anxiety Scale,[12] a four-item scale with demonstrated reliability and validity (α=.93) which assesses statements reflecting a fixed mindset (e.g., "To be honest, you cannot really change how anxious you are"). All items are reverse scored so that higher scores represent stronger growth mindset of anxiety.

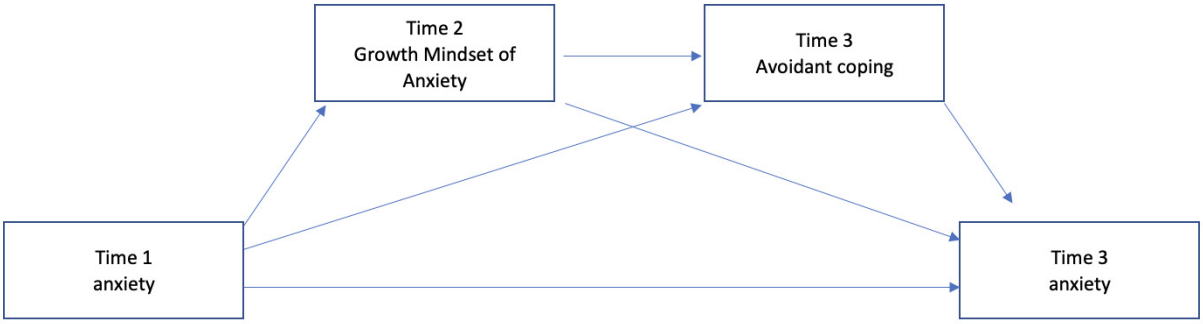

Figure 1. Hypothesized mediation model of anxiety, mindset, and coping.

Table 1

Participant Characteristics

Variables		N	%
Gender			
	Female	88	72.1
	Male	31	25.4
	Other	3	2.4
Race/ethnicity			
	Asian	25	20.5
	Black/African American	9	7.4
	Latinx, Hispanic, or Spanish Origin	11	9
	White	84	68.9
	Other response	6	4.9
Federal Pell Grant Eligible			
	yes	28	23
	no	65	53.3
	I don't know	28	23
	prefer not to answer	1	0.8
Fall 2020 Residence			
	On campus	104	
	At home	17	
	other	1	

Note. Characteristics of all students completing Time 1 survey (n=122) in August 2020.

PSYCHOLOGICAL COPING

Students' coping behavior related to the COVID-19 pandemic was assessed using the Brief COPE.[13] This validated scale assesses how much participants have used 28 coping strategies to manage a specified stressor (in this case, the COVID-19 pandemic). Engaged and avoidant coping scales were derived from original Brief COPE survey items. The two factors of engagement and avoidance were predetermined through theoretical grouping based on cognitive-behavioral principles of avoidant behavior (e.g., distraction, use of substances) versus active engagement in emotional or problem focused coping behaviors (e.g, seeking social support, reframing, working to improve situation). Following theoretical grouping, an exploratory factor analysis was conducted to evaluate factor loadings (maximum likelihood method, direct oblimin rotation, 2-factor model specified). Theoretical and factor analysis groupings of variables were closely aligned (see supplemental table 1 for factor loadings), resulting in good internal consistence for the engaged coping scale (α=.85) and the avoidant coping scale (α=.82).

ANXIETY

The Generalized Anxiety Disorder scale (GAD-7[14]) is a well-validated measure of symptoms of generalized anxiety disorder (α=.91). Participants rate the frequency of the experience of 7 GAD symptoms over the last two weeks (e.g., "being so restless that it's hard to sit still").

DATA ANALYTIC STRATEGY

Patterns of missing data for the MCAR mechanism were determined by Little's (1988) omnibus MCAR test. Using all 4 waves of data, all variables were placed in the MCAR test in SPSS. Results of Little's MCAR test were not significant [$X^2(2495)=1689.96$, $p = 1.00$], suggesting that the data are missing completely at random. Conservatively, nonparametric missing value imputation using Random Forest was conducted to treat missing data using the R package missForest.[15]

To conduct path analysis and mediation testing, IBM SPSS Version 26.0 its plug-in PROCESS macro version 3.5.3 were used for analysis. First, descriptive statistics and bivariate correlations were conducted for all study variables. Second, assumptions of linearity, homoscedasticity, and normality of estimation error were assessed using visual inspection of residual plots in SPSS. Identification of multivariate outliers was determined by calculating Mahalanobis distances on the residuals (Newton & Rudestam, 2012). The assumption of the absence of multicollinearity was evaluated using the criteria of VIF <5 and bivariate correlation <.8.

Finally, the serial mediating role of growth mindset of anxiety and avoidant coping in the change in anxiety symptoms over time was tested using Model 6 of the plug-in PROCESS macro in SPSS developed by Hayes.[16] Following

Table 2

Descriptive Statistics

Variables		n	*M*	*SD*	Scale range	α
Time 1		122				
	Mindset		3.40	1.40	1--6	0.9
	Anxiety		7.6	5.74	0-21	0.9
Time 2						
	Avoidant coping		1.93	0.46	1--4	0.9
	Mindset		3.47	1.15		
	Anxiety		8.43	4.81		
Time 3						
	Anxiety		9.4	4.82		
	Avoidant coping		1.96	0.49		
Time 4						
	Anxiety		7.88	4.75		
	avoidant coping		1.94	0.48		

Avoidant coping subscale derived from the Brief COPE (Carver, 1997). Anxiety = GAD-7 Spitzer et al, 2006); Mindset = Implicit Theories of Anxiety (Schroder et al, 2014) Time 1 = August; Time 2 = October; Time 3 = November 2020; Time 4 = September 2021.

the suggested analysis process of Hayes (2013) for serial mediation, the significance of the total indirect and direct effects, as well as the unique indirect effect of each hypothesized mediator, is tested with a bootstrap method in the sampling process. When the upper and lower limits of the 95% confidence interval do not contain 0, paths are interpreted as statistically significant. For all models, percentile confidence intervals (95%) were constructed using 10,000 bootstrap samples.

The model was run with Time 1 anxiety symptoms as predictor, Time 2 growth mindset of anxiety and Time 3 avoidant coping as the mediators, and Time 3 anxiety as the outcome. The model was repeated with Time 4 coping as mediator and Time 4 anxiety as the outcome.

RESULTS

Descriptive statistics for all key variables are provided in Table 2. Anxiety scores were highest in Time 3 (the end of fall semester), followed by Time 2 (middle of semester), and lowest at the beginning of the fall semester in both 2020 and 2021.

Bivariate correlations were explored in all key variables across the four time points (Table 3). As expected, anxiety at all time points was significantly positively correlated with avoidant coping and significantly negatively associated with growth mindset of anxiety.

A hierarchical linear regression analysis was conducted on Anxiety (T3), with demographic variables entered first, followed by hypothesized predictor and mediator variables: Anxiety (T1), Anxiety Mindset (T2), and Avoidant coping (T3). A separate regression analysis was conducted with Anxiety at T4 as the outcome (Table 4). In both regression models, Anxiety, Mindset, and Avoidance contributed significantly to the model after accounting for race/ethnicity and gender. Female gender contributed to the model predicting Time 4 anxiety, but no other demographic variables were significant.

MEDIATION ANALYSES

Results of each mediation model are presented for anxiety outcomes at Time 3 (Table 5 & Figure 1) and Time 4 (Table 5 and Figure 2).

MINDSET AND AVOIDANCE AS MEDIATORS OF ANXIETY

Anxiety growth mindset and avoidant coping partially mediated the relationship between T1 and T3 anxiety [total indirect effect β = .26, SE =.06 , 95% CI (.15, .37)], such that T1 anxiety was negatively associated with endorsing a growth mindset of anxiety at T2, which was negatively related to avoidant coping behaviors at T3 (β=-.14, p <.01), and both growth mindset and avoidance were related to anxiety at T3 (Figure 2). A significant direct effect for T1 anxiety on T3 anxiety remained after accounting for indirect effects of mindset and avoidance [total direct effect β = .27, SE =.06 ,

Table 3

Bivariate Correlations

	Variables	1	2	3	4	5	6	7	8
1	anxiety (T1)	--							
2	mindset (T1)	-.59***	--						
Time 2									
3	anxiety (T2)	.72***	-.56***	--					
4	mindset (T2)	-.55***	.57***	-.72***	--				
5	avoidant coping (T2)	.53***	-.31***	.69***	-.53***	--			
Time 3									
6	anxiety (T3)	.56***	-.45***	.71***	-.56***	.52**	--		
7	avoidant coping (T3)	.28**	-0.2	.39***	-.32***	.53**	.57***	--	
Time 4									
8	anxiety (T4)	.56***	-.46***	.64***	-.55***	.44**	.59***	.20*	--
9	avoidant coping (T4)	.53***	-.30***	.60***	-.56***	.69**	.50***	.45***	.56***

Note. * $p < .05$; ** $p < .01$; *** $p < .001$

Table 4

Regression Model of Coping and Growth Mindset of Anxiety as Mediators of Anxiety Change Over Time

		Goodness of fit		Significance			
Outcome	Predictor	R^2	F	B	SE	β	t
Anxiety (Time 3)		0.6	20.91 ***				
	Asian			-1.02	1.29	-0.08	-0.79
	Black			0.49	1.50	0.03	0.32
	Latinx			-0.16	1.11	-0.01	-0.14
	White			1.66	1.22	0.15	1.37
	Female			0.51	0.71	0.05	0.72
	Anxiety (Time 1)			0.25	0.06	0.28	3.80 ***
	Growth Mindset of Anxiety (Time 2)			-1.03	0.33	-0.24	-3.11 **
	Avoidant Coping (Time 3)			4.13	0.66	0.40	6.30 ***
Anxiety (Time 4)		0.52	14.92***				
	Asian			0.15	1.42	0.01	0.10
	Black			2.28	1.65	0.12	1.38
	Latinx			0.47	1.22	0.03	0.39
	White			2.09	1.34	0.19	1.56
	Female			1.95	0.78	0.18	2.52 *
	Anxiety (Time 1)			0.21	0.07	0.24	2.80 **
	Growth Mindset of Anxiety (Time 2)			-0.85	0.38	-0.19	-2.23 *
	Avoidant Coping (Time 4)			2.94	0.89	0.28	3.31 ***

95% CI (.14, .40)], suggesting a partial mediation effect. See Figure 2 and Table 5

The model was repeated for avoidance and anxiety measures at T4. Anxiety growth mindset and avoidant coping partially mediated the relationship between T1 and T3 anxiety [indirect effect β = .28, SE =.05 , 95% CI (.18, .38)], such that T1 anxiety was negatively associated with endorsing a growth mindset of anxiety at T2, which was negatively related to avoidant coping behaviors at T4, and both growth mindset and avoidance were related to anxiety at T4. A significant direct effect for T1 anxiety on T4 anxiety remained after accounting for indirect effects of mindset and avoidance, suggesting a partial mediation effect [total direct effect β = ..24, SE =.08 , 95% CI (.09, .40)],

Table 5
Bootstrap Analysis of Mediation Effects

Outcome	Predictor	Effect size	SE	95% CI Lower limit	95% CI Upper limit
Anxiety Time 3	total effects*	0.493	0.066	0.362	0.624
	direct effects*	0.268	0.066	0.128	0.398
	total indirect effects*	0.257	0.055	0.15	0.367
	anxiety(T1)-growth mindset(T2)—anxiety(T3)*	0.146	0.049	0.065	0.257
	anxiety(T1)-avoidant coping(T3)-anxiety(T3)	0.059	0.036	-0.02	0.126
	anxiety(T1)-growth mindset(T2)—avoidant coping(T3)-anxiety(T3)*	0.052	0.026	0.003	0.107
Anxiety Time 4					
	total effects*	0.488	0.066	0.357	0.62
	direct effects*	0.244	0.076	0.093	0.395
	total indirect effects*	0.279	0.053	0.175	0.384
	anxiety(T1)-growth mindset(T2)–anxiety(T4)*	0.136	0.054	0.04	0.251
	anxiety(T1)-avoidant coping(T4)-anxiety(T4)*	0.085	0.041	0.012	0.17
	anxiety(T1)-growth mindset(T2)–avoidant coping(T4)-anxiety(T4)*	0.058	0.028	0.01	0.121

Bootstrap analyses based on 10,000 samples
*Confidence interval does not include zero

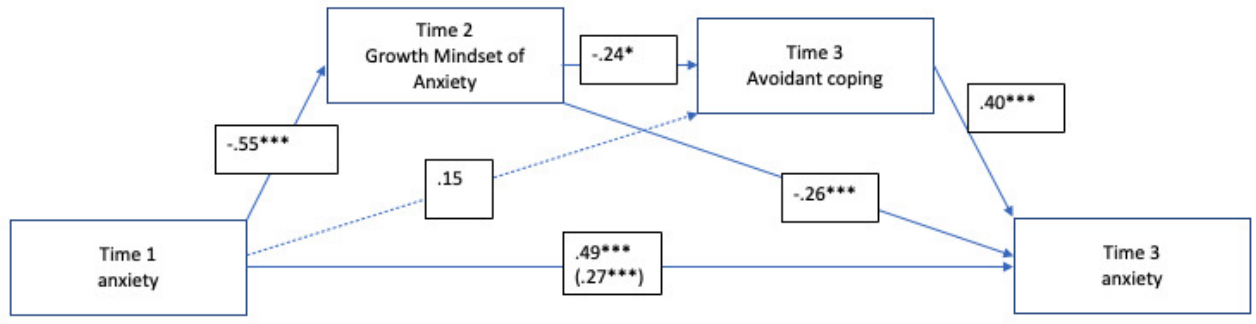

Figure 2. Mediation model outcomes for Time 3 Anxiety.

DISCUSSION

The purpose of this study was to evaluate the role of growth mindset of anxiety and avoidant coping in mediating the relationship in anxiety change over time for first year students managing the transition to college under the COVID-19 pandemic and associated restrictions. It was hypothesized that growth mindset and avoidant coping would mediate the relationship between baseline and outcome anxiety scores. A partial mediation effect was found for change in anxiety at 3 months and 12 months after the baseline anxiety measure.

In the current study, the belief that anxiety is malleable is associated with less usage of avoidant coping strategies for dealing with COVID-19 stress, which in turn is associated with lower anxiety directly as well as less avoidance coping behavior. This finding partially reinforces a core tenet of attributional theories surrounding emotion beliefs, including growth mindset theory, which suggests that helplessness or avoidance is a more likely response when one holds a fixed mindset.[11] In the case of emotions, research is beginning to converge around the finding that emotional malleability beliefs are related to positive mental health outcomes as well as effective, active emotion regulation strategies. For example, in a recent study of college students navigating the transition to undergraduate life (not during the COVID pandemic), active cognitive reappraisal was found to link early semester emotion malleability beliefs (or growth mindset) to end of semester depression.[17]

Evidence for a role for avoidant coping in this relationship has been found in some other health domains. For example, in men recently diagnosed with HIV, avoidant coping mediated a relationship between self-efficacy for HIV

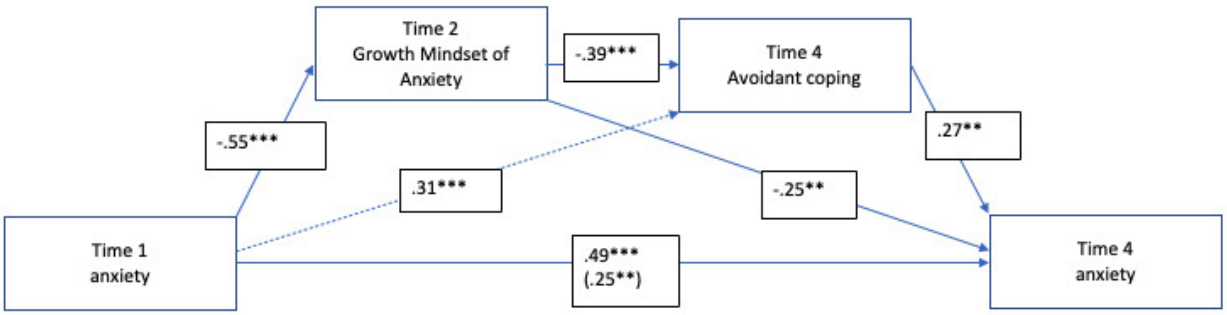

Figure 3. Mediation model outcomes for Time 4 Anxiety.

disclosure and depressive symptoms.[18] Similarly, avoidant coping was found to mediate the relationship between fathers' involvement in their child's Type I diabetes management and fathers' parenting stress.[19] Within college students, the first two years of college are associated with increased avoidant coping usage relative to pre-college and the latter two years of college,[9] suggesting an area for potential intervention strategies in improving student mental health during the transition to college.

Our data may have important implications for health initiatives on college campuses. Because growth mindset was found to be related to less avoidant coping strategies and with healthier mental health outcomes, efforts to educate students about the health benefits of growth mindset of anxiety, and training efforts aimed at cultivating growth mindset in students who may have a low growth mindset (or a fixed mindset) about emotions may be a useful strategy for students to cope with some of the academic and social stressors that students face during college, not only during the COVID-19 pandemic, but afterwards, as well.

Our study was not without limitations. In addition to a relatively small sample size, more women than men participated in the study. Clearly, a more gender-balanced sample would have been ideal. In addition, because two-thirds of our sample was White, we did not have an ideal distribution of racial/ethnic diversity in the study. Finally, as medical history questions were not included, we not have a full context of our participants' health situation to assess how, specifically, COVID-19 was differentially impacting the stress and wellbeing of the students in the sample.

Two important future directions should be explored as a result of these findings. First, large-scale prospective survey studies should be conducted to further explicate the relationship of growth mindset of anxiety to varied coping strategies, including emotion regulation and problem-focused coping, within and outside of the COVID-19 stress context. Second, experimental manipulation of mindset should be explored in this domain, to determine optimal ways for growth mindset of anxiety to be fostered through intervention, and whether its fostering can lead to positive coping and mental health outcomes. Research in the domain of growth mindset of intelligence suggests that educational intervention and positive outcomes are possible in the domain of growth mindset of intelligence (see Yeager & Dweck[11] for review), but intervention to induce growth mindset of emotion has not been widely explored. A related, yet distinct, framework for thinking about mindset and emotional health is the role of Stress Mindset Theory,[20] which proposes that students may hold beliefs about stress that roughly endorse a "stress is enhancing" or "stress is debilitating" mindset.

CONCLUSIONS

Growth mindset and avoidant coping were assessed in a sample of first-year college students during the COVID-19 pandemic. Evidence for a mediating role of growth mindset and avoidant coping in explaining change in anxiety symptoms over time was found. The data suggest that there may be important implications for training programs and interventions that might result in more adaptive coping strategies and in healthier mental health outcomes in college students.

CONFLICTS OF INTEREST

The authors declare they have no competing interests to report.

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