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Growth mindsets of anxiety: Do the benefits to individual flourishing come with societal costs?

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Abstract

Believing anxiety can change is a predictor of wellbeing, in part, because such beliefs—known as growth mindsets—predict weaker threat appraisals, which in turn improves psychological functioning. However, feeling a sense of personal threat facilitates social activism, and thus growth mindsets may undermine such action. Across six studies (N=1761), including cross-sectional and experimental approaches (3 pre-registered), growth mindsets predict flourishing, including wellbeing, resilience, and grit. We find that growth mindsets indirectly predict reduced activism against social threats through reduced threat appraisals, which are critical motivators of activism. The total effect linking growth mindsets to activism was not robust. Overall, Bayesian meta-analytic summary effects reveal that growth mindsets of anxiety are critical components of psychological flourishing, broadly defined. Mindsets are also consistently linked to weakened threat appraisals across a variety of social threats from gun violence to natural disasters. Although helpful for resilience, these dampened threat appraisals impair social action.

Keywords: mindsets; anxiety; wellbeing; flourishing; activism; threat appraisal

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Believing that anxiety is manageable, also known as holding a growth mindset, can help individuals cope more effectively with adversity (Burnette et al., 2020). This link is driven, in part, because growth mindsets inform threat appraisals, defined as beliefs that one can handle the stressor, that stress can be adaptive, and that arousal can be a learning tool (Crum et al., 2017; Seo et al., 2020). Yet, this very cognitive reframing that helps to protect individuals with growth mindsets from psychological distress might undermine motivation to act against social threats. Although anxiety growth mindsets offer wellbeing benefits to the self, they might also come with social costs. In order to fully harness the potential benefits of growth mindsets of anxiety, we must understand their psychological benefits as well as investigate potential limitations. The primary goal of the current work is twofold: to explore more fully the link between anxiety mindsets and individual flourishing, and to test the idea that growth mindsets might be associated with social costs in the form of decreased social activism via weakened threat appraisals.

Mindset Theory

People's intuitive beliefs regarding the malleability of personal attributes, from intelligence to weight, impact how they construe their social world. These mindsets range from believing traits are malleable (i.e., growth mindset) to believing they are unchanging (i.e., fixed mindset; Dweck, 1986). Although the majority of early work focused on mindsets of intelligence and academic achievement, mindset theory is now used to understand a range of traits, abilities, and outcomes (Zedelius et al., 2017). Mindsets are particularly important for guiding responses to challenging situations, with growth mindsets promoting beneficial self-regulatory strategies that increase chances of success (Burnette et al., 2013).

Growth mindsets also help individuals cope with mental health challenges. For example, growth, relative to fixed, mindsets of emotions promot more adaptive emotion regulation strategies, with important implications for socioemotional functioning and mental health (e.g., Tamir et al., 2007). Two meta-analyses report moderately strong links between growth mindsets and reduced psychological distress (Schleider et al., 2015; Burnette et al., 2020). There is also a robust link between mindsets of anxiety and greater overall wellbeing (Schroder et al., 2015, 2017, 2019). Furthermore, growth mindsets of people buffer against adverse psychological responses to stressful life events, in part, via weaker threat appraisals (Seo et al., 2020).

Mindsets & Psychological Flourishing

In the current work, we first seek to replicate the positive association between growth mindsets of anxiety and psychological wellbeing, and to extend this to other aspects of psychological flourishing. We focus on resilience (the ability to bounce back from adversity; Smith et al., 2008) and grit (perseverance towards long-term goals; Duckworth et al., 2007). Related empirical findings suggest that growth mindsets of anxiety will predict both of these outcomes. For example, growth mindsets predict greater tenacity in the face of setbacks, with those who hold growth mindsets seeing challenges as opportunities to develop higher resilience (Dweck & Yeager, 2019). Additionally, growth mindsets are linked to perseverance in goal pursuits, despite obstacles, which is the definition of grit. Growth mindsets, resilience, and grit are closely linked both theoretically and empirically. They are also critical predictors of adaptive regulatory strategies, academic success, and wellbeing (Kannangara et al., 2018). In this work, our primary focus is on the association between anxiety mindsets and wellbeing, resilience, and grit, but we also report links with other related dispositional constructs, including trait anxiety

and emotional stability. Overall, we seek to replicate links between growth mindsets and psychological flourishing and to provide a test of the robustness of these relations.

Mindsets, Threat Appraisals, and Social Activism

Additionally, we recognize that to harness growth mindsets for flourishing, we must also examine potential downsides. Indeed, the very mechanisms that help individuals with growth mindsets flourish may undermine motivation to act to reduce social threats. There is expanding evidence that growth mindsets predict reduced internalizing symptoms such as anxiety, in large part, because they help to mitigate the view that stressful life events are personally threatening, called threat appraisals (Seo et al., 2020). Similar cognitive processes include 'stress as enhancing' mindsets, arousal reappraisals, and offset efficacy. The first two cognitive processes are beliefs that stress and arousal are adaptive, whereas offset efficacy is confidence to handle the stressor. All of these types of reframing cognitions can buffer against the psychological consequences of stressful life events and are directly tied to wellbeing and mental health (Crum et al., 2017; Jamieson et al., 2017; Seo et al., 2021).

Critically, growth mindsets can be harnessed to foster such cognitive appraisals, with much of this work focusing specifically on decreasing threat appraisals, defined as evaluating the stressor as less ominous, less threatening to the self, and less anxiety producing (Yeager et al., 2021). For example, research on both emotion and anxiety mindsets shows that growth mindsets promote more adaptive emotion regulation strategies (De Castella et al., 2013; Kneeland et al., 2016). One such strategy, cognitive reappraisal, involves changing the way one thinks about situations in order to reduce uncomfortable emotions. This strategy is associated with many markers of psychological wellbeing—from closer relationships with friends, to fewer depressive symptoms, to greater satisfaction with life (Gross & John, 2003). Overall, growth mindsets set up

the meaning assigned to stressful life events, and if such experiences can change (i.e., anxiety), then the event becomes less about one's core identity and more about an opportunity to learn and develop. In contrast, for individuals more oriented toward a fixed mindset, stressors and anxiety are less about an experience (e.g., I am experiencing stress) and more about an identity (e.g., I am an anxious person; Dweck, 2016). These threat appraisals are cornerstones of wellbeing.

However, in the context of social activism, rendering social threats as less stressful and/or anxiety-producing might also weaken the impetus to engage in activism to decrease such threats. Indeed, a rich literature demonstrates that stress and anxiety both serve as a warning system to act (Schwarz & Clore, 2007), can cue goals to reduce uncertainty (Frijda et al., 1989), and play a central role in triggering action (Brader et al., 2008; Marcus et al., 2000). Perceiving threat and the accompanying distress are stronger motivators of activism than opportunity (Miller & Krosnick, 2004) or ideology (Baldassare & Katz, 1992). Overall, growth mindsets of anxiety lead individuals to alter how they think about social threats and these reappraisals, which dampen stress and anxiety, could serve to undermine motivation to act to reduce the threats.

Mindsets, Political Orientation, and Social Activism

In examining the relationship between growth mindsets, threat appraisals, and social activism, political ideology must be considered as such beliefs are adopted in part to satisfy epistemic and existential motivations to manage uncertainty and threat (Jost et al., 2003). Research shows that the conservative, relative to liberal, belief system is more strongly related to motivations to psychologically manage fear and uncertainty (Jost et al., 2003; Jost et al., 2017). Additionally, research demonstrates that growth mindsets are negatively linked to conservatism and that mindset manipulations are less effective for those for whom the mindset served a motivational function—namely, conservatives (Hoyt et al., 2018). Thus, in examining growth

mindsets and threat appraisals, we carefully considered which social actions to investigate in conjunction with political ideology. First, we examined gun violence because we sought one social issue that is of concern to Americans widely (e.g., gun violence, McCarthy, 2019). In Studies 1-2, we chose one issue that is of more concern to liberals (e.g., global warming; Jost et al., 2017), and thus we brought in a third social issue that is of greater concern to conservatives in Studies 3-5, illegal immigration (Jost et al., 2017). In the final study, we sought to replicate the key findings and to examine the generalizability of these predictions in the context of two new social threats that are not strongly politicized (Jost et al., 2017): natural disasters and organized crime. Overall, we expect political ideology to be a critical correlate of both threat appraisals and social action, and thus a potential important covariate in the current work[1].

The Current Research

First, we suggest that believing anxiety is manageable is a precursor to psychological adjustment. Second, we also investigate a potential drawback to growth mindsets of anxiety by exploring if they relate negatively to intentions to engage in activism via the very mechanism that links them to wellbeing—namely, threat appraisals. We also explore if the link between mindsets and reduced social activism through reduced threat appraisals is robust to covarying out other potential predictors of activism including participants' ideology, dispositional trait anxiety, and personality traits. We further test our flourishing predictions by examining the link between anxiety mindsets and trait anxiety and the personality trait of emotional stability and by offering an overall Bayesian analysis of these links across studies.

Studies 1-3 are exploratory and not pre-registered. Studies 4-6 are pre-registered studies that seek to replicate the primary findings in Studies 1-3. All studies were approved by the

[1] Analyses with political orientation as the focal point can be found in Online Supplemental Materials.

University of Richmond Institutional Review Board for the Protection of Human Subjects of Research (URIRB 191107 and URIRB 201205). We synthesize results by presenting meta-analytic summary effects across the studies for links between mindsets and critical outcomes related to flourishing, threat appraisals, and activism. We report these average effects in concert with Bayes factors, which provide a continuous measure of confidence in the relative plausibility of the research hypothesis vs. the null hypothesis of no effect.

Study 1 Methods

Participants

Our data and materials, including Supplemental Materials, are available on the Open Science Framework (OSF; https://osf.io/xa8ud/?view_only=77e43e81866349538fa3bd904b0dc33c). In this study, we solicited U.S. participants via CloudResearch for research on mindsets and resilience (Litman & Abberbock, 2017). Seeking a minimum sample to have adequate power to detect medium moderation effects (power=.95, n=119), we solicited 200 participants in January 2020. Two-hundred and two participants completed the study (M_{age}=35.84 years, range=22– 68; 75 women, 123 men, and 4 other/no response; 6% Asian/Pacific Islander, 18.5% Black, 18% Latinx, 4% multiracial/other, 2.5% Native American, 69% white)[2].

Procedure

After consenting, participants responded to a measure of anxiety mindsets, then measures of psychological wellbeing, resilience, and grit, followed by measures of activism intentions and finally measures of political ideology and other demographics[3]. Participants indicated their

[2] N varies slightly across analyses due to missing data.
[3] We included an attention check in studies 1-2. Results are similar after excluding those who failed it thus, we retain all participants. Across studies we retained the data from all participants who completed the study.

activism intentions on two social issues: gun violence and global warming. We assessed other measures not directly relevant to the primary research questions, including person mindsets and perceived response efficacy and self-efficacy related to the social issues. All measures as well as exploratory analyses for efficacy measures are in Supplemental Materials.

Measures

Participants responded to items using a 7-point scale from *strongly disagree* to *strongly agree* unless noted otherwise (see Table 1 for reliabilities).

Mindsets of Anxiety. We used the established 4-item measure (Schroder et al., 2015) to assess mindsets regarding the malleability of anxiety (e.g., "You have a certain amount of anxiety and you really cannot do much to change it"). Higher scores indicate a stronger growth mindset.

Psychological Wellbeing. Participants responded to an 18-item measure of psychological wellbeing (Ryff & Keyes, 1995) that assessed six aspects of wellbeing, including autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, and self-acceptance (e.g., "I like most parts of my personality," and, "In general, I feel I am in charge of the situation in which I live"). Higher scores reflect greater wellbeing.

Psychological Resilience. We assessed participants' ability to recover from stress with the 6-item Brief Resilience Scale (Smith et al., 2008; i.e., "I tend to bounce back quickly after hard times"). Higher scores reflect more resiliency.

Grit. We assessed participants' perseverance and passion for long-term goals with the eight-item Short Grit Scale (Duckworth & Quinn, 2009; e.g., "Setbacks don't discourage me"). Higher scores reflect greater grit.

Activism Intentions. Participants indicated how likely they were to engage in actions to address social issues on 5-item scales for both gun violence (GV) and global warming (GW). The items were modified from van Zomeren et al. (2004) and Corning and Myers (2002). Higher scores reflect greater activism intentions (e.g., "I would participate in raising our collective voice for gun violence/global warming reform" and "I would attend an information meeting of a political group discussing gun violence/global warming"). We computed separate scales and one combined activism intention scale—we focus on the combined assessment. Higher scores represent greater activism intentions.

Political Ideology. Using a 7-point scale (*strongly liberal* to *strongly conservative*), people indicated their political identity on social issues and economic issues and indicated their political party affiliation on a 7-point scale (*strong democrat* to *strong republican*). Higher scores represent more conservative ideologies.

Study 1 Results

See Table 1 for scale correlations and reliabilities along the diagonal (see online Supplemental Table 1 for issue-specific subscales). Across studies, the Cronbach's alphas reveal that our scales are reliable. To interpret the descriptive statistics, all scales have a minimum value of 1 and maximum value of 7, with a midpoint of 4. In this study, growth mindsets, wellbeing, resilience, grit, and activism intentions are above the midpoint of the scales. Political ideology is below the midpoint, revealing an overall slightly liberal sample.

We began by testing if growth mindsets are positively linked to wellbeing and found that stronger beliefs in the malleability of anxiety correlated positively with psychological wellbeing, resilience, and grit. Next, we tested and supported our prediction that growth mindsets of anxiety correlate negatively with activism intent. A partial correlation revealed that the link between

growth mindsets and activism holds when controlling for political ideology ($r(195) = -.42$, $p<.001$).

Table 1

Scale Means, Standard Deviations, and Intercorrelations.

DV	**M**	**SD**	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Study 1									
1. Growth Mindsets	4.38	1.81	.97						
2. Wellbeing	4.70	.84	.44**	.83					
3. Resilience	4.44	1.38	.28**	.64**	.88				
4. Grit	4.52	1.04	.46**	.59**	.67**	.80			
5. Activism Intentions	4.21	1.64	-.37**	-.07	-.05	-.14^	.96		
6. Political Ideology	3.86	1.86	-.41**	-.21*	-.06	-.08	-.05	.96	
Study 2	M	SD	1	2	3	4	5	6	7
1. Experimental Cond	--	--							
2. Growth Mindsets	3.65	1.89	.27**	.97					
3. Wellbeing	4.62	.83	-.02	.42**	.84				
4. Resilience	4.32	1.20	-.02	.27**	.71**	.78			
5. Grit	4.36	1.00	.03	.27**	.71**	.71**	.79		
6. Activism Intentions	4.70	1.59	.04	-.48**	-.17*	-.14^	-.14^	.96	
7. Political Ideology	4.24	1.82	.09	-.34**	-.21**	-.12^	-.10	.14^	.93
Study 3	M	SD	1	2	3	4	5	6	7
1. Growth Mindsets	3.50	1.82	.95						
2. Threat Appraisals	4.99	1.18	-.61**	.81					
3. Activism Intentions	4.82	1.48	-.64**	.72**	.96				
4. Political Ideology	4.43	1.80	-.46**	.35**	.28**	.94			
Study 4	M	SD	1	2	3	4	5	6	7
1. Growth Mindsets	4.98	1.51	.98						
2. Wellbeing	5.12	.92	.49**	.90					
3. Resilience	4.72	1.44	.40**	.71**	.94				
4. Grit	4.83	1.12	.37**	.74**	.66**	.88			
5. Threat Appraisals	4.08	1.08	-.18**	-.19**	-.21**	-.13^	.83		
6. Activism Intentions	3.71	1.56	.01	-.01	-.03	-.05	.44**	.95	
7. Political Ideology	3.25	1.76	-.04	.06	.07	.12*	-.23**	-.53**	.91
Study 5	M	SD	1	2	3	4	5	6	7
1. Growth Mindsets	4.41	1.56	.95						
2. Wellbeing	4.81	.80	.51**	.85					
3. Resilience	4.24	1.34	.37**	.61**	.92				
4. Grit	4.06	1.03	.34**	.57**	.61**	.84			
5. Threat Appraisals	4.03	1.02	-.17*	-.11	-.19**	-.08	.83		
6. Activism Intentions	4.10	1.38	-.01	.02	-.09	-.04	.47**	.94	
7. Political Ideology	2.77	1.53	.05	.17*	.20**	.23**	-.32**	-.46**	.89
Study 6	M	SD	1	2	3	4	5	6	7
1. Growth Mindsets	4.36	1.68	.95						
2. Wellbeing	4.82	.85	.45**	.85					
3. Resilience	4.24	1.41	.52**	.65**	.92				
4. Grit	4.23	1.08	.44**	.66**	.60**	.84			
5. Threat Appraisals	4.43	1.47	-.17*	.01	-.10	.03	.83		

6.	Activism Intentions	3.95	1.44	.05	.08	.11	.15^	.50**	.98	
7.	Political Ideology	3.86	1.80	.07	.13*	.17*	.28**	-.07	-.25**	.90

Note: Experimental Condition (fixed=0, growth=1); Scale reliabilities along the diagonal (Cronbach's alphas or correlations for 2-item measures).
^ = p <.05; * = $p \leq$.01; ** = $p \leq$.001.

Study 2

Our next goal was to replicate the effect of growth mindset on flourishing and activism intentions using an experimental paradigm designed to temporarily manipulate anxiety mindsets.

Study 2 Methods

Participants

We sought adequate power to detect the effects of experimental condition on mindsets and activism[4], with regression coefficients of .26 and bias-corrected bootstrap tests (power=.80, n=296, Fritz & MacKinnon, 2007). Three-hundred and one U.S. participants solicited from CloudResearch to participant in research on mindsets and resilience in February 2020 completed the study (M_{age}=36.21 years, range=18– 74; 134 women, 164 men, and 3 other or did not respond; 3.4% Native American, 8.7% Asian, 26.2% Black, 56% white, 5.7% multiracial/other; 33% Latinx).

Procedure

After consenting, participants completed demographic measures and the measure of political ideology before being randomly assigned to read an article discussing either the malleable or the fixed nature of anxiety. Participants were asked to summarize the theme of the article, indicate the evidence they found most compelling, and rate understandability for 9th grade students. Next, they responded to the anxiety mindset measure, then measures of wellbeing, resilience, and grit, followed by measures of activism intentions.

[4] We did not expect the manipulation to impact more trait-level outcomes like grit.

Mindset Manipulation. We used a procedure widely employed in mindset research (e.g., Hoyt et al., 2018). We presented each participant with one of two fictitious articles from the "APA Science Observer" that presented compelling evidence that anxiety is either fixed or malleable: "*Anxiety, Like Plaster, is Pretty Stable Over Time*," as compared to "*Anxiety is Changeable and Can Be Developed*." The articles were matched for style and length.

Study 2 Results

We first present a direct replication of findings from Study 1, testing our primary correlational predictions, ignoring the manipulation[5]. We then present the experimental effects on mindsets and activism.

For the first set of analyses, we used self-reports of anxiety mindsets (see Table 1). Replicating Study 1, greater beliefs in the malleability of anxiety related positively to psychological wellbeing, resilience, and grit, and correlated negatively with activism intentions. As in Study 1, a partial correlation revealed that the link between growth mindsets and activism help when controlling for political ideology ($r(296) = -.47$, $p<.001$).

As for experimental effects, participants in the growth (M=4.17; SD=2.07), relative to fixed (M=3.14; SD=1.53), condition reported stronger growth mindsets ($F(1, 299)= 24.10$, $p<.001$; $\eta^2=.08$). However, the manipulation failed to directly impact any of the flourishing measures or activism intentions (see Table 1). Yet, because of research demonstrating that the conservative, relative to liberal, belief system is more strongly related to motivations to psychologically manage fear and uncertainty (Jost et al., 2003; Jost et al., 2017) and research showing that mindset manipulations are less effective for those for whom the mindset served a motivational function (Hoyt et al., 2018), we also explored if the effectiveness of our

[5] Partial correlations and moderation analyses controlling for experimental condition are nearly identical.

manipulation was dependent upon participants' political ideology. There was a significant interaction of condition by ideology (*B*=-.62, *t*=-6.01, *p*<.001, CI=-.82,-.41; see Supplemental Figures). For liberal participants, the experimental condition had a significant effect on mindsets (*B*=2.54; *t*=8.59, *p*<.001; CI=1.96, 3.12), but the experimental manipulation did not predict conservatives' mindsets (*B*=.08, *t*=.32, *p*=.749, CI=-.42,.59). Furthermore, for more liberal participants, the growth mindset condition indirectly predicted wellbeing, resilience, and grit, and less intent to engage in action to reduce both gun violence and global warming, via this increase in growth mindsets[6]. In summary, we replicate effects when using self-reports of growth mindsets and find indirect links of manipulations but not total effects, which is due, in part, to the failure to manipulate mindsets for more conservative participants.

Study 3

In Study 3, we focus exclusively on the novel link between mindsets and activism, offering three key extensions of the first two studies. First, although there is existing theory (e.g., Seo et al., 2020) as well as intuitive reason to suggest threat appraisals as a key driver of the link between growth mindsets and reduced activism, we empirically explore this mediation. Second, we ask: what factors other than mindsets predict activism, and do mindsets predict above and beyond those other factors? Of relevance to the current work is the link between dispositional worry/anxiety and activism (Boehnke & Wong, 2011). We examine if the indirect effects of mindsets on activism go above and beyond the potential associations between both trait anxiety and political ideology with activism intentions. We also explore the correlation between mindsets and trait anxiety. Third, we included a social issue postulated to be of greater concern to conservatives—namely, immigration (Jost et al., 2017).

[6] See online Supplemental Materials for details of these conditional indirect effects.

Method

Participants

We solicited a minimum sample to have adequate power to detect small to medium moderation effects (power=.95, n=206). Three-hundred and two U.S. participants, solicited from CloudResearch to participate in research on mindsets, resilience, and social engagement in June 2020, completed the study (M_{age}=37.42 years, range=19– 78; 92 women, 209 men, and 1 no response; 5% Asian, 23.6% Black, 30% Latinx, 2.7% multiracial/other; 1.3% Native American, 67.4% white).

Procedure

After consenting, participants answered demographic questions including a measure of political ideology. Then, they responded to a measure of trait anxiety before a measure of anxiety mindsets. Next, they indicated their perceptions of threat in regards to gun violence, global warming, and illegal immigration, and finally they completed the activism intention measures. In this study, we did not assess the three measures of flourishing from Studies 1-2.

Measures

We used the same mindsets of anxiety and political ideology measures as in Studies 1-2. We added the following assessments:

Trait Anxiety. Participants completed the 6-item short-form Spielberger State—Trait Anxiety Inventory (Marteau & Bekker, 1992). On a scale from 1 (not at all) to 4 (very much so), participants indicated the extent to which they generally feel: calm, tense upset, relaxed, content, and worried. Higher numbers represent greater anxiety.

Threat Appraisals. For each social issue, using a 7-point scale from *strongly disagree* to *strongly agree*, participants responded to two items indicating how much each threatens their

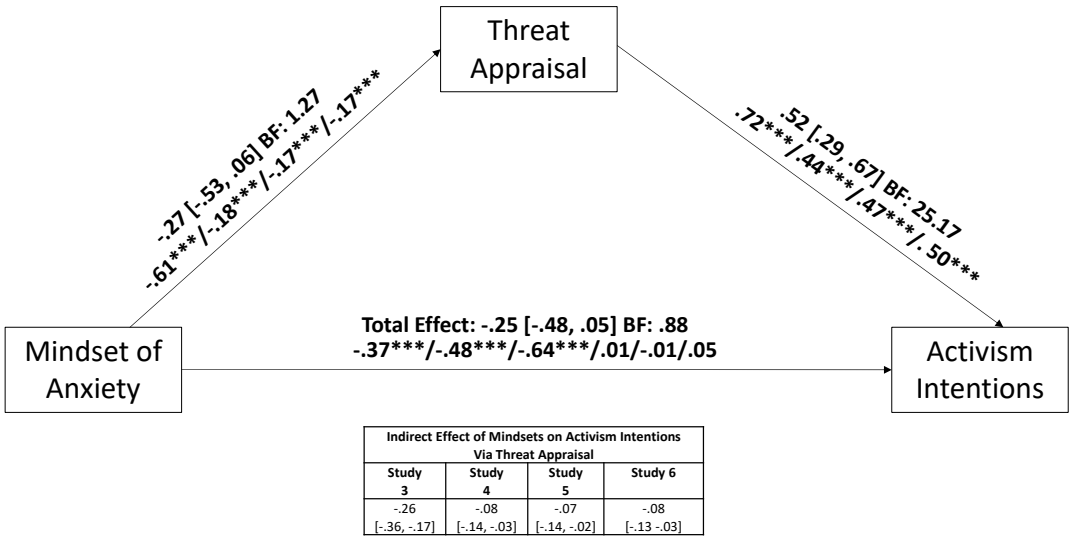
sense of safety and makes them feel anxious. Higher scores indicate greater threat. We computed separate scales and one combined threat appraisals scale[7].

Study 3 Results

Growth mindsets of anxiety again predicted lower levels of intent to engage in behaviors to decrease perceived social threats (see Table 1). To test our mediating hypothesis, we used PROCESS Model 4 to compute bootstrap-based confidence intervals (95%) for the estimate of the indirect effect of mindsets on activism through threat appraisals. Threat appraisals mediated the link between growth mindsets and activism (indirect effect=-.26, CI=-.36, -.17; see Figure 1). Additionally, both political ideology and trait anxiety predict activism, and the indirect effect is robust to covarying them both out. Trait anxiety is negatively correlated with growth mindsets ($p < .001$), again demonstrating the link between growth mindsets and wellbeing.

In summary, in Study 3, we demonstrated that growth mindsets of anxiety related negatively to activism intentions and do so, in part, via threat appraisals. The total and indirect effects held when controlling for trait anxiety and political ideology.

[7] Correlations reveal that both gun violence and global warming were seen as similarly threatening across ideology, but illegal immigration was seen to be more threatening to more conservative participants.



Indirect Effect of Mindsets on Activism Intentions Via Threat Appraisal			
Study 3	Study 4	Study 5	Study 6
-.26 [-.36, -.17]	-.08 [-.14, -.03]	-.07 [-.14, -.02]	-.08 [-.13 -.03]

Figure 1. Path model examining threat appraisals as a mediator of the effects of growth mindset of anxiety on activism intentions in studies 3-6. Parameter estimates are standardized. Along each pathway, a summary effect size estimate appears uppermost. This summary effect size was obtained from Bayesian meta-analysis and is accompanied by the 95% credible interval and a Bayes factor (BF) that quantifies the posterior odds of the research hypothesis relative to the null hypothesis (see Method for details of meta-analysis). Below the meta-analytic summary effect size on each pathway are the individual effect sizes for each of the individual studies (studies 3-6), separated by slash marks and with results from studies appearing in order from left to right. See Table for summary of indirect effects, with bootstrapped 95% CI's in brackets. *** $p < .001$; ** $p < .01$; * $p < .05$.

Studies 4-5

In these pre-registered studies, we sought to replicate the key findings from Studies 1-3. We also once again explored if the effects of mindsets on activism go above and beyond other potential predictors of activism including political ideology, trait anxiety, and in these studies, we also examine Big 5 personality traits. Once again, we further explore the flourishing predictions by examining the correlation between anxiety mindsets and trait anxiety, and we also

examine the relationship between mindsets and the personality trait of emotional stability to add additional evidence for the growth mindset to flourishing link.

Participants

In Study 4, three-hundred and fifty-six U.S. participants, solicited from CloudResearch to participate in research on mindsets, resilience, and social engagement in January 2021, completed Study 4 (M_{age}=43.22 years, range=18– 89; 181 women, 174 men, and 1 other gender identity; 9.8% Asian, 7.3% Black, 4% Latinx, 3.1% multiracial/other, 79.2% white;). In Study 5, three-hundred U.S. participants, solicited from Prolific to participate in research on beliefs and resilience in January 2021, completed the study (M_{age}=32.39 years, range=18– 68; 162 women, 127 men, and 11 no response or another gender identity; 14% Asian, 7.7% Black, 7.3% Latinx, 9.7% multiracial/other; 1.0% Native American, 67.3% white).

Methods

The methods are similar to Study 3, but we once again include the three measures of flourishing used in Studies 1-2. We used the same measures as Study 3 except that we assessed trait anxiety with a face-valid single-item measure assessing how anxious they are in general (0-100), and we sought to increase the number of items in the threat appraisals measure from two to four by assessing the extent to which the issues make them fearful and are threatening to them[8]. We also included a measure of the Big Five which includes emotional stability, extraversion, agreeableness, openness, and conscientiousness (Gosling et al., 2003).

Study 4 Results

[8] In both studies, correlations reveal that both gun violence and global warming were seen as more threatening to relatively more liberal participants whereas illegal immigration was seen to be more threatening to relatively more conservative participants.

First, greater beliefs in the malleability of anxiety predicted psychological wellbeing, resilience, and grit (see Table 1). Additionally, once again using overall threat appraisals and activism measures, mindsets of anxiety indirectly predicted activism intent via threat (see Figure 1), and this effect held above and beyond other predictors of activism. In this study, extraversion, agreeableness and openness from the Big 5 predicted activism, and political ideology strongly predicted activism as well. Yet, the indirect effect of mindsets on activism was robust to covarying these out. However, contrary to the previous studies, growth mindsets did not correlate directly with activism intentions. Finally, growth mindsets negatively correlated with trait anxiety and positively correlated with emotional stability (*p*s < .001).

Study 5 Results

First, greater beliefs in the malleability of anxiety predicted psychological wellbeing, resilience, and grit (see Table 1). Once again using overall threat appraisals and activism measures, mindsets of anxiety indirectly predicted activism intent via threat (see Figure 1), and this effect held above and beyond other predictors of activism. In this study, openness to experience, trait anxiety, and political ideology predicted overall activism intent, and the indirect effect of mindsets on activism was robust to covarying these out. However, similar to Study 4, mindsets did not correlate directly with activism intentions. Again, growth mindsets negatively correlated with trait anxiety and positively correlated with emotional stability (*p*s < .001).

Study 6

In this final, and pre-registered, study, we sought to replicate the key findings and to examine the generalizability of these predictions in the context of two new social threats that are not strongly politicized (Jost et al., 2017): natural disasters and organized crime.

Participants

Three-hundred and one U.S. participants, solicited from Prolific in May 2021, completed Study 6 (M_{age}=36.35 years, range=18– 79; 167 women, 127 men, and 7 report other gender identities; 10.3% Asian/Pacific Islander/Middle Eastern, 12.3% Black, 7.3% Latinx, 3% multiracial/other, 1.3% Native American, 73.8% white). Using custom prescreening, we ensured our sample equally represented those considering themselves conservative, moderate, and liberal on the political spectrum[9].

Methods

The methods are similar to Studies 4-5.

Measures

We used similar measures to Studies 4-5 with minor changes[10]. In this study, we focus the gun violence activism questions on gun safety reform, rather than gun violence reform. In this study, we examined responses to the social threats of gun violence, natural disasters, and organized crime[11]. Additionally, we augmented the activism intention measure to more thoroughly assess both self-directed and other-directed actions by adding six items. Finally, at the end of the study we asked individuals to note if they did not complete the survey carefully or accurately.

Activism Intentions. We added one item to the original 5-item activism scales: "I would actively support political leaders who I see as able to help with (social threat)." In addition, we included an additional 5 items assessing social change actions modified from Sloot et al. (2018).

[9] The recruitment platform asked participants "In general, what is your political affiliation?" with the options of Democrat, Republican, Independent, Other, None.
[10] We included exploratory measures including the efficacy measures from Study 3 and an assessment of inclination to act to reduce or prevent threats; exploratory analyses for efficacy measures are in Supplemental Materials.
[11] Correlations reveal that gun violence was seen as more threatening to relatively more liberal participants, organized crime more threatening to relatively more conservative participants, and no ideological difference in perceiving threat from natural disasters.

These items included self-directed actions (individual behaviors, community-based actions) as well as other-directed strategies (campaigning, civil disobedience, dialog with authorities). We combined all items into one highly reliable activism intention scale.

Study 6 Results

One person indicated to not use their data and, in accordance with our preregistration, we removed them from analyses. First, greater beliefs in the malleability of anxiety predicted psychological wellbeing, resilience, and grit (see Table 1). Next, mindsets of anxiety once again indirectly predicted activism intent via threat appraisals (see Figure 1). However, similar to Studies 4-5, mindsets did not directly correlate with activism. In this study, trait anxiety did not predict activism intent but political ideology did. The indirect effect of mindsets on activism was robust to covarying ideology out. Finally, growth mindsets of anxiety predicted lower levels of trait anxiety.

Bayesian Meta-Analysis

To synthesize the findings across our six studies, we performed an internal meta-analysis, using Bayesian model-averaging conducted in JASP 0.12.2.0 (JASP Team, 2020). This technique produces both a summary effect size estimate that considers the relative likelihoods of both fixed and random-effects models, and a Bayes factor (BF) that represents the posterior odds of the research hypothesis vs. the null hypothesis. In accord with convention, we interpret Bayes factors greater than 10 as strong evidence in favor of the research hypothesis; those between 3 and 10 as moderate evidence in favor; and those between 3 and 1 as inconclusive (Gronau et al., 2020). We report meta-analytic results for the following correlations: mindsets with flourishing; mindsets with threat appraisals; threats appraisals with activism intentions; and mindsets with activism intentions. We note that the construct *flourishing* encompasses multiple related

measures. To determine a single, independent correlation of mindsets with flourishing for each study, we used the procedures recommended by Borenstein et al. (2009) to average the correlations of mindset with as many of the following measures as were available for the study: psychological wellbeing, resilience, grit, trait anxiety, and emotional stability. In conjunction with recommended practice, we conducted sensitivity analyses, and determined that all conclusions were robust to the use of multiple reasonable priors. Relevant output—including forest plots and raw data—are available on OSF—primary findings are reported below.

Mindsets with flourishing. Results indicate a summary effect size of *r*=.42, with the 95% credible interval ranging from .37 to .46. The Bayes factor for the summary effect is 14624.65, confirming extremely strong confidence in an average effect greater than zero. Altogether, results strongly support the presence of a robust, consistent positive correlation between growth mindsets and flourishing.

Mindsets with threat appraisals. The summary effect size for this correlation is *r*=-.27, with the 95% credible interval ranging from -.53 to .06. The results reveal high between-study variation in the effect, tau=.30 [.14,.63]. Consistent with the upper bound of the 95% CI extending into the positive range, the Bayes factor was 1.27, indicating inconclusive results. Overall, findings are consistent with a negative association of growth mindsets with threat appraisals on average, but with substantial between-study variation in the strength of this association.

Threat appraisals with activism intentions. The meta-analytic summary estimate for this correlation is *r*=.52, with the 95% credible interval ranging from .29 to .67. The Bayes factor of 25.17 indicates strong evidence for a non-zero effect.

Mindsets with activism intentions. Results indicate a summary effect size of *r*=-.25, with 95% credible intervals ranging from -.48 to .05. The broad credible interval reflects the large amount of between-study heterogeneity: tau is estimated to be .35 [.19,.61]. This large between-study heterogeneity contributes to a low Bayes factor of .88, which indicates an inconclusive result that does not favor the research hypothesis of a direct link between mindsets and activism intentions.

Discussion

In this research, we sought to better understand the potential benefits of anxiety growth mindsets to the self and to explore if they might come with social costs. We first replicated the positive association between growth mindsets of anxiety and psychological wellbeing and other aspects of psychological flourishing including resilience (Smith et al., 2008) and grit (Duckworth et al., 2007). This research robustly shows that growth mindsets of anxiety are associated with greater levels of psychological flourishing and this effect is stable. The summary effect size of *r*=.42 is larger than that reported in two meta-analyses examining mental health, which found a link between mindsets and mental health in youth (*r*=.25 [.19,.32]; Schleider et al., 2015) and mindsets and psychological distress (*r*=-.22 [-.26, -.18]; Burnette et al., 2020). This may be, in part, because the link is stronger with flourishing-related outcomes such as grit, compared to distress-related outcomes such as depression.

Another key goal of this research was to explore if believing anxiety can be changed might undermine activism via the very mechanism that fosters flourishing. We find that growth mindsets indirectly predict reduced activism against social threats through reduced threat appraisals, which are critical motivators of activism. Across the four studies that included both mindsets and threat appraisals, growth mindsets indirectly predicted less intent to engage in

activism to reduce perceived social threats via threat appraisals (indirect effects ranging from -.26 to -.07, see Figure 1). These indirect effects of anxiety mindsets were demonstrated on a variety of social threats including gun violence, global warming, illegal immigration, natural disasters, and organized crime, and were robust to covarying out other predictors of social activism including trait anxiety and political ideology. However, the total effect linking growth mindsets to activism appears not to be robust, as three pre-registered replication attempts failed to detect a significant total effect. Additionally, Bayesian meta-analysis of the correlation between mindsets and activism in all six studies revealed large credible intervals that included zero, and a Bayes factor that was less than one—reflecting large heterogeneity between studies and low overall confidence in a non-zero effect. However, links between growth mindsets and threat appraisals and between threat appraisals and activism were fairly robust.

This research makes important contributions to the theoretical and empirical understanding of mindsets and well-being. Overall, we both replicated and extended the literature on mindsets of anxiety and psychological health (e.g., Schroder et al., 2015, 2017, 2019). We illustrated a robust and reliable association of growth mindsets with a host of dispositional constructs related to psychological flourishing. We also explored potential social costs of growth mindsets of anxiety by examining if they might undermine intentions to engage in activism. Although we only find the total effect in three of six studies, growth mindsets consistently related negatively to perceiving the social issues as threats, which, in turn, predicted activism intent. This accords with work showing that mindsets impact stress and threat appraisals (Crum et al., 2017; Seo et al., 2020), which are meaningful for action.

Importantly, this work contributes to a nascent body of work exploring the potential limitations of growth mindsets, especially those examining double-edged sword effects (e.g.,

Hooper et al., 2018; Hoyt & Burnette, 2020; Niiya et al., 2010; Ryazanov & Christenfeld, 2018). That is, growth mindsets are often beneficial for the self (e.g., self-efficacy) but may also encourage more negative attitudes towards others (e.g., prejudice). For example, individuals holding a growth mindset more readily judge and blame others—an effect driven largely by responsibility attributions (Ryazanov & Christenfeld, 2018). The current work contributes to a nascent but growing and important literature that outlines the mechanisms by which growth mindsets serve the self but not always others.

More work is needed to replicate findings and to characterize the generality of findings (Simons et al., 2017). The heterogeneity of effects and the consistent link to activism is may indicate the existence of meaningful boundary conditions. For example, Studies 1-3 were conducted earlier than Studies 4-6, with potential differences in the sociopolitical climate (e.g., earlier stages of the pandemic, leading up to the US Presidential election), and threat appraisals were higher (M_{Study3}=4.99), relative to Studies 4-6 (using the same two items as Study 3, M_{Study4}=4.15; M_{Study5}=4.11; M_{Study6}=4.51). Because both the pandemic and political life are directly relevant to threat assessments and activism regarding social issues, changes in these factors could have moderated the association between mindsets and threat appraisals and activism intentions. Additionally, the samples differed in terms of political ideology, with participants in Studies 1-3, reporting a slightly conservative mean ($M_{Studies1-3}$=4.18), and participants in Studies 4-6, reporting a more liberal mean ($M_{Studies4-6}$=3.29). With such liberal-leaning participants, and considering political ideology correlated with activism intentions in 5 out of the 6 studies, the differences in samples may represent constraints on generality (Simons et al., 2017).

This research opens up many avenues for future work. Given the direct link between mindsets of anxiety and intentions to engage in social activism was not robust, research examining mindsets in a broader context might prove useful. For example, in further examining the association between anxiety mindsets and activism, researchers might examine how other potent predictors of social activism, such as motivations based on identity, morality, emotion, and efficacy (van Zomeren, 2013), might interact with mindsets in predicting social action. Additionally, it might be the case that growth mindsets of anxiety are associated with specific wellbeing outcomes, such as meaning/purpose in life, that in turn act to suppress social activism. Or, given the link between activism and subjective wellbeing (Klar & Kasser, 2009), it might be the case that the wellbeing boost of growth anxiety mindsets may undermine motivation to engage in social activism. That is, there may be not only important boundary conditions but also additional suppressor mediators other than threat appraisals (e.g., meaning in life) that are positively linked to growth mindsets but negatively related to motivation to engage in activism. Additionally, future work should explore whether growth mindsets in domains other than anxiety, such as mindsets of the social threats themselves, might have benefits for the self but potential costs for social action. Finally, though activism intentions have been shown to be predictors of collective action behavior (van Zomeren et al., 2008), investigating actual behavioral outcomes would be a good next step in this line of research.

In terms of application, our findings can inform mindset interventions. Our experimental study contributes to a growing literature delineating for whom mindset interventions are most, and least, promising (Yeager et al., 2021). Our research shows that more conservative individuals are most resistant to changing their anxiety mindsets relative to more liberal participants. Moreover, given the potential societal-level drawbacks that accompany the

individual level benefits of growth anxiety mindsets, future work should focus on trying to harness the psychological benefits while minimizing the societal-level costs. In line with this, future work could extend our findings to examine what type of compensatory growth mindset messaging (e.g., Hoyt & Burnette, 2020; keeping the benefits without the costs) might be most useful when considering anxiety, flourishing, and social action.

Overall, growth mindsets of anxiety are critical components of psychological flourishing. Although helpful for resilience, dampened threat appraisals may undermine social action. Indeed, we find that growth mindsets are consistently linked to weakened threat appraisals across a variety of social threats ranging from gun violence, to global warming, to natural disasters, which in turn, undermines action. We hope this initial work exploring the self-related benefits and potential societal costs associated with growth mindsets of anxiety sparks continued rigorous research that seeks to replicate effects and understand boundary conditions.

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