

The mindsets × societal norm effect across 78 cultures: Growth mindsets are linked to performance weakly and well-being negatively in societies with fixed-mindset norms

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Abstract:

Background/Aims: Recent research on mindsets has shifted from understanding its homogenous role on performance to understanding how classroom environments explain its heterogeneous effects (i.e., Mindsets \times Context hypothesis). Does the macro context (e.g., societal level of student mindsets) also help explain its heterogeneous effects? And does this interaction effect also apply to understanding students' well-being? To address these questions, we examined whether and how the role of students' mindsets in performance (math, science, reading) and well-being (meaning in life, positive affect, life satisfaction) depends on the societal mindset norms (i.e., Mindsets \times Societal Norm effect).

Sample/Methods: We analysed a global dataset ($n = 612,004$ adolescents in 78 societies) using multilevel analysis. The societal norm of student mindsets was the average score derived from students within each society.

Results: Growth mindsets positively and weakly predicted all performance outcomes ($r_s = .192, .210, .224$), but the associations were significantly stronger in societies with growth-mindset norms. In contrast, the associations between growth mindsets and psychological well-being were very weak and inconsistent ($r_s = -.066, .003, .008$). Importantly, the association was negative in societies with fixed-mindset norms but positive in societies with growth-mindset norms.

Conclusions: These findings challenge the idea that growth mindsets have ubiquitous positive effects in all societies. Growth mindsets might be ineffective or even detrimental in societies with fixed-mindset norms because such societal norms could suppress the potential of students with growth mindsets and undermines their well-being. Researchers should take societal norms into consideration in their efforts to understand and foster students' growth.

Keywords: mindset; norm; culture; PISA; performance, well-being

The mindsets × societal norm effect across 78 cultures: Growth mindsets are linked to performance weakly and well-being negatively in societies with fixed-mindset norms

Growth mindsets (i.e., the beliefs that intelligence can be cultivated via effort and strategies) are an important individual factor for students' academic motivation and achievement (Dweck & Yeager, 2019). Recent meta-analytical studies, however, showed that growth mindsets have a large heterogeneity effect, yielding an overall positive, but small effect on academic performance ($r = .10$, 95% CI = [.08, .13] in Sisk et al., 2018; $r = .07$, 95% CI = [.04, .11] in Costa & Faria, 2018). In response to this controversy, researchers examined the nuances of where growth mindsets work better (i.e., Mindsets × Context theory; Yeager et al., 2019). They found that a supportive, immediate environment (e.g., peers and teachers) is a key to the positive effect of growth mindsets (Yeager et al., 2019; 2021). However, limited attention has been directed to understanding the power of cultural norms, a more distal factor that affects all social members (not just members of a particular immediate context), in guiding the psychological process in relation to mindsets. An even smaller body of research has examined the role of mindsets in psychological well-being in different cultures. Understanding whether growth mindsets are more beneficial (or even harmful) in varying societies is important, as growth mindsets are becoming a prevalent concept for educators around the world to guide educational changes (OECD, 2021; Rattan et al., 2015).

We draw from the cultural norm approach and argue that the role of individual mindsets in academic performance and psychological well-being is subjected to the societal norms of mindsets. Research on societal/cultural norms offers the perspective that integrates social, personality, and cultural psychology to understand individuals' motivation and well-being. People's individual characteristics (personality, values, beliefs) could manifest into different behavioural and psychological outcomes depending on whether the societal norm supports or matches those characteristics (Van Vianen, 2018; Fulmer et al., 2010; Ward et al., 2004). Furthermore, the cultural-fit hypothesis suggests that in the same society, people whose characteristics resemble those of the dominant culture generally have higher self-esteem and psychological well-being (Fulmer et al., 2010; Heshmati & Oravecz, 2022). However, this approach is less prominent in the field of achievement motivation, such as mindsets (cf. King et al., 2021). This study aims to understand the mindsets × societal norm effect: How does the

societal norm of student mindsets (i.e., the average level of mindset among students in each society) moderate the role of individual mindsets in learning outcomes and well-being?

Individual Mindsets' Links to Performance and Well-being

The beliefs about whether one's ability is fixed or changeable are associated with students' motivation, engagement, and resilience, thus, indirectly linked to their academic achievement (Dweck & Yeager, 2019). Students with fixed mindsets, or the beliefs that ability is immutable, are more likely to believe that effort is a sign of lack of talent, set performance-oriented goals (focus on learning outcome), and thus, are more likely to avoid challenges and undermine their performance. In contrast, students with growth mindsets, or the beliefs that ability can be changed and cultivated via effort, are more likely to believe their effort is rewarding, set mastery goals (focus on the learning process), and are more likely to engage in learning and challenging tasks (Burnette et al., 2013; Lou & Noels, 2016; Lee et al., 2021). These mindset-related psychological and engagement processes could predict how students perform in academic settings (Yeager & Dweck, 2020). As a result, students with growth (vs. fixed) mindsets perform better in school (Burnette et al., 2013).

Students' mindsets are also related to how they feel. When students focus on their learning progress (i.e., students with growth mindsets), they are more likely to experience positive emotions in learning (Dweck & Yeager, 2019; Lou et al., 2022). Growth mindsets can also serve as a resilience factor that can help students reappraise and thus buffer the negative effect of academic setbacks and negative events (Yeager & Dweck, 2012). In contrast, students with fixed mindsets are more likely to view setbacks as signs of incompetence, feel threatened, have a lower sense of control, and experience more negative emotions in tests and exams (e.g., Daniels et al., 2022; King, 2016; Lou & Noels, 2020). A recent review has also showed that growth (vs. fixed) mindsets are related to active coping and a lower level of distress (Burnette et al., 2020). Therefore, in academic settings where challenges and setbacks are almost inevitable, students with growth (vs. fixed) mindsets tend to have a higher level of psychological well-being (Burnette et al., 2020).

Mindsets × Context Theory

Although research has shown that growth (vs. fixed) mindsets generally predict performance and well-being, a meta-analysis showed a large heterogeneity effect of mindsets, particularly in performance (Sisk et al., 2018). Similarly, Costa and Faria (2018) revealed

varying links between mindsets and achievement across regions, with a positive link in North America, a non-significant link in Asia, and a negative link in Europe. To address this controversy, Yeager and Dweck (2020) proposed a Mindsets \times Context theory, and argued that contextual factors can systematically explain the inconsistent effects of individual mindsets. As such, individuals' growth mindsets alone may not be sufficient to lead to positive outcomes; instead, their effect may highly depend on the context.

Where do mindsets work in predicting achievement?

Research on Mindsets \times Context theory suggests that individuals' growth mindsets are more effective in academic performance when the environment supports a growth mindset, highlighting the importance of a growth-oriented learning environment (i.e., the supportive effect of growth-mindset environments; Yeager et al., 2019; 2022). Growth-mindset environments can provide affordances and opportunities for students to act on their growth mindsets (Yeager et al., 2022; Hecht et al., 2021). For instance, teachers with growth mindsets are more likely to communicate that challenges and making mistakes can be opportunities to learn and improve and are not signs of failure (Canning et al., 2019, 2022; Kroeper et al., 2022) and use evaluations that reflect improvement rather than performance (Muenks et al., 2020). These supports from teachers can provide affordance for students to act on their growth mindsets (e.g., setting mastery goals, challenge-seeking; Lou & Noels, 2020; Muenks, 2020). Similarly, when students with growth mindsets are surrounded by supportive peers, they are more likely to apply their mindsets (e.g., help-seeking; Sheffler & Cheung, 2020; Yeager et al., 2019). In contrast, in a more fixed-mindset-oriented environment, although growth-mindset students are personally motivated to improve, they may receive little opportunity to do so, suppressing them from acting on their growth mindsets. As a result, students in classrooms with teachers and peers with growth (vs. fixed) mindsets showed more improvement in their academic performance over time (Yeager et al., 2019; 2022).

Expanding the Mindsets \times Context Theory

The Mindsets \times Context theory is important to understand “where” students' mindsets are important, but previous research provides a limited outlook on the moderating effect of contexts. First, previous research focuses on academic achievement as the outcome and neglects the potential link to well-being. Second, previous research has centred on the contextual effect with immediate contexts (e.g., classroom), especially in North America. Little is known about how

societal contexts (which shape the psychological processes of all social members) may enhance or undermine the role of individuals' mindsets. Societies have different norms regarding students' mindsets about *intelligence*. For example, although effort is an important cultural value in Confucius-influenced countries (e.g., China and Japan), students in these countries tend to endorse stronger fixed (vs. growth) mindsets than their Western (e.g., the US and Canada) counterparts (Jose et al., 2012; Sun et al., 2021). It is possible that the societal norm in East Asian countries tends to emphasize performance and competition (Wang & Ng, 2012), and a performance-oriented environment could undermine people's growth beliefs about intelligence (Haimovitz & Dweck, 2017). In this sense, Asian (vs. Western) countries might share a growth-mindset norm about performance, but a relatively fixed-mindset norm about intelligence ("I can make an effort to improve my test score, but I can't change my fundamental intelligence."). In this study, we will focus on the latter (i.e., intelligence mindsets) and we aim to extend the Mindsets \times Context theory to understand the contextual effect of mindset norms across 78 societies and their implications on not just performance but also well-being.

Mindsets \times Context effect on Well-being

Although it has not been discussed in the Mindsets \times Context theory, we argue that this theory can extend to understanding students' well-being. Research demonstrates that students with growth mindsets are more likely to apply their beliefs and learning goals to actions in a supportive context (Canning et al., 2020; Fuesting et al., 2019; Jia et al., 2021; Yeager et al., 2022). In a supportive, growth-oriented environment, students with growth mindsets may experience higher levels of positive affect and psychological well-being because they are more likely to progress toward fulfilling their learning goals (Klug & Maier, 2015). In contrast, in environments that promote fixed mindsets, even if students with growth mindsets are motivated to set learning goals, they may feel frustrated because the environment restricts them from acting on their mindsets and goals (e.g., receiving feedback that focuses on getting good grades). Given that students generally have little control over their environment, the negative emotions driven by the mismatch of individual mindsets and societal norms may persist and could potentially predict their overall psychological well-being.

The person-environment fit perspective also provides a complementary view of how people feel in environments that promote different mindsets. Research in personality and cultural psychology suggests that people are happier and have higher self-esteem if their beliefs and

values match the societal norms (Bleidorn et al., 2016; Geeraert et al., 2019; Heshmati & Oravec, 2022; Van Vianen, 2018). People are more likely to feel “right” and experience positive events (e.g., receiving positive interpersonal feedback) in environments where people share similar beliefs (Fulmer et al., 2010; Higgins, 2008). Because fitting in and feeling a sense of belonging is a fundamental human need and an important part of one’s identity (Baumeister & Leary, 1995; Chirkov et al., 2005), a mismatch between personal mindsets and societal norms might lead to a lower sense of belonging and adaptation, undermining people’s emotional well-being (Lu, 2006).

Societal Norm of Student Mindsets

The Mindsets \times Context theory is conceptualized to explain “in what contexts” mindsets are more effective, and we argue that it is important to conceptualize “contexts” beyond the classroom. Learners’ development is the result of their interaction with the complex, multiple levels of interrelated ecological environments, from immediate contexts, such as school and family, to broad cultural contexts, such as shared societal beliefs and identity (Bronfenbrenner, 2005). In this study, we focus on the society-level students’ growth mindsets, which are often neglected in the literature. This level of context reflects a general social environment in which the students are immersed. The socio-cultural environment can shape human psychological processes, including motivation, emotion, and cognition (Markus & Kitayama, 1991). Consequently, the beliefs and values developed in North America may not be as adaptive and applicable in other parts of the world (Heine et al., 2001; Henrich et al., 2010). In this study, we aim to understand whether the role of students’ mindsets in performance and well-being might depend on the societal norm of student mindsets (i.e., the average level of mindsets among students in a society).

In terms of performance, previous research suggests that the *supportive effect of growth-mindset environments on performance* also applies to a cultural-level context. A supportive societal environment, despite a distal context, can provide psychological affordance for students to seek opportunities to improve (Bernardo et al., 2021; Jia et al., 2021). Societies with more equal opportunities in supporting education for all (i.e., higher educational mobility) can strengthen the effect of mindsets on academic performance because this kind of environment may help to inform students that their efforts can pay off, and enable them to achieve their learning goals (e.g., Jia et al., 2021). Therefore, we predict that societies in which the growth

mindset is the norm may provide students with psychological affordances to engage in growth-related practices. In such societies, it is easier for students with growth mindsets to act on their mindsets, which can foster academic success. In contrast, in societies where performance and natural talent are valued (a fixed-mindset norm), it is more difficult for them to translate their growth beliefs into learning behaviours and academic success.

Individuals' fit with their cultural environment is also important for their well-being, as endorsing beliefs that adhere to the societal norm can lead to thoughts and behaviours that allow them to adapt to the culture (e.g., endorsing collectivist values in a society that historically relies more on groups and conformity to survive; Chudek & Henrich, 2011). In a congruent cultural environment, there are generally more opportunities for individuals to connect with others and receive validation for their beliefs and goals (Sagiv & Schwartz, 2000; Khaptsova & Schwartz, 2016). Accordingly, the more an individual's beliefs are congruent with the cultural norm, the more they feel "fit" to their culture, which can predict psychological well-being (Fulmer et al., 2010; Sorthaix & Lönnqvist, 2015). Therefore, in a growth-mindset cultural environment, students with strong growth (vs. fixed) mindsets may have a higher level of well-being. This effect may be reversed in a fixed-mindset environment as it indicates a "cultural misfit."

The Current Study

This study aims to extend Mindsets \times Context theory to understand whether and how societal norms of mindsets moderate the link between students' mindsets on performance and well-being. We argue that the process in which individuals' mindsets predict performance and well-being is through different contextual mechanisms. Because the social environments provide different extents of affordance for students with growth mindsets to act on their beliefs, we expect a *supportive effect of growth-mindset norms*. That is, the positive link between growth mindsets and achievement may be stronger in societies with growth-mindset norms (that provide more affordance) and weaker in societies with fixed-mindset norms (that provide little affordance). In predicting well-being, it is also important to consider the cultural fit perspective. In addition to the positive link between growth mindsets and well-being in societies with growth-mindset norms (i.e., cultural fit), we also expect a negative link between growth mindsets and well-being in societies with fixed-mindset norms (i.e., cultural misfit). That is, we expect a *supportive effect of growth-mindset norms*, as well as a *thwarting effect of fixed-mindset norms* on students' well-being.

To examine these hypotheses, we used a large-scale, cross-cultural dataset from PISA (OECD, 2019), which included measurement of academic performance with nationally representative adolescents. PISA also measured students' mindsets, well-being, and other personal characteristics. In addition, we included economic conditions (i.e., GDP per capita) for each region from the World Bank (n.d.; <https://data.worldbank.org/>) as a country-level covariate.

Methods

Participants

We include the 78 countries/regions with available data for growth mindsets from the PISA 2018 dataset (OECD, 2019), which resulted in 612,004 students (49.8% female participants) aged 15 to 16. The data is available online (<https://www.oecd.org/pisa/data/>).

Measures

Table 1 presents the descriptive statistics of the measures.

Table 1.

Descriptive Statistics of the Measures

Measure	Mean	SD	Range	Score
<u>Student-level factor</u>				
Growth (vs. Fixed) Mindsets	2.63	0.93	1 – 4	Raw (reverse) score from PISA
Mathematics	461.22	104.36	24.74 – 888.06	Standardised score from PISA
Science	460.69	102.66	58.74 – 886.08	Standardised score from PISA
Reading	456.12	108.05	0.00 – 887.69	Standardised score from PISA
Meaning in life	0.15	0.98	-2.15 – 1.74	Standardised score from PISA
Positive affect	0.11	1.01	-3.07 – 1.24	Standardised score from PISA
Life satisfaction	7.24	2.59	0.00 – 10.00	Raw score from PISA
Family wealth	-0.43	1.24	-7.55 – 4.75	Standardised score from PISA
<u>Societal-level factor</u>				
Societal norm of student mindsets	2.62	0.22	1.99 – 3.04	Average score of raw (reverse) data from PISA
GDP per capita (K \$US)	26.65	23.86	2.72 – 114.70	Raw data from World Bank

PISA Data (OECD, 2019)

Growth (vs. Fixed) Mindsets. A single item, “Your intelligence is something about you that you can’t change very much”, was used to measure students’ mindsets (1 = strongly disagree; 4 = strongly agree). We reversed the score such that a higher score indicates stronger growth (vs. fixed) mindsets. Studies have demonstrated the reliability and validity of a single-item measure of mindsets (Rammstedt et al., 2021).

Academic Achievement. The PISA assessed students' academic performance in mathematics, science, and reading. To maximize the scope of content covered in the test while maintaining a reasonable completion time, students completed different subsets of questions with some overlapping items. To accurately estimate the performance of the students, the PISA used item response theory and regression modelling and provided ten plausible values for each subject following the posterior distribution. These procedures helped evaluate and ensure the accuracy of estimations. Details can be found in the PISA technical report (OCED, 2019). The first plausible value of each subject was used, as previous work showed similar results using the ten plausible values as the outcome variables (Spiezia, 2010).

Psychological Well-being. Three different aspects of psychological well-being were assessed in PISA: meaning in life, positive affect, and life satisfaction. Meaning in life was measured by three items (1 = strongly disagree; 4 = strongly agree; e.g., "My life has clear meaning or purpose."). Positive affect was measured by three items (1 = never; 4 = always; e.g., "happy" and "joyful"). For these two measures, we adopted the computed scores available in the PISA dataset, which were computed following item-response theory instead of using raw data. Finally, life satisfaction was measured by a single item (0 = not at all satisfied; 10 = completely satisfied; i.e., "Overall, how satisfied are you with your life as a whole these days?").

Societal Norm of Student Mindsets (Moderator)

The societal norm of student growth mindsets was calculated as a contextual factor by averaging the scores of all responses within a country/region. A higher score indicates a stronger societal norm of growth mindsets in a given society¹. The practice has been adopted in previous studies that examined how societal-level characteristics moderated the effect of individual-level characteristics in the same dimension on varying psychological processes (e.g., Gebauer et al., 2012; Li et al., 2022).

Covariates

In the analyses, the respondent's sex (male = 0; female = 1) and family wealth from the PISA data were entered as two student-level covariates. The region's GDP per capita (World Bank; <https://data.worldbank.org/>) was entered as a societal-level covariate.

Analysis

¹ The range and *SD* of the societal-level mindsets were quite narrow (Table 1). Thus, it was not possible to assess any extreme influences of societal mindsets.

In the multilevel analyses², the student-level continuous variables were centred by the group mean, while the society-level continuous variables were centred by the grand mean, as recommended by Enders and Tofighi (2007). We entered students' growth mindsets, societal-level growth mindsets, and their interaction term, as well as covariates, into the analyses, with random effects for the intercepts and the student-level factors (viz., students' mindsets, sex, and family wealth) specified. Separate analyses were conducted for different outcome variables.

Results

Table 2 shows the intercorrelations among the key variables. Below, we reported the multilevel analyses associated with students' growth mindsets and societal norms of growth mindsets. The full results (with covariates) are presented in Tables 3 and 4, with unstandardized coefficients reported. Table 5 presents the correlational statistics for each society.

Table 2.
Correlations among the Major Variables

	1	2	3	4	5	6	7
1. Performance in math	--	.845***	.829***	-.119***	-.017***	-.040***	.192***
2. Performance in science	.970***	--	.881***	-.135***	-.036***	-.063***	.210***
3. Performance in reading	.945***	.977***	--	-.131***	-.025***	-.063***	.224***
4. Meaning in life	-.742***	-.732***	-.729***	--	.366***	.387***	-.066***
5. Positive affect	-.437***	-.459**	-.449***	.603***	--	.485***	.003
6. Life satisfaction	-.449***	-.478***	-.430***	.592***	.697***	--	.008***
7. Students' growth mindsets	--	--	--	--	--	--	--
8. Societal norm of growth mindsets	.526***	.557***	.609***	-.550***	-.331**	-.247*	--

Note. Values above the diagonal show the student-level correlations ($n = 449,770$ to $606,627$); values below the diagonal show the societal-level correlations ($n = 70$ to 77); * $p < .05$; ** $p < .01$; *** $p < .001$.

Academic Achievement

As shown in Table 3, students with a stronger growth mindset had better performance in all three subjects (Mathematics: $b = 14.64$, $p < .001$, 95% CI = [12.80, 16.48]; Science: $b = 16.49$, $p < .001$, 95% CI = [14.56, 18.43]; Reading: $b = 17.91$, $p < .001$, 95% CI = [15.89, 19.92]). Regions with a stronger societal norm of growth mindsets also predicted better academic performance (Mathematics: $b = 93.37$, $p < .001$, 95% CI = [46.85, 139.89]; Science: $b = 96.85$, $p < .001$, 95% CI = [53.91, 139.80]; Reading: $b = 108.71$, $p < .001$, 95% CI = [67.68, 149.73]). More

² The interclass correlation coefficient (i.e., the degree of variability between regions) was significant for each outcome variable, $ps < .001$ (mathematics: .27; science: .24; reading: .22; meaning in life: .05; positive affect: .05; life satisfaction: .05), indicating the appropriateness of using multilevel analyses.

importantly, a significant interaction effect between students' growth mindsets and the societal norm of mindsets was found for performance in all three subjects (Mathematics: $b = 11.01$, $p = .01$, 95% CI = [2.77, 19.26]; Science: $b = 14.43$, $p = .001$, 95% CI = [5.76, 23.10]; Reading: $b = 17.88$, $p < .001$, 95% CI = [8.87, 26.88]).

Table 3.

Summary of the Two-Level Multilevel Analysis with Students' Growth Mindsets as the Predictor and Societal Norm of Growth Mindsets as the Moderator for Academic Performance

Predictors [†]	Outcome variables		
	Math Coefficient (SE) [95% CI]	Science Coefficient (SE) [95% CI]	Reading Coefficient (SE) [95% CI]
Societal level			
GDP	.99*** (.22) [.55, 1.43]	.83*** (.20) [.42, 1.23]	.83*** (.19) [.44, 1.22]
Societal norm of growth mindsets	93.37*** (23.35) [46.85, 139.89]	96.85*** (21.55) [53.91, 139.80]	108.71*** (20.59) [67.68, 149.73]
Individual level			
Family wealth	15.60*** (.90) [13.81, 17.39]	13.19*** (.87) [11.46, 14.92]	13.54*** (1.01) [11.53, 15.55]
Gender (male = 0; female = 1)	-4.98*** (.90) [-6.76, -3.19]	2.74** (1.01) [.74, 4.75]	28.33*** (1.04) [26.26, 30.40]
Students' growth mindsets	14.64*** (.93) [12.80, 16.48]	16.49*** (.97) [14.56, 18.43]	17.91*** (1.01) [15.89, 19.92]
Cross-level interaction			
Societal norm of growth mindsets × Students' growth mindsets	11.01** (4.14) [2.77, 19.26]	14.43*** (4.35) [5.76, 23.10]	17.88*** (4.52) [8.87, 26.88]
	$R^{2‡}$	30%	26%

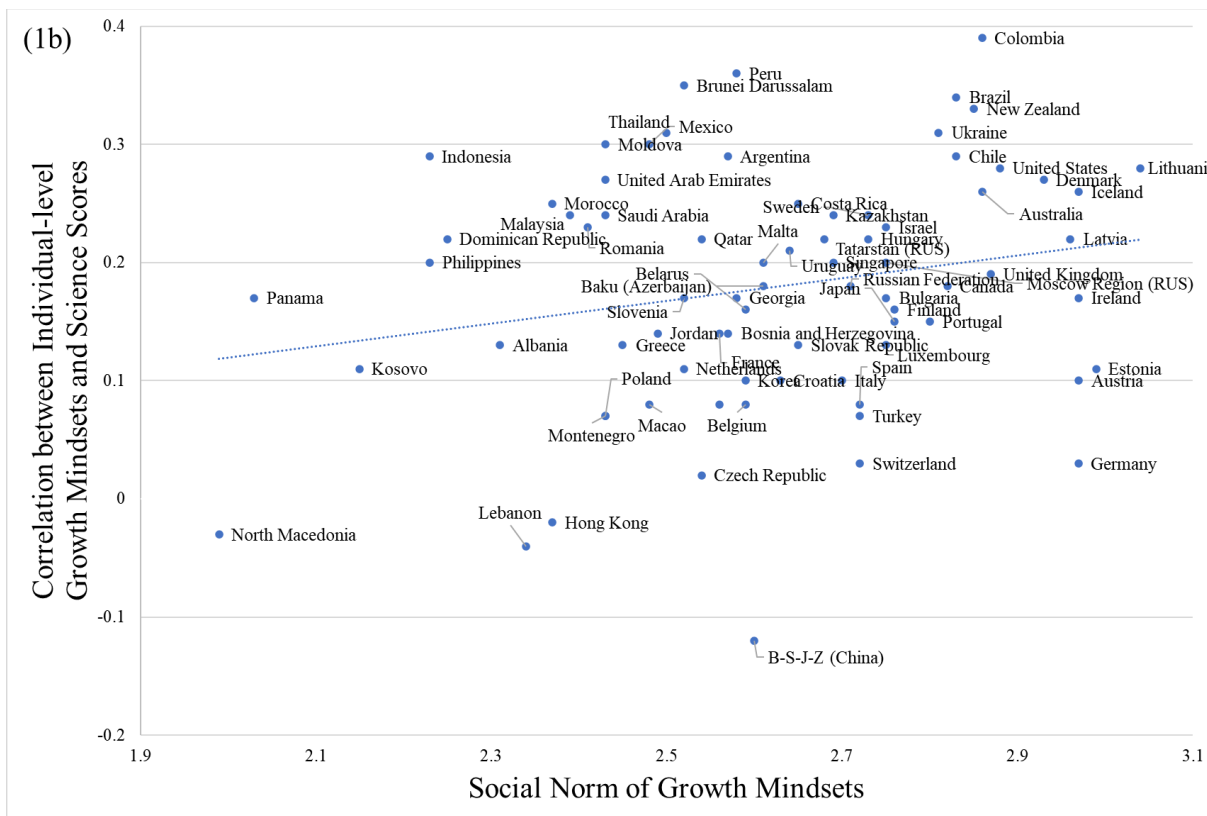
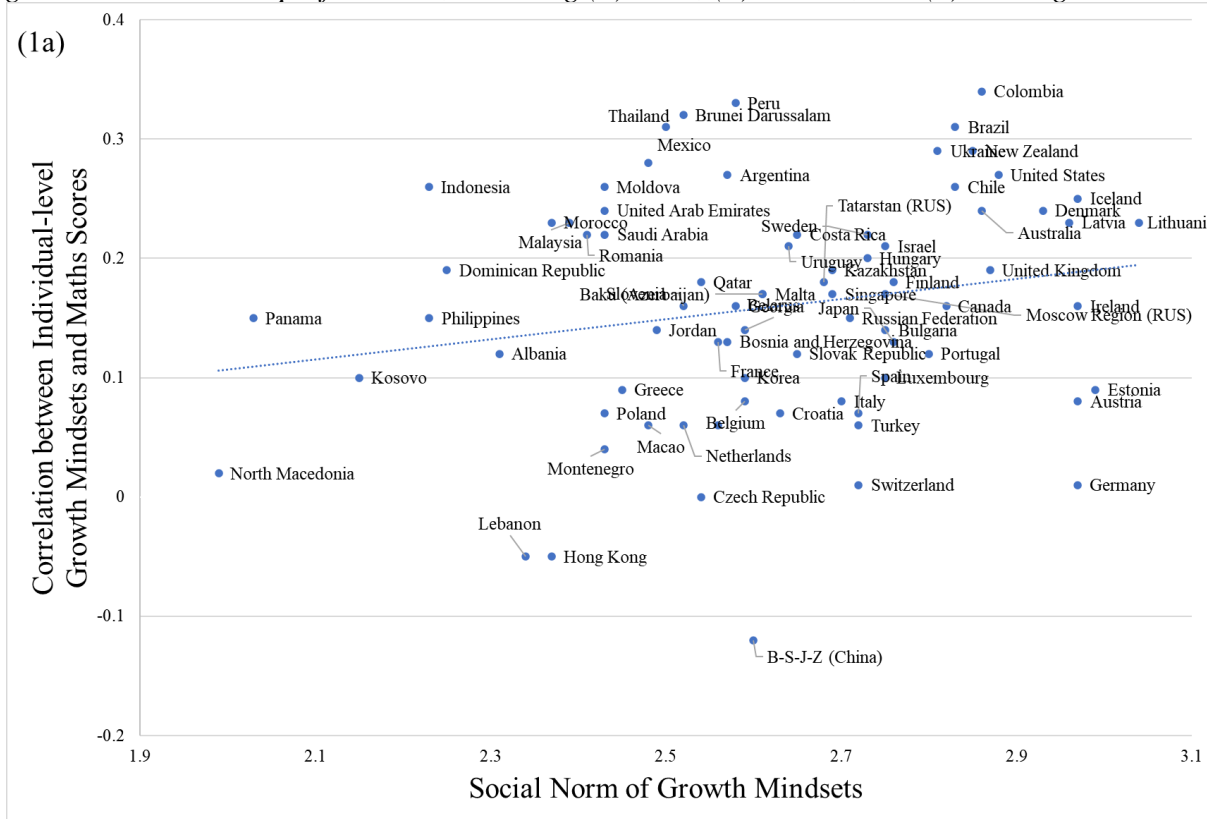
Note. * $p < .05$; ** $p < .01$; *** $p < .001$. Unstandardized coefficients are reported. SE = standard error.

[†]The degree of freedom for both societal- and individual-level as well as the interaction was estimated based on the number of societies ($n \sim 78$ societies) instead of the number of participants.

[‡]The explained variance was estimated by R package "r2mlm" (Shaw et al., 2020) following the procedures in Rights and Sterba (2020) with cases with missing values of any variables removed.

The interaction effects were unpacked with simple-slope analyses (Figure 1), which showed that the positive effect of students' growth mindsets on academic performance was stronger in regions with a stronger societal norm of growth mindsets (+1SD; Mathematics: $b = 16.94$, $p < .001$, 95% CI = [14.37, 19.52]; Science: $b = 19.51$, $p < .001$, 95% CI = [16.80, 22.22]; Reading: $b = 21.65$, $p < .001$, 95% CI = [18.83, 24.47]) than in regions with a weaker societal norm of growth mindsets (-1SD; Mathematics: $b = 12.33$, $p < .001$, 95% CI = [9.86, 14.81]; Science: $b = 13.47$, $p < .001$, 95% CI = [10.88, 16.07]; Reading: $b = 14.17$, $p < .001$, 95% CI = [11.47, 16.87]).

Figure 1. Societal norms of growth mindsets predicted stronger correlations between students' growth mindsets and performance, including (a) math, (b) science, and (c) reading.



Summary of the Two-Level Multilevel Analysis with Students' Growth Mindsets as the Predictor and Societal Norm of Growth Mindsets as the Moderator for Well-being

Predictors [†]	Outcome variables		
	Meaning in life	Positive affect	Life satisfaction
	Coefficient (SE) [95% CI]	Coefficient (SE) [95% CI]	Coefficient (SE) [95% CI]
Societal level			
GDP	-.003**(.001) [-.004, -.001]	-.002*(.001) [-.005, -.00004]	-.01*(.003) [-.01, -.001]
Societal norm of growth mindsets	-.35***(.09) [-.53, -.17]	-.16(.12) [-.41, .09]	-.05(.33) [-.71, .61]
Individual level			
Family wealth	.06***(.004) [.05, .07]	.08***(.005) [.07, .09]	.22***(.02) [.19, .25]
Gender (male = 0; female = 1)	-.07***(.01) [-.10, -.05]	.02(.01) [-.01, .05]	-.40***(.04) [-.48, -.33]
Students' growth mindsets	-.04***(.01) [-.06, -.02]	.02*(.01) [.002, .03]	.06**(.02) [.02, .10]
Cross-level interaction			
Societal norm of growth mindsets × Students' growth mindsets	.29***(.04) [.20, .37]	.19***(.03) [.13, .25]	.46***(.09) [.29, .63]
	R^2 ‡		
	7%	6%	8%

Note. * $p < .05$; ** $p < .01$; *** $p < .001$. Unstandardized coefficients are reported. *SE* = standard error.

Regarding positive affect, students with stronger growth mindsets reported higher levels of positive affect ($b = .02$, $p = .026$, 95% CI = [.002, .03]). However, the societal norm of growth mindsets was not significantly associated with students' positive affect on average ($b = -.16$, $p = .214$, 95% CI = [-.41, .09]). Importantly, a significant interaction effect between students' mindset and societal norm of mindset was found ($b = .19$, $p < .001$, 95% CI = [.13, .25]). As shown in Figure 2b, students' growth mindsets were positively associated with positive affect in regions with a stronger societal norm of growth mindsets (+1SD; $b = .06$, $p < .001$, 95% CI = [.04, .08]). In contrast, students' growth mindsets were negatively associated with positive affect in regions with a weaker societal norm of growth mindsets (-1SD; $b = -.02$, $p = .015$, 95% CI = [-.04, -.005]).

For life satisfaction, students with stronger growth mindsets reported higher levels of life satisfaction ($b = .06$, $p = .002$, 95% CI = [.02, .10]). However, the societal norm of growth mindsets did not significantly predict students' positive affect ($b = -.05$, $p = .882$, 95% CI = [-.71, .61]). A significant interaction effect between students' mindsets and societal norm of mindsets was found ($b = .46$, $p < .001$, 95% CI = [.29, .63]). Specifically, as shown in Figure 2c, students' growth mindsets were positively associated with life satisfaction in regions with a stronger societal norm of growth mindsets (+1SD; $b = .16$, $p < .001$, 95% CI = [.10, .21]). In

contrast, this association was reversed in regions with a weaker societal norm of growth mindsets, although it did not reach the statistical significance ($-1SD$; $b = -.04$, $p = .159$, $95\%CI = [-.08, .01]$).

Figure 2. Societal norms of growth mindsets predicted stronger correlations between students' growth mindsets and well-being, including (a) meaning in life, (b) positive affect, and (c) life satisfaction.

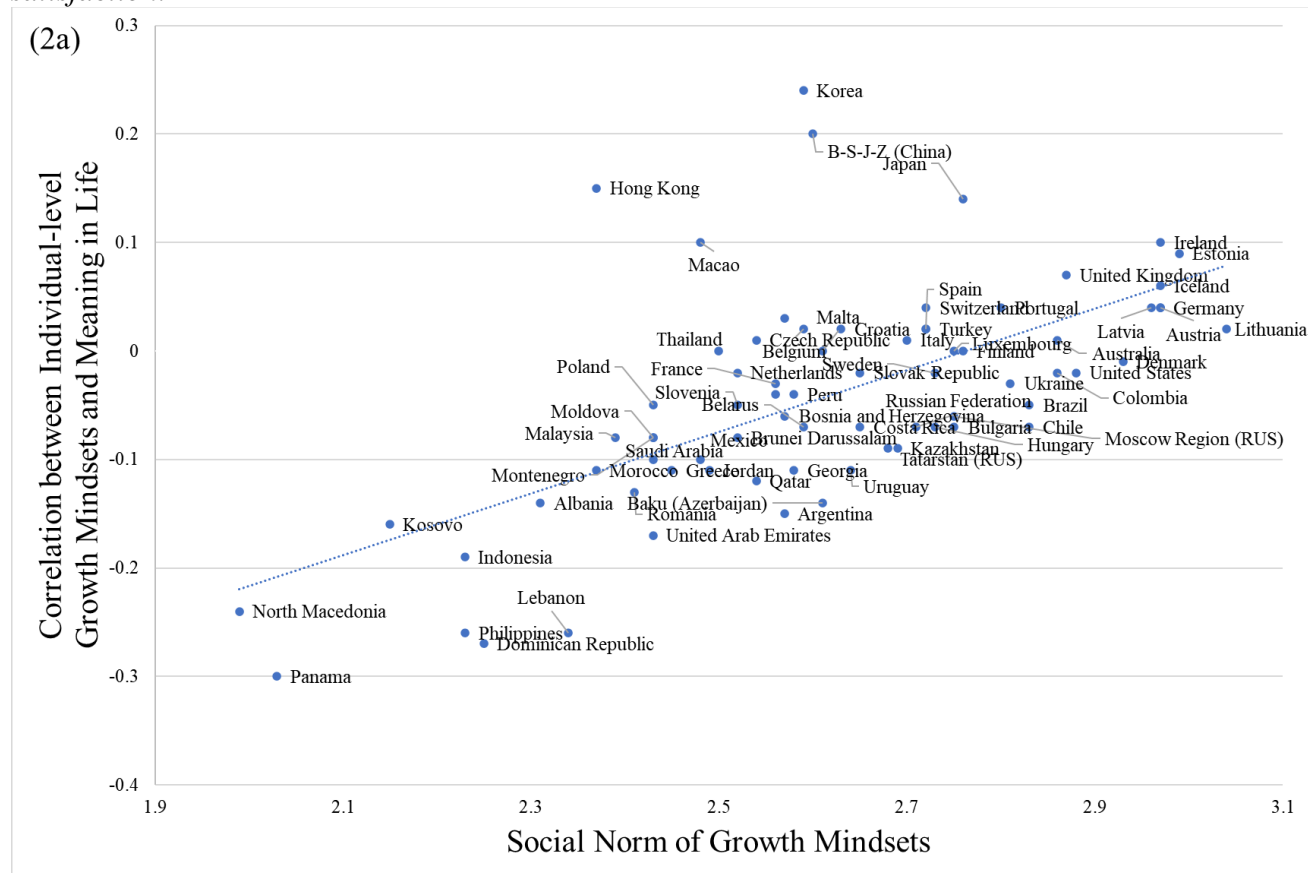


Table 5.

Correlations of Students' Growth Mindsets with Their Academic Performance and Psychological Well-being for Each Country/ Region (with the Values of Societal Norm of Growth Mindsets Sorted in a Descending Order)

Country/ Region	Societal-level growth mindsets ¹	Correlation between students' growth mindsets and					
		Math	Science	Reading	Meaning in life	Positive affect	Life satisfaction
Lithuania	3.04	.23***	.28***	.29***	.02	.09***	.08***
Estonia	2.99	.09***	.11***	.12***	.09***	.10***	.09***
Austria	2.97	.08***	.10***	.13***	.05***	.08***	.07***
Germany	2.97	.01	.03*	.04*	.04**	.08***	.03
Iceland	2.97	.25***	.26***	.26***	.06**	.11***	.15**
Ireland	2.97	.16***	.17***	.17***	.10***	.12***	.14***
Latvia	2.96	.23***	.22***	.26***	.04**	.10***	.11***
Denmark	2.93	.24***	.27***	.27***	-.01	.03*	--
United States	2.88	.27***	.28***	.29***	-.02	.04*	.03*
United Kingdom	2.87	.19***	.19***	.21***	.07***	.10***	.12***
Australia	2.86	.24***	.26***	.27***	.01	--	--
Colombia	2.86	.34***	.39***	.40***	-.02	-.02	-.03*
New Zealand	2.85	.29***	.33***	.33***	--	--	--
Brazil	2.83	.31***	.34***	.37***	-.05***	.03*	-.01
Chile	2.83	.26***	.29***	.31***	-.07***	-.01	.001
Canada	2.82	.16***	.18***	.21***	--	.06***	--
Ukraine	2.81	.29***	.31***	.32***	-.03*	.01	.005
Portugal	2.80	.12***	.15***	.17***	.04***	.06***	.08***
Finland	2.76	.18***	.16***	.17***	.003	.05**	.04**
Japan	2.76	.13***	.15***	.15***	.14***	.14***	.15***
Bulgaria	2.75	.14***	.17***	.20***	-.07***	-.04**	-.01
Israel	2.75	.21***	.23***	.24***	--	--	--
Luxembourg	2.75	.10***	.13***	.14***	.001	.05**	.05***
Moscow Region (RUS)	2.75	.17***	.20***	.20***	-.06*	-.05*	-.03
Hungary	2.73	.20***	.22***	.22***	-.07***	.08***	.06***
Sweden	2.73	.23***	.24***	.25***	-.02	.06***	.07***
Spain	2.72	.08***	.08***	.12***	.02**	.05***	.05***

Switzerland	2.72	.01	.03*	.05***	.04**	.08***	.05**
Turkey	2.72	.06***	.07***	.09***	.02	.03*	.01
Russian Federation	2.71	.15***	.18***	.19***	-.07***	-.04**	-.01
Italy	2.70	.08***	.10***	.12***	.01	--	.08***
Kazakhstan	2.69	.19***	.24***	.25***	-.09***	-.03***	-.07***
Singapore	2.69	.17***	.20***	.19***	--	--	--
Tatarstan (RUS)	2.68	.18***	.22***	.22***	-.09***	-.05***	-.04**
Costa Rica	2.65	.22***	.25***	.26***	-.07***	.01	-.01
Slovak Republic	2.65	.12***	.13***	.13**	-.02	.03*	.03*
Uruguay	2.64	.21***	.21***	.21***	-.11***	-.01	-.03
Croatia	2.63	.08***	.10***	.11***	.02	.03**	.04**
Baku (Azerbaijan)	2.61	.17***	.18***	.21***	-.14***	-.01	.001
Malta	2.61	.17***	.20***	.19***	-.004	.02	.03
B-S-J-Z (China)	2.60	-.12**	-.12***	-.13***	.20***	.13***	.18***
Belarus	2.59	.14***	.16***	.17***	-.07***	-.04**	-0.02
Belgium	2.59	.08***	.08***	.09***	.02	--	--
Korea	2.59	.10***	.10***	.08***	.24***	.20***	.23***
Georgia	2.58	.16***	.17***	.18***	-.11***	-.04**	-.04**
Peru	2.58	.33***	.36***	.34***	-.05**	-.02	-.01
Argentina	2.57	.27***	.29***	.29***	-.15***	-.03*	-.02*
Bosnia and Herzegovina	2.57	.13***	.14***	.15***	-.06***	-.01	.01
Vietnam	2.57	--	--	--	.03*	--	-.03
France	2.56	.14***	.14***	.16***	-.03*	.02	.05***
Serbia	2.56	.06***	.08***	.08***	-.05**	-.02	.01
Czech Republic	2.54	-.004	.02	.03*	.01	.03**	.05***
Qatar	2.54	.18***	.22***	.21***	-.12***	-.04***	-.01
Brunei Darussalam	2.52	.32***	.35***	.34***	-.08***	.02	.04***
Netherlands	2.52	.06***	.11***	.09***	-.02	.01	.03
Slovenia	2.52	.16***	.17***	.16***	-.06***	-.01	.01
Thailand	2.50	.31***	.31***	.31***	.004	.03**	.01
Jordan	2.49	.14***	.14***	.13***	-.11***	-.04***	-.04***
Macao	2.48	.06***	.08***	.07***	.10***	.12***	.13***

Mexico	2.48	.28***	.30***	.32***	-.10***	-.03*	-.02
Greece	2.45	.09***	.13***	.15***	-.11***	-.02	-.05***
Moldova	2.43	.26***	.30***	.29***	-.08***	-.04**	.004
Montenegro	2.43	.05***	.07***	.06***	-.08***	-0.02	.001
Poland	2.43	.07***	.07***	.09***	-.05***	-0.02	.01
Saudi Arabia	2.43	.22***	.24***	.23***	-.10***	-.03*	-.05***
United Arab Emirates	2.43	.24***	.27***	.27***	-.17***	-.04***	-.04***
Romania	2.41	.22***	.23***	.25***	-.13***	-.03*	-.04**
Malaysia	2.39	.23***	.24***	.22***	-.08***	.01	.01
Hong Kong	2.37	-.06**	-.02	-.03*	.15***	.10***	.12***
Morocco	2.37	.23***	.26***	.24***	-.11***	--	-.05***
Lebanon	2.34	-.05*	-.04**	-.04**	-.26***	-.15***	-.11***
Albania	2.31	.12***	.13***	.14***	-.15***	-.05***	-.04***
Dominican Republic	2.25	.19***	.22***	.20***	-.28***	-.05**	-.04*
Indonesia	2.23	.26***	.29***	.28***	-.19***	-.03**	-.04***
Philippines	2.23	.15***	.20***	.19***	-.26***	-.08***	-.10***
Kosovo	2.15	.10***	.11***	.10***	-.16***	-.07***	-.06***
Panama	2.03	.15***	.17***	.15***	-.31***	-.11***	-.13***
North Macedonia	1.99	.02	-.03*	-.02	-.24***	-.11***	-.07***

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

¹ The societal level of growth mindsets was calculated by averaging the scores of all responses within a country/region.

Discussion

Expanding the Mindsets \times Context theory, we examined how the societal norm of mindsets (as the context) moderated the role of students' mindsets in performance (mathematics, science, and reading) and well-being (meaning in life, positive affect, and life satisfaction) across 78 societies. We found that the associations of students' growth mindsets with their academic performance and psychological well-being depended on the societal-level growth mindsets, supporting the mindsets \times norm effect. In predicting performance, we found the supportive effect of the growth-mindset norms. Growth mindsets weakly predicted all performance outcomes in general ($r_s = .192, .210, .224$), but the associations were significantly stronger in societies with

growth-mindset norms. In predicting psychological well-being, growth mindsets generally had a very weak and inconsistent effect ($r_s = -.066, .003, .008$). Similar to performance outcomes, we found a supportive effect of growth-mindset norms, such that growth mindsets were a positive predictor of positive affect and life satisfaction in regions higher in societal growth mindsets. In contrast to the performance outcome, we found a thwarting effect of fixed-mindset norms – growth mindsets were a negative predictor of positive affect and meaning in life in societies with a fixed-mindset norm. In summary, in societies with fixed-mindset norms, students with growth mindsets not only experience little academic benefit (i.e., weaker positive correlations with performance), but they may also experience a lower level of well-being (i.e., negative associations with positive affect and meaning in life).

Implications for Mindsets Research

Previous research suggests that growth (vs. fixed) mindsets are an important individual factor in understanding learners' performance and well-being, but our findings suggest that the contextual mechanisms in which mindsets work differ for achievement and well-being. In predicting achievement, it is important to consider how the context provides affordance to learning behaviours – fixed-mindset societies may adopt more fixed-mindset practices (e.g., providing performance feedback, signalling mistakes as signs of unintelligence), which could undermine students' learning regardless of their mindsets. Therefore, even though students with growth mindsets are motivated to improve, a fixed environment can suppress their effort and learning, which weakens the positive effect of their mindsets and thus, results in weaker positive links between growth mindsets and learning outcomes.

The mindsets \times norm effect on well-being is more complex than on performance. We found that one's growth mindsets being congruent with a cultural environment might promote positive affect and life satisfaction, but incongruence might undermine positive affect and meaning in life. Specifically, students with growth mindsets feel more negative and have a less clear meaning or purpose in their life, but only when they are in a society with a fixed-mindset norm. In an environment that does not match their beliefs, these students may feel more threatened and lack a sense of control and belonging, which could undermine their well-being (Lu, 2006). To summarize, while this negative association was not observed for academic outcomes (i.e., growth-mindset students still outperform fixed-mindset students) in societies with

fixed-mindset norms, having growth mindsets may undermine students' well-being in such an environment because of the cultural mismatch in mindsets.

Our findings provide further implications for unpacking the nuances of the Mindsets × Context theory, and highlight its application beyond the classroom context. We demonstrated that societal norms of mindsets could also systematically explain the heterogeneous role of mindsets in performance and well-being, supporting an important role of macro, distal contexts. These results provide additional explanations for understanding the controversy of mindsets research. Future studies of mindsets should consider the societal contexts to interpret the effects of mindsets. For instance, the effect found in the US (with a relatively stronger growth-mindset norm) may not be replicated in the Philippines (with a relatively weaker growth-mindset norm).

Practical Implications

Growth mindsets have become a widely used concept among educators around the world, but the discussion mostly emphasizes how to foster students' personal beliefs (OECD, 2021; Rattan et al., 2015; Yettick et al., 2016). We stress that the mindsets surrounding the students are also important; promoting students' personal growth mindsets may help them flourish, but this is more effective when the environment also supports growth mindsets (Dweck & Yeager, 2020; Fraser, 2018). There is increasing research that has shown how to support students in the classroom – not just by fostering their mindsets, but also by providing them with the supportive environment to help them act on their mindsets (e.g., feedback that focuses on the process; Kroeper et al., 2022). We argue that it is additionally important to consider the support from a societal level, such as educational policies. However, more research is needed to articulate the affordances that are most relevant when leveraging growth mindsets in larger societal contexts.

The current findings also call for caution regarding the consequences of mindset intervention across cultures. Given that most mindset interventions aim to foster students' personal growth mindsets, it is possible that cultural environments may moderate the intervention effects. Following our results, in societies with a fixed-mindset norm (e.g., Albania, the Philippines, and Lebanon), individuals' mindsets may have little association with academic achievement and even a negative association with well-being. Therefore, it is possible that in those societies, students may not only benefit less from individual-based mindset interventions on their performance, but it may also undermine their well-being. Careful evaluation of the effect

of the interventions on multiple domains is needed, given the double-edged effects of growth mindsets found in the present study.

Limitations

Our findings should also be interpreted with consideration of the study's limitations. First, the cross-sectional data should not be interpreted as causal evidence, although previous intervention studies have shown the Mindsets \times Context theory in the classroom context (Yeager et al., 2019, 2021). Second, the conceptualization of measurement of growth (vs. fixed) mindset is limited in the current dataset due to a single-item use of the mindsets, which may not fully represent the spectrum and dimensions of mindset beliefs (cf. Rammstedt et al., 2021). It is also possible that more complex belief systems that contribute to mindsets are embedded in different cultures (Bernardo et al., 2021; King et al., Lou et al., 2017). Third, although this study focused on the macro-context and demonstrated that societal norms could provide additional value to understanding the role of students' mindsets, it is important for future studies to conceptualize multiple levels of learning contexts, such as other micro-(e.g., school) and exo-systems (e.g., educational policies; Bronfenbrenner, 2005) to provide a more comprehensive picture of the Mindsets \times Context theory.

Conclusions

This research extends the mindset theory by demonstrating that societal norms of mindsets can help explain where growth mindsets predict outcomes, not only academic achievement but also well-being outcomes. This study sheds light on the cross-cultural research on mindsets, and by extension, academic motivation, by showing that the benefit of having growth mindsets cannot be simply generalized to all cultural environments. This norm-based explanation for why individuals' mindsets predict outcomes differently across cultures can help bridge educational psychology research with personality, social, and cultural psychology. Future research should continue to explore whether and how the effect of personal beliefs (and other motivational factors) on students' performance and well-being may depend on the societal norms.

References

- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, *117*(3), 497–529. <https://doi.org/10.1037/0033-2909.117.3.497>

- Bernardo, A. B., Cai, Y., & King, R. B. (2021). Society-level social axiom moderates the association between growth mindset and achievement across cultures. *British Journal of Educational Psychology*, e12411. <https://doi.org/10.1111/bjep.12411>
- Bleidorn, W., Schönbrodt, F., Gebauer, J. E., Rentfrow, P. J., Potter, J., & Gosling, S. D. (2016). To live among like-minded others: Exploring the links between person-city personality fit and self-esteem. *Psychological Science*, 27(3), 419-427. <https://doi.org/10.1177/0956797615627133>
- Bronfenbrenner, U. (2005). The Bioecological Theory of Human Development (2001). In U. Bronfenbrenner (Ed.), *Making human beings human: Bioecological perspectives on human development* (pp. 3–15). Sage Publications Ltd.
- Burnette, J. L., Knouse, L. E., Vavra, D. T., O'Boyle, E., & Brooks, M. A. (2020). Growth mindsets and psychological distress: A meta-analysis. *Clinical Psychology Review*, 77, 101816. <https://doi.org/10.1016/j.cpr.2020.101816>
- Burnette, J. L., O'boyle, E. H., VanEpps, E. M., Pollack, J. M., & Finkel, E. J. (2013). Mind-sets matter: a meta-analytic review of implicit theories and self-regulation. *Psychological Bulletin*, 139(3), 655-701. <http://dx.doi.org/10.1037/a0029531>
- Canning, E. A., Muenks, K., Green, D. J., & Murphy, M. C. (2019). STEM faculty who believe ability is fixed have larger racial achievement gaps and inspire less student motivation in their classes. *Science Advances*, 5(2), eaau4734. <http://dx.doi.org/10.1126/sciadv.aau4734>
- Canning, E. A., Murphy, M. C., Emerson, K. T., Chatman, J. A., Dweck, C. S., & Kray, L. J. (2020). Cultures of genius at work: Organizational mindsets predict cultural norms, trust, and commitment. *Personality and Social Psychology Bulletin*, 46(4), 626-642. <https://doi.org/10.1177/0146167219872473>
- Chirkov, V. I., Ryan, R. M., & Willness, C. (2005). Cultural context and psychological needs in Canada and Brazil: Testing a self-determination approach to the internalization of cultural practices, identity, and well-being. *Journal of Cross-Cultural Psychology*, 36(4), 423-443. <https://doi.org/10.1177/0022022105275960>
- Chudek, M., & Henrich, J. (2011). Culture–gene coevolution, norm-psychology and the emergence of human prosociality. *Trends in Cognitive Sciences*, 15(5), 218-226. <https://doi.org/10.1016/j.tics.2011.03.003>

- Costa, A., & Faria, L. (2018). Implicit theories of intelligence and academic achievement: A meta-analytic review. *Frontiers in Psychology, 9*, 829.
<https://doi.org/10.3389/fpsyg.2018.00829>
- Daniels, L. M., Goegan, L. D., Tulloch, S. L., Lou, N. M., & Noels, K. A. (2022). School-led mindset messaging: understanding elementary students' meaning and emotions. *Educational Psychology in Practice, 38*(3), 279-296.
<https://doi.org/10.1080/02667363.2022.2090904>
- Dweck, C. S., & Yeager, D. S. (2019). Mindsets: A view from two eras. *Perspectives on Psychological Science, 14*(3), 481-496. <https://doi.org/10.1177/1745691618804166>
- Enders, C. K., & Tofighi, D. (2007). Centering predictor variables in cross-sectional multilevel models: A new look at an old issue. *Psychological Methods, 12*(2), 121-138.
<https://doi.org/10.1037/1082-989X.12.2.121>
- Fraser, D. M. (2018). An exploration of the application and implementation of growth mindset principles within a primary school. *British Journal of Educational Psychology, 88*(4), 645-658. <https://doi.org/10.1111/bjep.12208>
- Fuesting, M. A., Diekman, A. B., Boucher, K. L., Murphy, M. C., Manson, D. L., & Safer, B. L. (2019). Growing STEM: Perceived faculty mindset as an indicator of communal affordances in STEM. *Journal of Personality and Social Psychology, 117*(2), 260–281.
<https://doi.org/10.1037/pspa0000154>
- Fulmer, C. A., Gelfand, M. J., Kruglanski, A. W., Kim-Prieto, C., Diener, E., Pierro, A., & Higgins, E. T. (2010). On “feeling right” in cultural contexts: How person-culture match affects self-esteem and subjective well-being. *Psychological Science, 21*(11), 1563-1569.
<https://doi.org/10.1177/0956797610384742>
- Gebauer, J. E., Sedikides, C., & Neberich, W. (2012). Religiosity, social self-esteem, and psychological adjustment: On the cross-cultural specificity of the psychological benefits of religiosity. *Psychological Science, 23*(2), 158-160.
<https://doi.org/10.1177/0956797611427045>
- Geeraert, N., Li, R., Ward, C., Gelfand, M., & Demes, K. A. (2019). A tight spot: How personality moderates the impact of social norms on sojourner adaptation. *Psychological Science, 30*(3), 333-342. <https://doi.org/10.1177/0956797618815488>

- Haimovitz, K., & Dweck, C. S. (2017). The origins of children's growth and fixed mindsets: New research and a new proposal. *Child Development, 88*(6), 1849-1859.
<https://doi.org/10.1111/cdev.12955>
- Hecht, C. A., Yeager, D. S., Dweck, C. S., & Murphy, M. C. (2021). Beliefs, affordances, and adolescent development: Lessons from a decade of growth mindset interventions. In *Advances in Child Development and Behavior* (Vol. 61, pp. 169-197).
<https://doi.org/10.1016/bs.acdb.2021.04.004>
- Heine, S. J., Kitayama, S., Lehman, D. R., Takata, T., Ide, E., Leung, C., & Matsumoto, H. (2001). Divergent consequences of success and failure in Japan and North America: An investigation of self-improving motivations and malleable selves. *Journal of Personality and Social Psychology, 81*(4), 599–615. <https://doi.org/10.1037/0022-3514.81.4.599>
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world?. *Behavioral and Brain Sciences, 33*(2-3), 61-83.
<https://doi.org/10.1017/S0140525X0999152X>
- Heshmati, S., & Oravecz, Z. (2022). I feel loved when other people feel loved: Cultural congruence in beliefs on love is related to well-being. *Journal of Social and Personal Relationships, 39*(2), 347-371. <https://doi.org/10.1177/02654075211036510>
- Higgins, E. T. (2008). Culture and personality: Variability across universal motives as the missing link. *Social and Personality Psychology Compass, 2*(2), 608-634.
<https://doi.org/10.1111/j.1751-9004.2007.00075.x>
- Jia, L., Lim, C. H., Ismail, I., & Tan, Y. C. (2021). Stunted upward mobility in a learning environment reduces the academic benefits of growth mindsets. *Proceedings of the National Academy of Sciences, 118*(10), e2011832118.
<https://doi.org/10.1073/pnas.2011832118>
- Jose, P. E., & Bellamy, M. A. (2012). Relationships of parents' theories of intelligence with children's persistence/learned helplessness: A cross-cultural comparison. *Journal of Cross-Cultural Psychology, 43*(6), 999-1018. <https://doi.org/10.1177/0022022111421633>
- Khaptsova, A., & Schwartz, S. H. (2016). Life satisfaction and value congruence: Moderators and extension to constructed socio-demographic groups in a Russian national sample. *Social Psychology, 47*, 163–173. <https://doi.org/10.1027/1864-9335/a000268>

- King, R. B. (2016). A fixed mindset leads to negative affect. *Zeitschrift für Psychologie*, 225(2), 137-145. <https://doi.org/10.1027/2151-2604/a000290>
- King, R. B., Cai, Y., & Du, H. (2021). Societal-level utility value strengthens the relationship between student-level utility value and achievement: A person-culture fit perspective. *British Journal of Educational Psychology*, 91, 328–346. <https://doi.org/10.1111/bjep.12354>
- King, R. B., McInerney, D. M., & Watkins, D. A. (2012). How you think about your intelligence determines how you feel in school: The role of theories of intelligence on academic emotions. *Learning and Individual Differences*, 22(6), 814-819. <https://doi.org/10.1016/j.lindif.2012.04.005>
- Klug, H. J. P., & Maier, G. W. (2015). Linking goal progress and subjective well-being: A meta-analysis. *Journal of Happiness Studies*, 16, 37–65. <https://doi.org/10.1007/s10902-013-9493-0>
- Kroeper, K. M., Fried, A. C., & Murphy, M. C. (2022). Towards fostering growth mindset classrooms: Identifying teaching behaviors that signal instructors' fixed and growth mindsets beliefs to students. *Social Psychology of Education*. Advanced Online Publication. <https://doi.org/10.1007/s11218-022-09689-4>
- Lee, H., Shirley, L. Y., Kim, M., & Koenka, A. C. (2021). Concern or comfort with social comparisons matter in undergraduate physics courses: Joint consideration of situated expectancy-value theory, mindsets, and gender. *Contemporary Educational Psychology*, 67, 102023. <https://doi.org/10.1016/j.cedpsych.2021.102023>
- Li, L. M. W., Lou, X., & Bond, M. H. (2022). Societal emphasis on religious faith as a cultural context for shaping the social-psychological relationships between personal religiosity and well-being. *Journal of Cross-Cultural Psychology*, 53(3-4), 306-326. <https://doi.org/10.1177/00220221221079875>
- Lou, N. M., Chaffee K. E., & Noels, K. A. (2022). Growth, fixed, and mixed mindsets: Mindset system profiles in foreign language learners and their role in engagement and achievement. *Studies in Second Language Acquisition*, 44(3), 607-632. <https://doi.org/10.1017/S0272263121000401>
- Lou, N. M., & Noels, K. A. (2016). Changing language mindsets: Implications for goal orientations and responses to failure in and outside the second language

- classroom. *Contemporary Educational Psychology*, *46*, 22-33.
<https://doi.org/10.1016/j.cedpsych.2016.03.004>
- Lou, N. M., & Noels, K. A. (2020a). Breaking the vicious cycle of language anxiety: Growth language mindsets improve lower-competence ESL students' intercultural interactions. *Contemporary Educational Psychology*, *61*, 101847.
<https://doi.org/10.1016/j.cedpsych.2020.101847>
- Lou, N. M., & Noels, K. A. (2020b). "Does my teacher believe I can improve?": The role of meta-lay theories in ESL learners' mindsets and need satisfaction. *Frontiers in psychology*, 1417. <https://doi.org/10.3389/fpsyg.2020.01417>
- Lou, N. M., Masuda, T., & Li, L. M. W. (2017). Decremental mindsets and prevention-focused motivation: An extended framework of implicit theories of intelligence. *Learning and Individual Differences*, *59*, 96-106. <https://doi.org/10.1016/j.lindif.2017.08.007>
- Lu, L. (2006). "Cultural fit": individual and societal discrepancies in values, beliefs, and subjective well-being. *The Journal of Social Psychology*, *146*(2), 203-221.
<https://doi.org/10.3200/SOCP.146.2.203-221>
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review*, *98*(2), 224–253. <https://doi.org/10.1037/0033-295X.98.2.224>
- Muenks, K., Canning, E. A., LaCrosse, J., Green, D. J., Zirkel, S., Garcia, J. A., & Murphy, M. C. (2020). Does my professor think my ability can change? Students' perceptions of their STEM professors' mindset beliefs predict their psychological vulnerability, engagement, and performance in class. *Journal of Experimental Psychology: General*, *149*(11), 2119–2144. <https://doi.org/10.1037/xge0000763>
- OECD. (2019). *PISA 2018 technical report*. Paris: OECD publishing.
<http://www.oecd.org/pisa/data/pisa2018technicalreport/#d.en.423800>
- OECD. (2021). Sky's the Limit: Growth Mindset, Students, and Schools in PISA. PISA 2018. *OECD Publishing*. <https://www.oecd.org/pisa/growth-mindset.pdf>
- Rammstedt, B., Gruning, D. J., & Lechner, C. (2021). Measuring growth mindset: A validation of a three-item scale and a single-item scale in youth and adults. *PsyArXiv*.
<https://doi.org/10.31234/osf.io/rs43g>

- Rattan, A., Savani, K., Chugh, D., & Dweck, C. S. (2015). Leveraging mindsets to promote academic achievement: Policy recommendations. *Perspectives on Psychological Science*, 10(6), 721-726. <https://doi.org/10.1177/1745691615599383>
- Sagiv, L., & Schwartz, S. H. (2000). Value priorities and subjective well-being: Direct relations and congruence effects. *European Journal of Social Psychology*, 30, 177–198.
- Shaw, M., Rights, J., Sterba, S., Flake, J. (2020). *r2mlm: R-squared measures for multilevel models*. <https://doi.org/10.31234/osf.io/xc4sv>
- Sheffler, P. C., & Cheung, C. S. (2020). The role of peer mindsets in students' learning: An experimental study. *British Journal of Educational Psychology*, 90, 17-34. <https://doi.org/10.1111/bjep.12299>
- Sisk, V. F., Burgoyne, A. P., Sun, J., Butler, J. L., & Macnamara, B. N. (2018). To what extent and under which circumstances are growth mind-sets important to academic achievement? Two meta-analyses. *Psychological Science*, 29(4), 549-571. <https://doi.org/10.1177/0956797617739704>
- Sortheix, F. M., & Lönnqvist, J. E. (2015). Person-group value congruence and subjective well-being in students from Argentina, Bulgaria and Finland: The role of interpersonal relationships. *Journal of Community & Applied Social Psychology*, 25(1), 34–48. <https://doi.org/10.1002/casp.2193>
- Spiezia, V. (2010). Does computer use increase educational achievements? Student-level evidence from PISA. *OECD Journal. Economic Studies*, 2010(1), 1 – 22. https://doi.org/10.1787/eco_studies-2010-5km33scwlvkf
- Sun, X., Nancekivell, S., Gelman, S. A., & Shah, P. (2021). Growth mindset and academic outcomes: a comparison of US and Chinese students. *Npj Science of Learning*, 6(1), 1-9. <https://doi.org/10.1038/s41539-021-00100-z>
- Van Vianen, A. E. (2018). Person–environment fit: A review of its basic tenets. *Annual Review of Organizational Psychology and Organizational Behavior*, 5, 75-101. <https://doi.org/10.1146/annurev-orgpsych-032117-104702>
- Wang, Q., & Ng, F. F. Y. (2012). Chinese students' implicit theories of intelligence and school performance: Implications for their approach to schoolwork. *Personality and Individual Differences*, 52(8), 930-935. <https://doi.org/10.1016/j.paid.2012.01.024>

- Ward, C., Leong, C. H., & Low, M. (2004). Personality and sojourner adjustment: An exploration of the Big Five and the cultural fit proposition. *Journal of Cross-Cultural Psychology, 35*(2), 137-151. <https://doi.org/10.1177/0022022103260719>
- World Bank. (n.d.). The World Bank open data. Retrieved May 16, 2021, from <https://data.worldbank.org/>.
- Yeager, D. S., & Dweck, C. S. (2012). Mindsets that promote resilience: When students believe that personal characteristics can be developed. *Educational Psychologist, 47*(4), 302-314. <https://doi.org/10.1080/00461520.2012.722805>
- Yeager, D. S., & Dweck, C. S. (2020). What can be learned from growth mindset controversies?. *American Psychologist, 75*(9), 1269. <https://doi.org/10.1037/amp0000794>
- Yeager, D. S., Carroll, J. M., Buontempo, J., Cimpian, A., Woody, S., Crosnoe, R., ... & Dweck, C. S. (2022). Teacher mindsets help explain where a growth-mindset intervention does and doesn't work. *Psychological Science, 33*(1), 18-32. <https://doi.org/10.1177/09567976211028984>
- Yeager, D. S., Hanselman, P., Walton, G. M., Murray, J. S., Crosnoe, R., Muller, C., ... & Dweck, C. S. (2019). A national experiment reveals where a growth mindset improves achievement. *Nature, 573*(7774), 364-369. <https://doi.org/10.1038/s41586-019-1466-y>
- Yettick, H., Lloyd, S., Harwin, A., Riemer, A., & Swanson, C. B. (2016). Mindset in the classroom: A national study of K-12 teachers. *Editorial Projects in Education*. <https://epe.brightspotcdn.com/0d/a4/49a22bcf4f899a36427c6d7859c6/ewrc-mindsetintheclassroom-sept2016.pdf>