

School-led Mindset Messaging: Understanding Elementary Students' Meaning and Emotions

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Abstract:

Evidence generally supports a positive association between growth mindset and academic outcomes, even if the experimental evidence for growth mindset interventions is somewhat more tenuous. From an applied perspective, the concept of growth mindsets has grown in popularity with a proliferation of materials readily available to teachers and school administrators. The purpose of this multi-method study was to explore elementary students' (ages 6-12) understanding of growth mindset messaging created by their school and teachers, and its association with students' emotions. The results showed that students were positively impacted by the growth mindset messaging, both in school and when facing challenges outside of school. Their emotions were largely positive, with the exception of frustration, which participants associated equally with a growth and a fixed mindset. Results are discussed in relation to Mindset Theory broadly as well as in regards to school- and teacher-initiated mindset messages.

Key Words: Growth mindset, elementary school, student emotions, school-based

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Mindset theory (Dweck, 2006) is one of the most well-known perspectives on student motivation. As evidence of its reach, as of January 2022 Dweck's TEDTalk has more than 13 million views, has been translated into 41 languages, and her book (2006) has sold more than 2 million copies. From an empirical perspective, many studies have shown that when students hold a growth mindset - that is they believe that their abilities can grow with effort and appropriate strategy use - they tend to persist and perform better (Dweck & Yeager, 2019). This beneficial outcome has led to a proliferation of easily-accessible mindset materials and integration of such messaging into schools with the intention of improving academic achievement. However, little is known about how such mindset messaging impacts elementary school students' emotions at school even if it does relate to their achievement. The purpose of this research was to explore students' perceptions of school-wide mindset messaging in general and specifically on their emotions. In this instance, we use mindset messaging to indicate the types of messages, visuals, resources, and conversations that a school and teachers chose to implement based on their understanding of growth mindsets. In the two part study, we first collected qualitative data through focus groups to answer the research question: What are students' perspectives on the school's growth mindset messaging? After completing an inductive thematic analysis, we collected quantitative data through a survey to answer the research question: What emotions do elementary students associate with fixed and growth mindsets?

Mindset Theory

Research on mindsets in the past 30 years has provided important implications for educational policies and teachers' practices (Dweck & Yeager, 2019). The theory originally asserted that there are two core mindsets, or beliefs, people tend to hold about intelligence: a fixed mindset refers to beliefs that intelligence is predetermined at birth, and thus cannot be changed; whereas, a growth mindset refers to beliefs that intelligence can be cultivated through dedicated practice and perseverance (Dweck, 1999). Researchers have identified that students with a fixed mindset tend to experience frustration and low performance on challenging tasks. In contrast, students with a growth mindset rebounded to challenges by putting in more effort, diversifying their strategies, and achieving better grades (Dweck & Yeager, 2019). Such findings exist theoretically at both a domain-specific level, such as by curricular area, and at a more domain-general level such as for intelligence broadly, however, the influence of each remains under explored in the literature (e.g., Cutumisu & Lou, 2020; Petscher et al., 2017) and unaddressed for teachers.

Although growth mindsets regularly prove to be beneficial for students' achievement (Yeager et al., 2019), little is known about their association with students' achievement emotions (Pekrun, 2006) even though such relationships are conceptually argued (Dweck, 2006). Pointing at the benefits of growth mindsets beyond grades, Ortiz Alvarado and colleagues (2019) found that well-being significantly mediated the relationship between growth mindsets and academic performance in college students. Schroder et al. (2015) showed that growth mindsets may be beneficial for college students' mental health. Likewise, research is coming out of clinical psychology showing that growth mindsets in the areas of anxiety, depression, and emotions are important elements in successful treatment (e.g., Schleider & Weisz, 2018; Schroder, 2021). As much as students' emotions are part of their well-being, these studies suggest that discrete emotions should be enhanced by growth mindsets relative to fixed.

Helping Students Grow Mindsets

Formal Interventions

Mindset interventions range in empirical sophistication from single classroom studies to national randomized controlled trials with students from kindergarten to post-secondary education. In one of the first mindset interventions, Blackwell and colleagues (2007) tested the effectiveness of an eight session “incremental theory” (i.e., growth mindset) intervention on junior high students’ mathematics achievement, motivation, and effort. The intervention taught students about brain structure and function, involved activities that showed how a brain can grow and become smarter with practice akin to a muscles, addressed maladaptive stereotypes, taught study skills, and discussed adaptively managing mistakes through case studies and testimonies. Each session was 25 minutes long and there was one session per week for eight weeks. “The key message was that learning changes the brain by forming new connections, and that students are in charge of this process” (p. 254). Relative to a control group ($n = 43$), the experimental group ($n = 48$) reported more growth mindset, showed more effort as reported by their teacher, and earned higher grades. This type of growth mindset intervention has been manualized and made available through organizations such as Brainology^(R) (Mindset Works, 2016), which offers 2.5 hours of instruction and approximately 10 hours of follow-up activities.

Building on this success (Yeager & Dweck, 2020), researchers began seeking ways to “scale up” mindset research. Paunesku and colleagues (2015) created a 45-minute online growth mindset intervention as part of the Project for Education Research That Scales (www.perts.net) and recruited teachers from 13 schools across the United States to schedule their students in grades 9-12 to participate in sessions from their school computer lab. Once logged into the system, students were randomly assigned to experimental or control conditions regardless of their school. Building on earlier mindset interventions such as Blackwell et al. (2007), the online session had students read an article about how the brain grows and organizes itself in response to learning making explicit connections to neuroscience and then had them complete two writing exercises. Nearly 1,600 students aged 14-18 years old participated from diverse backgrounds, schools, and parts of the country. The results were the first to suggest that these types of psychological interventions could improve students’ achievement and motivation en masse. More recently, Yeager and colleagues (2019) used a pre-registered analysis plan to report on more than 6,000 students who have participated in the National Study of Learning Mindsets. They found a relative risk reduction of 11% of not completing high school for students in the growth mindset condition. The methodological sophistication and scope of these studies is nearly unprecedented in educational settings.

Perhaps because fixed mindsets seem to increase in middle school (e.g., Kim & Park, 2021), there is relatively speaking less research on growth mindset interventions in elementary school settings involving children approximately aged 6-12 than later years. In a recent study, Griffin, Elleman, and Oslund (2021) found that a growth mindset intervention paired with vocabulary instruction did not produce statistically significant improvement in vocabulary acquisition for Grade 1 students (age range 6-8 years old), even though the effect size was moderate. Wanzek and colleagues (2021) paired Brainology^(R) with a reading intervention for Grade 4 students (age range 9-11 years old) with pre-existing reading difficulties and found that the pairing improved performance on nonword reading tasks relative to the reading intervention alone and a control group. However, the impact did not extend to word reading, comprehension, or self-reported growth mindset. Looking across grade levels, Sisk and colleagues’ (2018) meta-analysis showed similarly small and inconsistent effects. Specifically, based on 43 effect

sizes drawn from experimental growth mindset interventions conducted between 2003-2016 they found that interventions only resulted in a meaningful change in performance for students from low socioeconomic backgrounds. In other words, the effectiveness of growth mindset interventions on various aspects of students' performance is somewhat undecided in the research literature and their impact on achievement emotions (Pekrun, 2006) is largely unexplored.

Mindset Messaging

The ubiquity of Mindset theory in education is clear. For example, most teachers in a UK nation-wide study indicated they were familiar with the concept of growth mindsets (Foliano et al., 2019), and almost all teachers in a US national survey (98%) believed that changing students' mindsets can improve academic performance (Yettick et al., 2016). Teachers and administrators can find any number of materials to support growth mindsets available through formal organizations (e.g., mindsetworks.com) or informally on Pinterest and teacher blogs. As such, administrators and teachers can create and implement mindset messaging in their schools by either following a prescribed program or collecting a variety of readily available non-academic materials and tailoring them to their own purposes.

Unfortunately, it is not very common for school- and teacher-led mindset messaging to be studied empirically. As an exception, Emery and colleagues (2018) examined how a middle school authentically implemented a mastery approach to learning. They interviewed administrators, teachers, and students to understand how the initiatives envisioned by administrators were taken up and understood by teachers and students. They identified seven themes across the three groups that showed places of high correspondence such as the type of *tasks* involved in mastery and places of disagreement such as the role of *evaluation*.

Like Emery et al. (2018), the site of the current research is one example of a spontaneous school-initiated program pertaining to mindset messaging. Struck by her own learning about mindsets and her perception that growth mindsets are “something that anyone can use” (S. H., personal communication, May 10, 2021), the Assistant Principal introduced mindset messaging to the school. The program relied on mindset language and visuals, but did not follow any formalized intervention program (Yeager & Dweck, 2020). In order to develop a common language at the school when talking about mindsets, the school created a Mindset Bulletin Board with important key phrases related to mindsets. For example, “I can always improve and make it better” reflecting a growth mindset, and “This is good enough” indicating a fixed mindset (see Figure 1). There were also efforts to include parents in the messaging by adding a mindset section to the monthly newsletter thereby providing a rationale for why the school and teachers were incorporating mindset messaging into students' learning. The hope was that when mindset messaging was incorporated well at the school and in classrooms, students would use the language spontaneously, feel positive emotions such as excitement when it comes to a challenge, and experience less discouragement.

Fidelity of Messaging

As much as increasing the amount of mindset messaging in schools may have benefits, there can also be concerns about the fidelity of messaging when implemented without a formal plan or structure. This inconsistency has resulted in instances when mindset messaging inadvertently misrepresents some of the core messages of theory (Dweck & Yeager, 2019). One of the most subtle misrepresentations occurs when growth mindset messaging is boiled down to putting forth effort with little consideration of associated changes to learning processes, strategies, and outcomes. This is a space that might be particularly relevant for emotions and well-being. For example, if students receive growth mindset messages focusing primarily on

effort without complementary changes to instruction, strategies, and assessment, they may blame themselves for not investing enough effort and become more likely to ruminate their failures (e.g., “I should have put more effort” or “Why didn’t I study harder?”). Indeed, there are some preliminary findings suggesting that the overemphasis on effort and persistence may lead people to ruminate and self-blame (Park & Kim, 2015), outcomes that could be particularly harmful to young students.

The Current Study

The main objective of this multi-method study was to explore the emotions that elementary school students (age range 6-12 years old) may experience in relation to authentic mindset messaging embedded into their school. We hypothesized that students would primarily experience positive emotions in relation to the messaging, but that there may also be instances of negative emotions particularly if effort was over-emphasized without opportunities to experience success.

Methods

We used a multi-method approach to examine students' perceptions of mindset messaging at their school and the emotions they experienced. Due to school board protocols associated with COVID-19, all data was collected remotely. Ethics approval was obtained from the Human Ethics Research Office at the researchers' university. Moreover, the research team completed a Cooperative Activities Program application that was required by the school district to conduct research at the school. Two ethical considerations were front of mind in these applications. First, we were cognizant that teachers and students were both carrying additional burdens with the COVID-19 pandemic and thus we ensured that no pressure was applied to participate in the study from the outset. Second, conducting focus groups remotely required additional attention to storing data provided by children. For this reason, data is available on request.

School and Participants

[School Name] is an urban community based school with an ethnically diverse student population with families typically from a middle to high SES background located in Alberta, Canada. The school population is about 570 students with more than 30 staff members. Implemented originally by the Assistant Principal and before COVID-19, a key goal of the school-wide mindset messaging was to develop a common language between administrators, teachers, students, and parents. The Mindset Bulletin Board (Figure 1) was the focal point in the school and contained key phrases that reflect growth and fixed mindsets. Teachers and students were invited to write instances of mindsets “in action” on the board as the year progressed. Teachers had read Dweck’s mindset book and had the support of the administrative team in using the messaging in their classrooms; however, there were no shared standards or expectations of messaging between individual classrooms.

Eight teachers agreed to have their classes participate in the study, representing three Grade 1 teachers, two Grade 2 teachers, two Grade 4 teachers, and one Grade 5 teacher (childrens’ enter grade generally at 6, 7, 9, and 10 years old). From these eight classrooms, 84 parents/guardians gave consent for their child to participate in the study and all 84 students chose to participate when given the option at the scheduled time.

Procedure

In the Fall of 2020, teachers at [school name] were invited to have their classes participate in the study (see Figure 2). In those classes, information letters were sent home to the parents or guardians of the students, and they were provided with a link to a consent form. Phase 1 of the research involved focus groups that took place in December 2020 at a time arranged

between a research assistant (RA) and the classroom teacher. Seven of the participating classes were meeting in person and one class was online at the time of the focus group. As part of public health protocols, all students were in class-based cohorts and thus participated in the focus groups with students from the same cohort. When more than 13 students from one classroom had parental consent to participate, the teacher divided students into two groups. We conducted 10 focus groups (see Table 1). The RA provided the teacher with a link to a virtual platform and students signed in with their individual computers to participate. Before the focus groups took place, the RA provided students with information about the study and what they would be asked to do. This allowed for students to provide verbal assent. The focus groups lasted between 30 and 45 minutes and was audio recorded for transcription purposes.

COVID-19 restrictions meant that researchers could not enter the school to help younger students complete the survey portion of the project, and so the school decided that only students in Grades 4 and 5 (ages 10-11) would participate in Phase 2 ($n = 37$). Phase 2 of the research took place in March and April of 2021 when students completed surveys in their classes about their mindsets. The survey was designed to provide additional information about students' mindsets and emotions based on the responses from the focus groups. Students completed the survey online at a time arranged by the classroom teacher. The survey took between 5 to 10 minutes to complete.

Materials and Measures

The focus groups were semi-structured. At the beginning of a focus group, the RA prompted the students to think about the Mindset Bulletin Board at the school (Figure 1). This was to guide the questions to follow based on the students' memory of this board. Questions were related to student perspectives on mindsets: "How does your mindset help you at school right now?" and their emotions: "Can you tell me about a time when having a mindset made you feel really good/not good?" The script for semi-structured focus groups is available in Appendix A.

The online survey consisted of 30 questions including Likert-scale items, and open ended questions. For the purpose of this paper, we focus on the items that relate to students' emotions and their perceptions of mindsets. Students were provided with the prompt "When I think about [growth or fixed] mindset I feel:" and then responded on a scale from 1 (not at all) to 5 (very much so) for eight emotions. We included four positive emotions: (a) excited, (b) confident, (c) happy, and (d) good, and four negative emotions: (e) bad, (f) sad, (g) angry and (h) frustrated. Students also completed a 4-item mindset measure (Porter et al., 2020). These items were: (a) You can learn new things but you cannot make yourself smarter, (b) You cannot change how smart you are, (c) How smart you are is something about you that you cannot change very much, and (d) People are born smart or not smart. This can't be changed. Students responded to these items on a scale from 1 (Not at all correct) to 5 (A lot correct). Scores on the items were summed and averaged with higher scores indicating a more fixed mindset, and lower scores indicating more growth mindsets. The alpha coefficient for the four items was .50, which was lower than anticipated. Because we did not use the measure in any type of inferential analysis and simply for descriptive purposes, we chose to keep all four items, but this should be looked at more closely. This lower than desirable indicator of reliability is discussed as a limitation.

Rationale for Analysis

We conducted our analyses in two stages. First, we examined the qualitative information from the focus groups to perform an inductive content analysis following three common phases of data reduction, data grouping, and then formation of themes (Kyngäs, 2020). Inductive content analysis is appropriate when "the phenomenon under study has not been covered in

previous studies or when prior knowledge is fragmented” (p. 14), both of which are true in regards to the authentic growth mindset intervention here. Second, we ran a frequency analysis and one-sample *t*-test on the mindset measure to examine students’ endorsement of a growth or fixed mindset, and 8 paired-samples *t*-tests to determine the differences in emotions students felt when asked about growth and fixed mindsets respectively. We applied a Bonferroni correction, and adjusted the *p*-value to indicate a significant difference when $p \leq .006$.

Results

Qualitative Results

The second and third author met regularly via video conferencing to undertake data analysis. They began by separately open-coding the transcripts from the interviews. This involved highlighting large meaning units of the transcript and making notes in the margins to capture their thoughts. They met to discuss the comments and large meaning units and used them to establish categories that were grouped into six themes distinguished by a definition and anti-definition (DeCuir-Gunby et al., 2011): (1) Practice and Effort, (2) Learning, (3) Help, (4) The Role of Others, (5) Positive Attitudes, and (6) Negative Feelings. Restrictions on meeting in person meant that all the conversation and work happened remotely; however, neither researcher felt that this changed their ability to work towards consensus on the final themes. No qualitative software programming was used. Each theme is elaborated below with verbatim quotes from students.

When discussing mindsets, students often referenced the importance of *practice and effort* in order to get better. They discussed how certain skills and subjects in school required considerable effort, and that when using a growth mindset, they often needed to “keep trying.” For example, one student explained that they used growth mindset-like thinking when they learned to ride their bicycle without training wheels and “the first time was pretty scary but [they kept] trying and trying.” In reference to using their growth mindset, another student explained how they “practiced and practiced [and] I’m getting louder and louder.”

Students affirmed that using a growth mindset supported their *learning* inside and outside of school. They felt a growth mindset allowed them to absorb concepts more quickly and with greater ease, to learn a variety of skills, and to recover from their mistakes. One student mentioned that the growth mindset “makes us think bigger and get more things done faster and in faster ways.” Another student said that since discussing mindsets with their class, they can get questions incorrect on a test and reevaluate, thinking “I can learn from this and next time I can get it right.”

Students often discussed recognizing or asking for *help* when needed as part of their growth mindset. For example, one student said “[when] I couldn’t do it... I raised up my hand and asked for help.” They also inferred that a growth mindset helped them when they were frustrated, confused, or feeling negatively about themselves: “helps you in school when you are having a hard time and with something that you can’t figure out...and it will make it a lot better and easier for you.”

Students did not view growth mindsets as a solitary experience and instead named several *roles of others* in their growth mindset. Students stated that teachers, parents, older siblings, and other family members helped them with their mindsets. Students spoke of how their own growth mindset can help them feel good for others when they succeed. For example, one student shared when “I see someone with a blue star or a green star who got something right I choose to be happy for them and I just congratulate them.” Many students added that they have shared what they know about growth mindsets with siblings and friends and gave examples of how they have

helped others in the past to shift their mindsets or attitudes: “One time my sister was doing her homework and she was like ‘I don’t know this’ and so I told her about growth mindsets... and she now keeps trying to improve.” Lastly, some students said that they liked how the growth mindset is useful for a variety of people, with one student saying that the growth mindset “helps everyone,” and another student stating that it “helps a lot of people.”

Some students discussed how having a growth mindset and a *positive attitude* go hand in hand. One student proclaimed “[that having a growth mindset] made me feel like I could answer the questions - it was possible.” While another student explained what having a growth mindset was like, stating “when I’m doing gymnastics, when I’m doing a really hard trick I like to think that I can do it and then I do it and then I’m happy.” Despite this positive tone, it’s important to note that younger students tended to use the words “growth mindset” and “positive attitude” interchangeably, suggesting that there may be some simplification of their conceptualization of mindsets as they are more than *just* positive thinking.

There were a few instances of *negative feelings* associated with growth mindsets. Mostly these feelings arose when there was a heavy focus on effort. For example, one student said: “When I do piano, it kinda makes me frustrated sometimes because my teacher pushes me a lot and sometimes it makes me kinda mad.” Another student talked about someone pushing them to do better: “tell[ing] you need to keep doing it, you need to keep doing it, over and over again, I start to get frustrated cus that’s not really helping me.” Interestingly, the only other instances of negative feelings occurred when students felt they did not use a growth mindset or when they did not encourage others. For example, one student explained that they felt like they “did something wrong” when they did not use a growth mindset.

Quantitative Results

The frequency of students for the averaged scores on the mindset measure are presented in Figure 3. Overall, students appeared to have significantly more of a growth than fixed mindset, $t(35) = 12.53, p < .001 [4.88, 6.78]$. We ran eight paired samples t -tests to examine the difference between the emotions students reported when thinking about a fixed or growth mindset. The means, standard deviations, t -values, and effect sizes ranging from Cohen’s $d = 1.40$ to 2.08 are in Table 1. For the positive emotions, students felt more excited, happy, confident and good when thinking about growth mindsets than fixed mindsets. Similarly, in terms of negative emotions, students felt less bad, sad, angry, and frustrated when thinking about growth mindsets than fixed mindsets.

Discussion

We used multiple methods to explore the impact of a single school-initiated growth mindset messaging on elementary students and their emotions specifically. Even in the midst of restrictions related to the COVID-19 pandemic, the growth mindset messaging implemented by the school and specific teachers appeared largely beneficial for students. We highlight three main results. First, students as young as six years old appeared to understand the messaging provided by the school and their teachers and were able to identify its role in their learning and life. Second, students appeared to generalize the mindset messaging to beyond school and to other people. Third, a growth mindset was overwhelmingly more associated with pleasant emotions than unpleasant. We conclude with implications relevant to Mindset Theory and practical implications for teachers and other members of the school community including educational psychologists.

No one is too Young

Working with young children during the early parts of COVID-19 posed additional challenges for teachers. However, the results of this study suggest that even students as young as six years old were able to receive and internalize mindset messaging from their school and teachers. As researchers, teachers, and policymakers become increasingly concerned about the negative impact of COVID-19 on young students' learning, even simple and relatively unregulated teacher-based growth mindset messaging may be one way to help students persevere through disruption and focus on effort, persistence, and learning. This finding, however, needs to be considered within the context of this one school which is relatively affluent, has high levels of parent involvement, and attention to student well-being. By extension, future research should attend to a wide age range of students as well as those from diverse schools.

Growth Mindsets Outside of School

Students regularly applied the notion of a growth mindset to experiences and situations outside of school. Although this extrapolation was not explicitly part of how teachers discussed growth mindsets, it shows that the belief system is intuitive to children and one that they can apply naturally to other challenging situations. For example, Petscher et al. (2017) found that a bifactor structure of general and reading specific mindset fit the data better than a single factor with Grade 4 elementary students. Alternatively, Cutumisu and Lou (2020) showed that domain general mindsets can be a strong predictor of outcomes; however, this finding pertained to college students. The results of our study cannot comment on quantitative measurement perspectives, but does encourage researchers to consider that the boundaries of a growth mindset might be broader than anticipated in young students who do not necessarily experience "school" as discrete subject areas yet. From an attributional perspective, previous research has found that students do not distinguish between the effects of ability and effort on learning outcomes until around 12 years of age, prior to which outcomes are conceptualized to be equally influenced by ability and effort (Folmer et al., 2008). Inasmuch as fixed and growth mindsets may be linked to ability and effort attributions, future longitudinal research could measure students' mindsets in discrete areas over multiple years to see if, when, and how mindsets become more domain specific and if they are attached to developmental or school based milestones.

Mindsets and Emotions

Growth mindsets have mostly been promoted for their potential benefit for academic performance (Dweck & Yeager, 2019). However, as a construct that fits within the nomological net of various positive psychology constructs, growth mindsets are likely associated with a host of other beneficial outcomes even if the empirical literature on such outcomes is somewhat limited (see Frondozo et al., 2020; Zarrinabadi et al., 2021 for exceptions). Indeed, the Grade 4 and 5 students in our sample reported associating pleasant emotions more strongly with a growth mindset and negative emotions with a fixed mindset. These results are particularly important for epistemic emotions such as frustration (Pekrun et al., 2017). Frustration is a negative activating emotion that occurs when confusion cannot be resolved and it leaves little room for learning because of its cognitive demand and affective unpleasantness (D'Mello & Graesser, 2012). It is encouraging that the authentic mindset messaging appeared to create a pleasant set of emotions that are supportive of learning relative to negative emotions that can impede it. Future research may want to bring the control-value theory (Pekrun, 2006) into consideration alongside Mindset Theory because they are rarely paired in the empirical literature as well as to explore a wider range of epistemic and achievement emotions.

Limitations

This research needs to be considered in light of three limitations. First, mindset research is most often interested in the impact on academic achievement measured through grades or tests; however, we did not collect this information as part of our study and thus we are unable to comment on how the school-wide messaging impacted achievement. This decision was made intentionally for two reasons: First, we were genuinely interested in students' emotions as a critical educational outcome in their own right (Pekrun, 2006). Second, the school uses a descriptive grading system with four levels (exemplary, proficient, adequate, and limited) awarded in seven curricular areas (English language arts, Mathematics, Health, Music, Social Studies, Science, and Physical Education) and although a “mean” type of score could be calculated, at the elementary school level this sort of “grade point average” measurement would lack ecological validity in this context.

Second, the results of each phase need to be considered in light of analytical challenges pertaining to reliability. In the quantitative phase the mindset questionnaire had lower reliability than anticipated. Investigation of the scale shows that the first item related to “not getting smarter” had low correlations with the other items and if removed would have increased the reliability to .56, which is comparable with the original Porter et al. (2020) paper which also reported a reliability of .56. Despite its popularity and widespread use, there has been very little psychometric work done on mindset surveys (Duckworth & Yeager, 2015), many of which use negatively worded items which can be problematic (Barnette, 2000). In the qualitative phase, the coders did not undertake any formal bracketing or bias exercises and did not compute a numerical indication of their reliability. For both phases, students may have experienced social desirability in terms of wanting to represent the mindset messaging favourably because of its centrality to their school. Future research on scales and focus group procedures that can be used with young students immersed in a mindset environment will make an important contribution to the field.

Third, several modifications were made to the study procedure in order to successfully undertake the project within the COVID-19 public health restrictions. In particular, the researchers were unable to enter the school for any reason and thus the focus groups were conducted via Google Meets^(c) and the surveys were completed online without support from the research team. It is also possible that the additional teaching demands associated with the pandemic resulted in more teachers feeling unable to participate in the study either to manage workload or because they had reduced their focus on mindset messaging within their classroom. Future research should consider including teacher interviews to better understand the type and frequency of mindset messaging they employed as part of the broader school-wide approach. Because teachers were the first point of recruitment, any teacher who did not feel able to participate by extension also excluded their students. This recruitment procedure may have biased the sample so that the student participants were those whose teachers were most committed to mindset messaging, thereby possibly inflating its effectiveness as a school-wide initiative.

Implications for Research and Practice

Although the magnitude of effects from formal mindset interventions have been called somewhat into question (Sisk et al., 2018), mindset researchers tend to have growth mindsets themselves and thus are continually seeking to understand these associations and processes rather than abandoning them completely (Yeager & Dweck, 2020). This curiosity is good because Mindset Theory is hugely popular and thus has implications for real teachers and classrooms. One implication for researchers is to seek both an understanding of formalized growth mindset

interventions as rigorously implemented and of teachers' and schools' use of less formal mindset messaging and resources. This type of work requires a way to find schools and teachers that are implementing growth mindset messaging (Seaton, 2018). To facilitate this, researchers and school boards could create a registry where teachers who are using any form of growth mindset messaging in their classrooms can indicate as such. The purpose of such a registry is not to micromanage the good work teachers are doing, but to allow opportunities to evaluate empirically how well mindset messaging works regardless of its conformity to "wise intervention" standards (Walton & Yeager, 2020).

In terms of implications for teachers and other members of school communities including educational psychologists, it is important to remember that the evidence of the effectiveness for mindset interventions is based on a specific set of characteristics. Yeager and Dweck explain that successful interventions argue "that ability itself has the potential to be developed...without making any claim or promise about the magnitude or ease of that change" (2019, p. 9; see also Yeager et al., 2016; Walton & Yeager, 2020). The interventions were borne out of social psychological theories that target specific maladaptive beliefs and that precision is a necessary component that cannot be watered down or overgeneralized. Thus, teachers who choose to create growth mindset messaging, materials, or activities will need to attend to the specific misbelief that is impeding students from making progress. Although motivation theory may not be at the forefront of teachers' professional development sessions, it would be important for educators to stay abreast of the empirical body of literature and understand the network of constructs to which growth mindsets belong (Dweck & Yeager, 2019). With their advanced training, educational psychologists may be well positioned to help teachers understand the theoretical grounding in Mindset Theory and to discern characteristics of intervention effectiveness and fidelity. In instances when educational psychologists encounter authentic mindset messaging that has drifted away from the core principles, they hold a critical role in correcting misconceptions.

In conclusion, this study reports on students' experiences of mindset messaging implemented in one elementary school. Overall, it seems that students internalized the meaning of growth mindsets for their learning in school and other challenges they encounter beyond school. A growth mindset was overwhelmingly associated with pleasant emotions, which are beneficial for student learning, but are also an important outcome in their own right (Pekrun, 2006). In this case, it seems that the efforts of teachers paid off in helping students hold a growth mindset and see a variety of positive implications from that self-belief.

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Table 1

Distribution of Participants Across Focus Groups

Teacher	Grade/Age	Size
A	Grade 1, 6-7 years	n=9
B	Grade 1, 6-7 years	n=9
B	Grade 1, 6-7 years	n=7
C	Grade 1, 6-7 years	n=8
D	Grade 2, 7-8 years	n=7
E	Grade 2, 7-8 years	n=8
F	Grade 4, 9-10 years	n=9
G	Grade 4, 9-10 years	n=6
G	Grade 4, 9-10 years	n=9
H	Grade 5, 10-11 years	n=13

Table 2

Paired Samples t-test

Emotion	Growth		Fixed		<i>t</i> -value	Cohen's <i>d</i>
	<i>M</i>	SD	<i>M</i>	SD		
Excited	3.47	1.32	1.53	.94	7.20	1.62
Confident	4.00	1.15	1.72	1.03	7.23	1.89
Happy	3.61	1.27	1.67	1.15	7.28	1.60
Good	3.83	1.08	1.53	1.16	8.20	1.69
Bad	1.25	.65	2.28	1.45	-3.70	1.66
Sad	1.19	.47	2.25	1.38	-4.48	1.41
Angry	1.33	.68	2.47	1.61	-3.82	1.79
Frustrated	1.86	1.33	2.75	1.73	-2.56	2.08

Note, all comparisons statistically significant at $p < .001$ except frustration in which $p = .007$ one-tail.

Figure 1.

Mindset Bulletin Board as the Focal Point for the School-wide messaging

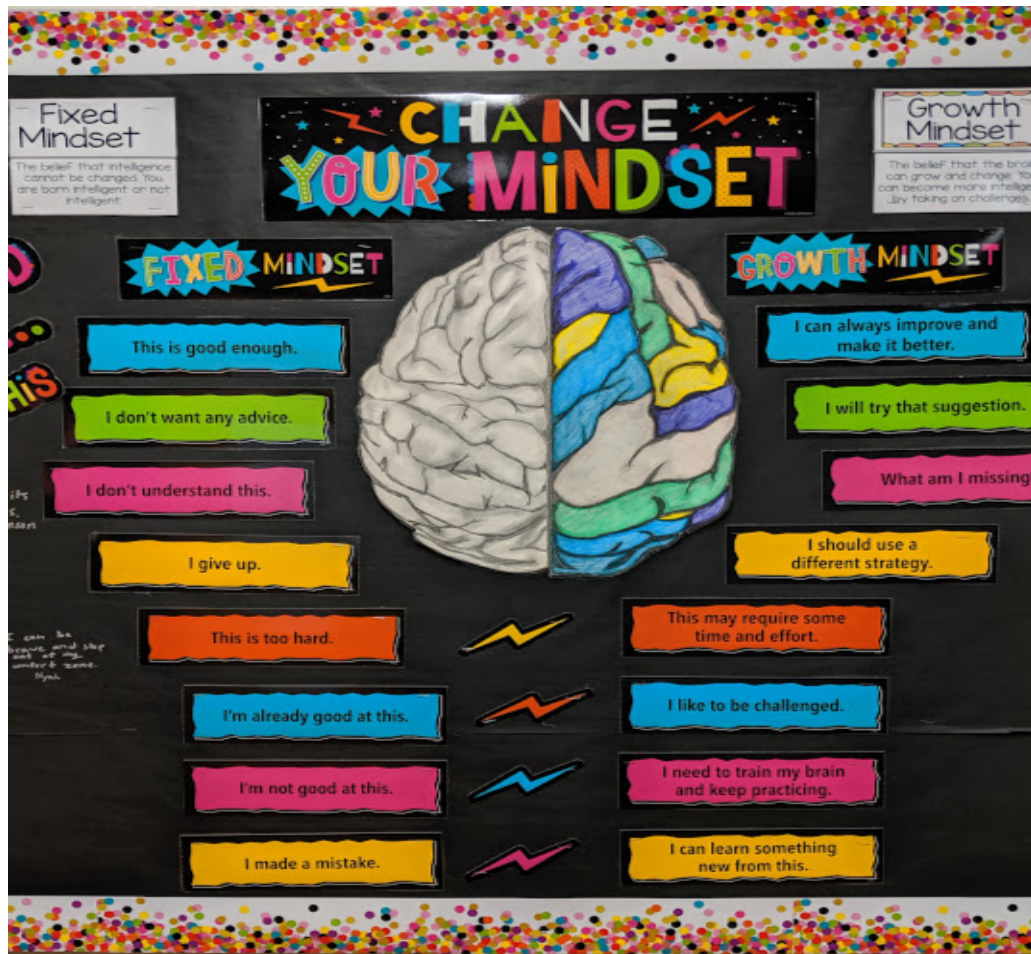


Figure 2.

Recruitment and Flow of Participants

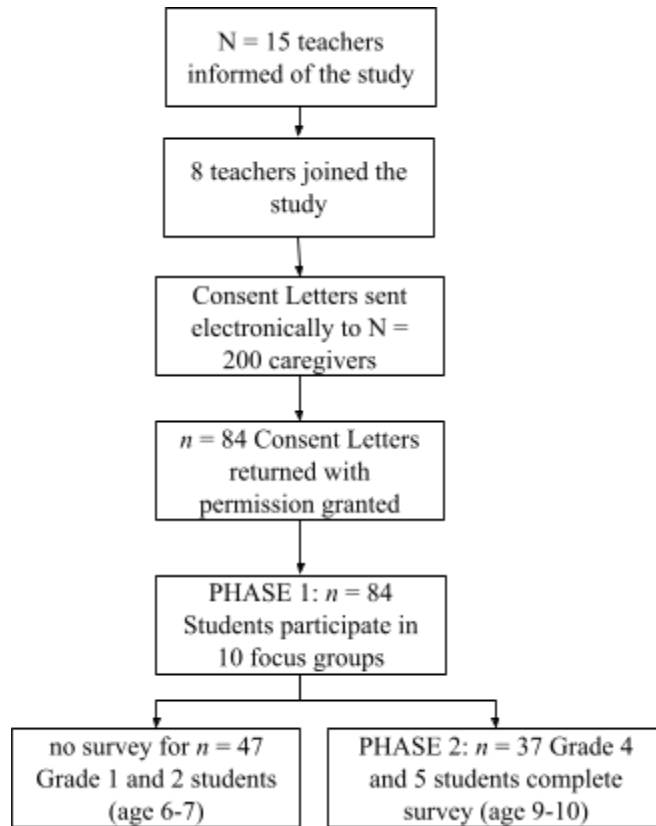
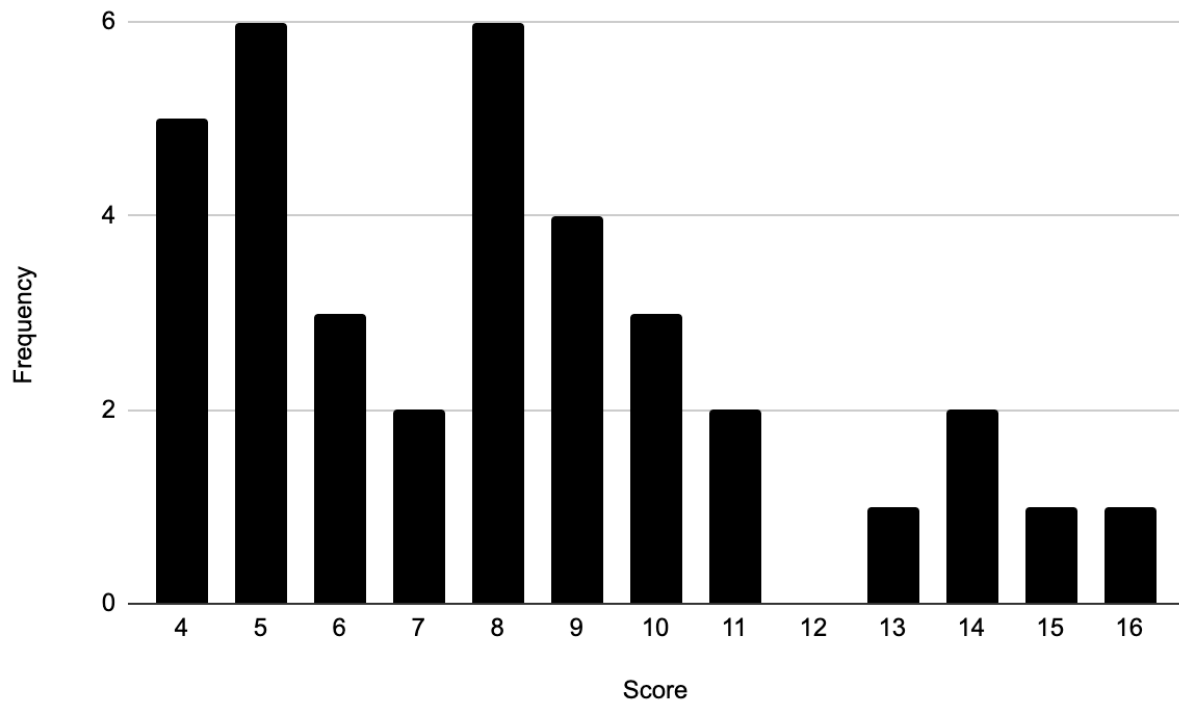


Figure 3.

Distribution of Mindset Scores



Note. lower scores are a more growth mindset.

Appendix A

Script for Semi-Structured Focus Group Questions

Put up your hand if you remember the “Mindset Board” outside Principal X’s Office. Here’s a picture of it to help you remember.

- What types of things do you remember about the Mindset Board?
- Why do you remember that? Why is that important to you?
- How do you talk about mindsets in your classroom now?

The mindset board suggests different things you can think at school and during your learning - especially when something in school is hard and maybe not going so well. Look at the statements now. Do any of them jump out at you? *[for grades 1 and 2 - let me read you a few and if you like one tell me to stop].*

- Why did you pick this one?
- Tell me how you feel about that idea?
- Why do you think you feel that way?

Option A	Option B only if no one responds
<p>The Mindset Board separates a growth mindset from a fixed mindset, who has an idea about what it means to have a fixed or growth mindset?</p> <ul style="list-style-type: none"> ● Which one is better? Why? How do you know? ● Can you change your mindset? How? ● Do people help you with your mindset? Who? 	<p>A growth mindset means that you believe your brain can grow and learn new things and a fixed mindset means that you can’t change how smart you are. Which do you think is true?</p> <ul style="list-style-type: none"> ● Which one is better? Why? How do you know? ● Can you change your mindset? How? ● Do people help you with your mindset? Who?

Sometimes our mindsets - either growth or fixed - can influence the way we feel - our emotions. Can you tell me about a time when having a mindset made you feel really **good**.

- Tell me more. What was going on? Why did you feel that way? What did you do?

Would you believe me if I said that sometimes mindsets can also make us feel bad? They can. Can anyone tell me about a time when having a mindset made you feel **not good**?

- Tell me more. What was going on? Why did you feel that way? What did you do?

How does your mindsets - either fixed or growth - help you most at school right now? What do you like most about mindsets?

Well our time is done. Thank you so much for taking some time to talk with me today. Your ideas help researchers at the University of X learn about kids’ mindsets. Your thoughts and feelings are really important and I am thankful you shared them with me. Does anyone have any questions about research or about mindsets?