Project Description:

The study's aims were to develop and test a school-based psychological intervention to help students develop adaptive narratives about academic and social challenges in middle school and improve academic engagement and achievement. We integrated key ingredients of previously-validated psychological interventions: (1) struggle stories of celebrities and scientists, (2) social belonging intervention, (3) growth mindset intervention, and (4) writing exercises that help students internalize the intervention's messages. These interventions work to change students' thoughts, feelings, and beliefs in and about school, such as the belief that intelligence can be developed through effort and that social challenges are normal and temporary. In turn, students are better equipped to take advantage of learning opportunities in school to generate long-lasting positive outcomes. Our intervention is one of the first to integrate psychological interventions to improve middle school students' engagement and achievement.

Project Accomplishments:

Prior to intervention implementation, we piloted and adapted the intervention to address the specific academic and social challenges of our target population, seventh grade students at a predominantly African American school (57% Black; 25% White; 90% eligible for free/reduced lunch). Then, using a randomized-control trial design, we implemented to the following year's cohort of 209 seventh graders. In 2016-2017 academic year, we collected three waves of student-report data (1 pre-intervention survey and 2 post-intervention surveys) to gauge the psychological mechanisms (e.g., changes in growth mindset) of how the intervention works to improve student engagement. We also will have students' academic achievement from their schools' records by the end of August in 2017 to understand the extent to which students' psychological processes translate to achievement outcomes. Moreover, we have gathered survey data from their mathematics teachers to understand students' learning context. This will provide us with greater understanding of the contexts in which psychological interventions work best.

Project Findings:

As we just finished the last post-test survey data collection in June and we are still waiting for the school record data, the analyses are not fully complete yet. Thus, we only presented what we have done so far. We found no main effect of the mindset intervention on students' behavioral engagement or on their mindset about effort. However, in line with prior research (e.g., Lin-Siegler et al., 2016; Pauneksu et al., 2015), we found that the mindset intervention was moderated by students' pre-intervention academic risk. Specifically, there was a significant interaction between the mindset intervention and students' initial behavioral engagement, such that students who started with relatively low behavioral engagement showed the greatest increases in engagement in the spring when assigned to the mindset intervention. In support of our theory of change, we found that this result could be explained by changes in students' beliefs about effort in the late fall. Students with initially low behavioral engagement in the mindset intervention condition developed more positive beliefs about effort. Finally, our analyses support the full moderated-mediation model of how the mindset intervention influenced initially low behaviorally engaged students' later spring engagement through their mindsets about effort.

Prior achievement did not moderate the association between intervention treatment and late fall mindset, nor the association between intervention treatment and spring behavioral engagement. However, we found an unexpected pattern of results that challenges the idea that academically

at-risk students benefit more from mindset interventions (see Figure 5). The study skills condition, rather than the mindset intervention, immediately benefitted lower-achieving students' behavioral engagement. Conversely, we found that higher-achieving students' showed greater increases in behavioral engagement when assigned to the mindset intervention. One potential reason for this divergent result is that, in certain school contexts, underachievement may be due to a lack of *skills* rather than a lack of motivation or *will*. This may be especially true for White students (who made up the majority of our sample), who do not face the same types of motivational barriers as their minority student counterparts (Walton & Cohen, 2007). In support of this hypothesis, we found that prior achievement was much less strongly correlated with students' initial mindset about effort, $r = .22$, $p < .001$. Because the root of underachievement did not necessarily stem from negative mindset beliefs, it is intuitive that a mindset intervention was not the appropriate remedy for these students.

Potential Contributions to the Field:

Our results highlight the importance for future research to examine individual differences in students' response to mindset interventions. It is notable that students in our study did not universally benefit from the mindset messages. We found that engagement increased only for students with initially low engagement, whereas the mindset intervention had no effect for students who were already engaged in school. This pattern aligns with prior work suggesting that students who are academically at risk benefit most from mindset content (Lin-Siegler et al., 2016; Paunesku et al., 2015). Students' pre-intervention academic functioning may indicate their current mindsets, and thus could determine whether intervention is necessary. Our results imply that future studies may need to consider pre-intervention "academic risk" as a multi-dimensional construct, rather than as a general indicator of sensitivity to intervention. Certain aspects of academic functioning, such as students' initial engagement, may indicate motivational challenges that can be remedied by mindset interventions. Other indicators, such as students' prior achievement, may actually suggest learning difficulties that require interventions that give students useable strategies. In order for interventions to be "wise," it is critical that researchers identify the process underlying the academic problem (see Walton, 2014).

Additionally, given the increasing push to deliver large-scale, high-impact interventions, researchers may want to develop wise interventions that combine mindset *and* study skills presentations. Indeed, many self-regulated learning theories posit that both metacognitive *skills* (e.g., planning, monitoring, and evaluation) and *will/motivation* (e.g., attribution beliefs, mindset, and attitudes) are critical for successful learning (Boekaerts & Corno, 2005; Efklides, 2011; Winne, 1995; Zimmerman, 2001, 2011). Students without metacognitive skills may have difficulties adapting problem-solving behaviors to different types of academic tasks and ultimately develop negative feelings toward learning. On the other hand, students without motivation to learn may be less willing to use the skills they have to solve problems and less persistent in the face of challenges and setbacks. Extant interventions that promote student engagement and achievement are currently stand-alone, as no research has sought to integrate the metacognitive skills with motivational beliefs into a single framework. In order to promote student engagement in academic learning, students need both *skill* and *will* to self-regulate and cope with challenges during the learning process. Accordingly, Kevin Binning and I are proposing an integrated approach to synergize the disparate goals of bolstering metacognition, shaping motivational beliefs, and inspiring behavioral change within the same intervention.