

## INTRODUCTION

# Instructional Interventions That Motivate Classroom Learning

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Motivation takes place at every point in the learning and achievement process. Many factors drive students' motivation, ranging from external rewards or schools' environments to students' personal goals and interests. Authors in this special issue utilize the research findings that students' beliefs about themselves, their environment, and what it takes to succeed in intellectual pursuits can influence their motivation and, as a result, their performance in school. This means that shaping these beliefs can potentially affect students' academic motivation and performance. Building on this insight, this special issue showcases a promising but underexplored approach to improving students' motivation and learning in schools: the design and implementation of psychologically informed instructional activities to change students' attitudes and beliefs. All of the authors studied motivational processes in schools and classrooms, and they tested the effectiveness of interventions against rigorous control conditions. Together, this issue reflects a genuine effort to thoughtfully and painstakingly understand the instructional processes that lead to improved motivation and learning in schools.

*Keywords:* motivation, instructional intervention, self-attribution, classroom learning

There are many reasons why students differ in their academic performance, such as cognitive ability, home environment, or teacher and school quality. Yet even when these factors are accounted for, there is still a wide variation in students' performance. How can we explain this? That is the question that this special issue addresses, and the issue focuses on students' motivation as an important source of this variation.

Students' beliefs about themselves, their environment, and the requirements for intellectual success can influence their motivation and, as a result, their performance in school (Bandura, 1986, 2005; Dweck & Leggett, 1988; Weiner, 2000). This means that shaping these beliefs can potentially affect students' academic motivation and performance. Building on this insight, this special issue showcases a promising but underexplored approach to supporting students' motivation and learning in schools: the design and implementation of psychologically informed instructional activities.

Each of the articles draws on a variety of motivation theories and models, such as attribution theory, mindsets or implicit theories of intelligence, expectancy-value theory, stereotype threat, and self-affirmation theory. Each examines the application of one or more of these theories to the design of interventions and instructional activities in school settings. These interventions and activities target the beliefs or perceptions that hamper students' motivation to learn. For example, many students attribute failure to insufficient intelligence rather than to their effort or the learning strategies they are using, particularly when learning challenging subjects or facing difficult school transitions (Hong & Lin-Siegler, 2012). Such attributions are commonly seen and are especially acute in science, technology, engineering, and mathematics courses—courses that many students fear but that are critical for their future jobs. This special issue explores how different types of instructional interventions can change students' unproductive beliefs and attributions to help them learn in classroom settings.

The focus on the psychology of the student is not meant to undercut the importance of other factors, such as the quality of subject matter instruction or school resources that can affect students' learning greatly. The current approach is meant to supplement rather than replace efforts to improve teachers' subject matter competence or to increase school resources. Nor is the current approach an attempt to "fix" or "reprogram" students from nonmajority backgrounds. Rather, the research showcased in this special issue represents an attempt to lift psychological barriers to student motivation and learning, such as unhelpful beliefs about their capabilities, about what it takes to be successful in schools and beyond, about whether they belong in their classrooms, and about effective strategies for self-regulation. With productive psychological conditions in place, they are better able to seize opportunities for growth in their classroom or school. Students who believe they

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can develop their abilities, secure in their belonging, equipped with effective self-regulatory tools, are more likely to benefit from quality instruction and classroom resources. By the same token, even high-quality instruction may yield disappointing results if students do not believe that they belong and can succeed.

### Motivation and Learning

For decades, motivation has been a topic of keen interest to educators and psychologists. Researchers typically define motivation as the processes that allow people to select appropriate goals and to pursue them successfully (Bargh, Gollwitzer, & Oettingen, 2010; Dweck & Leggett, 1988; McClelland, 1987; Touré-Tillery & Fishbach, 2014). For instance, optimally motivated students will seek challenging tasks, self-regulate effectively as they work on the tasks, and show resilience when they hit setbacks. They will invest more effort, find new strategies, or seek help if they get stuck. It is clear that students need this kind of motivation as they encounter difficult work or face a challenging school transition.

To examine these factors, motivational research, for decades, relied primarily on experimental studies in the laboratory and correlational studies in the classroom. These studies provided valuable information about how motivation works and provided a necessary basis for later attempts to influence student motivation. However, it was not until relatively recently that researchers tackled the daunting task of designing and implementing instructional interventions aimed at enhancing student motivation and learning. Before we turn to the instructional interventions in this issue, let us examine briefly some of the earlier lines of theory and research that led to them.

Motivation takes place at every point in the learning and achievement process. First, students bring to the learning situation their beliefs about the school setting: Do I belong here? Does my teacher respect and understand me? Can I trust my teacher? Can I be myself in this setting? Research shows that the answers to these questions can determine whether students believe that it is worthwhile invest in their schoolwork (see Deci & Ryan, 1985; Pintrich, 2003). It also helps them understand why things happen to them in school, for example, whether a negative outcome is a further proof that they are in a hostile setting or is instead something that happens to everyone and is a sign that they need to find a new strategy or seek input? The insight that these beliefs and understandings affect students' motivation is at the heart of the two articles by Gehlbach and colleagues (2016, pp. 342–352) and by Brady and colleagues (2016, pp. 353–373).

Next, students may bring to the learning situation beliefs about their own abilities, for example, beliefs about whether their intellectual abilities are fixed traits (an entity theory or fixed mindset) or malleable qualities that can be developed (an incremental theory or growth mindset). Of course, messages from teachers can also promote one mindset or the other (Rattan, Good, & Dweck, 2012). Research has shown that when students believe that their intellectual abilities can be developed, they are more likely to take on challenges, exert sustained effort, and learn from errors and setbacks (Blackwell, Trzesniewski, & Dweck, 2007; Moser, Schroder, Heeter, Moran, & Lee, 2011). This, in turn, can lead to greater achievement (e.g., Blackwell et al., 2007). These mindsets feature prominently in the articles by Yeager and colleagues (2016, pp. 374–391).

In a related vein, students may have certain beliefs about what it takes to be successful in school or in particular subjects in school. Especially in math and science, many students believe that it takes inherent ability or even brilliance to achieve well, rather than perseverance, good strategies, help from others, and learning over time (Hong & Lin-Siegler, 2012). Indeed, recent research shows that adult scholars in many math and science fields themselves believe that success comes from inherent aptitude that simply cannot be taught (Leslie, Cimpian, Meyer, & Freeland, 2015), a message that appears to make women and minorities feel less welcome. This means that when students encounter difficulty or struggle in these fields, they may give up, concluding that they lack the requisite aptitude, rather than simply need to try new strategies, seek feedback, and stay the course. The article by Lin-Siegler, Ahn, Chen, Fang, and Luna-Lucero (2016, pp. 314–328) shows how this kind of insight can form the basis for an effective instructional intervention.

Finally, pursuing learning effectively requires effective self-regulation throughout the learning process. Not only do students have to plan and execute the process for learning, but they also need to remain on task and resist the constant temptations and distractions that come their way, a feat that has become more and more difficult as new forms of media and greater amounts of texting and messaging come their way. Years of research show the importance of such self-control for achievement in the short-term and in the long-term (Mischel, 2014; Moffitt et al., 2011). The article by Duckworth, White, Matteucci, Shearer, and Gross (2016, pp. 329–341) takes these past findings and turns them into an intervention to increase students' awareness and use of effective self-control strategies as they work on academic tasks.

Clearly, students' motivation, especially in school settings, involves a constellation of closely related variables that unfold over time to affect learning. Years of basic research on how these different variables affect students' motivation and learning provide theoretically grounded constructs that can be applied in educational settings.

### Motivation and Instructional Interventions in Schools: Contributions of This Special Issue

Recently, we have witnessed an increased interest in applying the theories, constructs, and methods of basic motivational research to improve educational outcomes. Although this instructional research is only in its infancy, it shows promise to influence student performance and as a supplement to other interventions and reforms, such as those that target teacher recruitment and training, school structure, and curriculum.

The six articles in this special issue contribute to our knowledge of what it takes to design instruction that motivates students' learning and performance in schools. What these articles have in common is a genuine effort to thoughtfully and painstakingly understand instructional processes and craft interventions on the basis of years of theory-based research studies in the field of motivation. Most of the articles move beyond the laboratory to study motivational processes in schools and classrooms, and they test the effectiveness of interventions against rigorous control conditions. For instance, all of the experimental studies randomized students or classrooms to an intervention condition. All of the authors elaborate the processes underlying improved motivation

and improved performance and, often, attempt to measure these processes. All of the authors address not only what kind of motivational messages to convey to students, but how to best convey these messages in a credible and impactful way. Finally, all of the authors attempted to deploy multiple outcome measures, ranging from students' interests in learning specific subject matter, their beliefs about intelligence, the strategies students value, the approaches to studying, students' relationship with teachers, their desire to seek challenges, students' ability to control and regulate conflicting situations, and their academic performance. These skills are important for long-term success, especially across difficult school transitions when many students get derailed.

The issue begins with a year-long longitudinal study that examined the relationship between teachers' instructional practice, the development of students' beliefs about intelligence, and students' mathematics achievement in the first and second grades. Examining instructional factors contributing to students' motivation and achievement in math learning in early elementary school is especially important because children's acquisition of basic concepts at this age serves as a foundation for later motivation and learning (Barnett, 1995). In this study, Park, Gunderson, Tsukayama, Levine, and Beilock (2016, pp. 300–313) found that as early as first and second grades, children with an incremental theory of intelligence—who believed that intelligence was malleable—outperform those with an entity motivational framework on a standardized math test. This achievement advantage holds across the school year. Further, the more that teachers emphasize performance outcomes (e.g., demonstrating competence in the classroom), the more the students in that classroom endorse an entity framework at the end of the school year. These findings have significant implications for theory as well as practice. They show that classroom teachers' instructional practice predicts the development of children's motivational frameworks and that motivational frameworks in turn predict children's academic achievement in the early elementary school years. Thus, interventions that target teachers' instructional practice as way to help students' develop productive mindsets can be a fruitful area for future motivation research.

In the second article, Lin-Siegler and colleagues (2016) report a research study that examined the effect of story-based instruction on students' motivation and academic performance in science classes. They developed a novel approach to change ninth- and 10th-grade students' beliefs that success in science depends on exceptional talent. Stories were created to model how famous scientists such as Albert Einstein and Marie Curie struggled to convey the message that even the most accomplished scientists often fail and struggle. To test the impact of hearing people stories behind the science content that schools teach (see Lin & Bransford, 2010), they conducted a randomized classroom experiment in which students read biographical stories about these scientists' struggles to achieve or about their struggle to overcome difficulties in personal life, or they read control stories about the scientists' achievement. Results showed that participation in the struggle-story conditions improved science learning postintervention, relative to students in the control condition, and the effect of the intervention was more pronounced for low performing students. Moreover, far more students in the struggle-story conditions felt connected to the scientists. The instructional approach intends to motivate students' learning by humanizing the content knowledge

can be used to improve motivation and learning in science, and likely other subjects as well (Lin & Schwartz, 2003).

Duckworth and colleagues (2016) focused their field study on students' theories about what strategies are most effective in avoiding distracting activities when they are studying. Some students genuinely want to do well in school but are unable to regulate their behavior in ways that effectively advance them toward that aim (Corno & Mandinach, 2004; Zimmerman, 1989). Accordingly, their research identified the gap between students' longer term academic desires and their shorter term actions and revealed the type of strategies that students can use to close the gap. They conducted two field experiments to investigate the effects of teaching effective self-control strategies on students' motivation to use these strategies when appropriate. The results showed that students saw certain strategies as more effective—particularly those where people modify the situation to avoid temptation, compared with strategies where people try to respond or change something after the temptation is already in place. In addition, both high school and college students who were taught to practice situation-modification strategies, especially those who had some awareness of the effectiveness of these strategies, were more successful in meeting their academic goals, both in terms of spending more hours studying and improved academic performance.

In the fourth article, Gehlbach and colleagues (2016) studied social motivation in classrooms—specifically, impact of teacher–student relationships on students' motivation and learning. Extensive research has illustrated that positive teacher–student relationships predict many desired student outcomes (Eccles et al., 1993). However, there is scant research on interventions that improve teacher–student relationships. Their field experiment shows that using perceived similarity as a lever can improve teacher–student relationships (particularly in terms of teachers' perceptions of the relationship) and benefit students' motivation and classroom grades. These effects were more pronounced for black and Latino students than for students from other ethnic backgrounds. This research provides compelling evidence that targeted interventions that address teachers' and students' beliefs about the things they have in common can have meaningful effects on motivation and academic performance.

The study by Brady and colleagues (2016) investigated how the positive effects of a values-affirmation intervention persist over time. Countless studies have documented that people's views of themselves as having efficacy, agency, and integrity are key drivers of achievement motivation (see Bandura, 1978; Cohen & Sherman, 2014; Steele, 1988). This study examined the power of having students write about a core personal value from a value list provided by the researchers (e.g., sense of humor, religion, or relationships with friends and families) and elaborate on why that value was important to them. In the past, this affirmation activity has been shown to increase academic performance among those who are stereotyped as lacking in ability, including ethnic minority students (Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, 2009), female college students in advanced physics (Miyake et al., 2010), and first-generation college students (Harackiewicz et al., 2014). In the present study, college students completed a values-affirmation intervention and then were rerecruited for a follow-up session 2 years later. The intervention reduced the racial achievement gap

in college grade point average (GPA) by raising the cumulative grades of Latino students. How did this happen? The affirmation instructional activities created a lasting change in how students interpreted adversity. In response to an academic-stressor task that asked them to list all their end-of-semester requirements, Latino students in the affirmation group spontaneously generated more self-affirming and less self-threatening thoughts and feelings as assessed by an open-ended writing prompt. They also reported having a greater sense of self-adequacy as assessed by measures of self-integrity, self-esteem, and hope. This study shows that the affirmation instructional intervention can create enduring changes in the way students perceive and respond to adversity.

In the final article, Yeager and colleagues (2016) presented their research on redesigning mindset interventions to scale them up and evaluate their impact in broader school contexts. Although a number of researchers have validated smaller-scale mindset interventions, they have not taken these interventions to the next level: large scale interventions delivered via the Internet with little or no researcher involvement. This larger scale administration will allow researchers to see where and for whom the mindset interventions work to enhance motivation and achievement and where further improvements might be necessary. The work builds on psychological theory concerning the importance of implicit theories of intelligence or mindsets (e.g., Blackwell et al., 2007; Paunesku et al., 2015). First, they developed a method for scaling up a motivational intervention that had been shown to help students develop a growth mindset and lead to greater academic achievement (Paunesku et al., 2015). Next, they conducted two experimental evaluation studies of these revised instructional interventions with 7,500 students. Results showed that the revised intervention led to improved GPA and challenge-seeking abilities among ninth-grade students when delivered at a large scale with no direct involvement from the researchers. GPA improved among the lower-achieving students while challenge-seeking improved most among the higher achieving students. Their research attempted to convey a growth mindset message to a large population of students.

This collection of articles examines motivation coming from the inside and the outside. That is, how individual students' beliefs, perceptions and strategies in different school settings are shaped by and shape what happens in classrooms. We conclude this special issue with two commentary articles, one by Tim Wilson (2016, pp. 392–396; a social psychologist) and another by Dan Schwartz (2016, pp. 397–404; a learning science psychologist). They provide responses to the special issue as a whole, critiquing the strengths and limitations of each individual article and suggesting implications to future research studies. Their commentaries shed light on the current state of research in motivation and its possible forms in the future as we increasingly try to inject the hard-won lessons of the research into real-world classrooms.

All the articles in this special issue underwent thorough blind reviews by at least three reviewers with expertise in motivation, cognition, instructional design, and education. This review process was handled by the editor, Steve Graham. Together, these articles illustrate how motivation theories and findings can inform educators about the key processes driving student learning and performance. As researchers apply motivational theories to design and

implement instructional activities in schools, invent richer and more rigorous motivational behavioral measures, and replicate their findings across different domain subjects and school contexts, new motivation principles and applications will inevitably emerge. We hope that this special issue will inspire others to contribute to this enterprise.

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