UCHICAGOCCSR
THE UNIVERSITY OF CHICAGO CONSORTIUM ON CHICAGO SCHOOL RESEARCH

LITERATURE REVIEW JUNE 2012

Teaching Adolescents To Become Learners

The Role of Noncognitive Factors in Shaping School Performance: A Critical Literature Review

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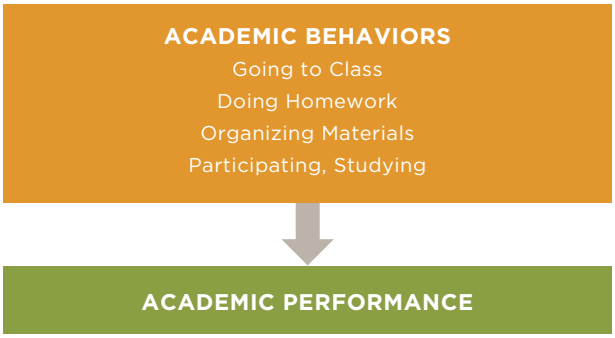
CHAPTER 2

Five Categories of Noncognitive Factors

Five General Categories of Noncognitive Factors Related to Academic Performance:

1. ACADEMIC BEHAVIORS
2. ACADEMIC PERSEVERANCE
3. ACADEMIC MINDSETS
4. LEARNING STRATEGIES
5. SOCIAL SKILLS

1. Academic Behaviors



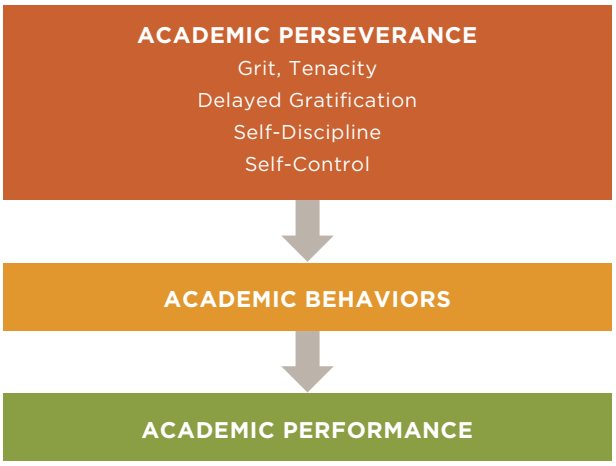
What does it take for students to graduate from high school, go to college, and persist to earn a degree? The list of potential answers to this question is long and extends far beyond content knowledge and academic skills. The noncognitive factors we considered for this review included: persistence, resilience, grit, goal-setting, help-seeking, cooperation, conscientiousness, self-efficacy, self-regulation, self-control, self-discipline, motivation, mindsets, effort, work habits, organization, homework completion, learning strategies, and study skills, among others. We pushed to clarify the meanings of a number of loosely defined concepts and to reconcile disparities between researchers from different disciplinary backgrounds (economists, psychologists, sociologists) who occasionally used different terms for similar constructs or the same terms to describe concepts that were measured quite differently. To synthesize the vast array of research literature on each of these concepts, we organized the wide range of traits, skills, behaviors, and attitudes into categories of similar constructs. We then created a conceptual framework, using empirical research and theory to hypothesize the relationships among categories and the relationship of each category to student academic performance. We describe each of the five categories briefly below, followed by a systematic review in the subsequent chapters of the quality of the research evidence in each category.

Academic Behaviors are those behaviors commonly associated with being a "good student." These include regularly attending class, arriving ready to work (with necessary supplies and materials), paying attention, participating in instructional activities and class discussions, and devoting out-of-school time to studying and completing homework. It is easy to see how these behaviors would directly relate to how well one does in a class. We start here in reviewing the relationship of noncognitive factors to academic performance because academic behaviors are most proximal to one's performance in school. Academic behaviors are the visible, outward signs that a student is engaged and putting forth effort to learn. Because they are observable behaviors, they are also relatively easy to describe, monitor, and measure. Academic behaviors are quite often an outcome of interest in evaluating interventions designed to improve students' school performance. Many programs, policies, and even curricula could reasonably be considered effective if they lead to an increase in student attendance, homework completion, studying, or class participation.

Academic behaviors are extremely important for achievement; we will show that virtually all other noncognitive factors work *through* academic behaviors to affect performance. We will return to this point in our review of academic perseverance, academic mindsets, learning strategies, and social skills, but it is hard to

imagine how noncognitive factors could improve student performance *without* working through the classroom behaviors that directly shape academic performance. Chapter 3 provides a summary of the research on academic behaviors.

2. Academic Perseverance



Academic Perseverance describes a set of psychological concepts with a long research history. Broadly, academic perseverance refers to a student's tendency to complete school assignments in a timely and thorough manner, to the best of one's ability, despite distractions, obstacles, or level of challenge. However, evaluating the literature on the range of concepts under our catch-all heading of "academic perseverance" proved challenging. To persevere academically requires that students stay focused on a goal despite obstacles (grit or persistence) and forego distractions or temptations to prioritize higher pursuits over lower pleasures (delayed gratification, self-discipline, self-control). Academic perseverance is the difference between doing the minimal amount of work to pass a class and putting in long hours to truly master course material and excel in one's studies. While academic perseverance is—by definition—a critical factor for students' long-term educational attainment and is often the explicit goal of the growing focus on noncognitive factors, the literature that falls under the umbrella of perseverance is not conclusive in its implications for educational practice or its generalizability to a broad range of students. Chapter 4 provides a summary of the research on academic perseverance.

3. Academic Mindsets

Academic Mindsets are the psycho-social attitudes or beliefs one has about oneself in relation to academic work. Positive academic mindsets motivate students to persist at schoolwork (i.e., they give rise to academic perseverance), which manifests itself through better academic behaviors, which lead to improved performance. There is also a reciprocal relationship among mindsets, perseverance, behaviors, and performance. Strong academic performance "validates" positive mindsets, increases perseverance, and reinforces strong academic behaviors. Note that this reciprocal, self-perpetuating system also works in a negative loop. Negative mindsets stifle perseverance and undermine academic behaviors, which results in poor academic performance. Poor performance in turn reinforces negative mindsets, perpetuating a self-defeating cycle.

A long history of psychological research undergirds the concept of academic mindsets. This includes foundational work in goal theory (Dweck, 1986; Dweck & Leggett, 1988); social learning theory (Bandura, 1977; Rotter, 1954); attribution theory (Weiner, 1979); expectancy-value theory (Eccles, Adler, Futterman, Goff, Kaczala, Meece, & Midgley, 1983); and the concepts of self-efficacy (Bandura, 1986) and locus of control (Rotter, 1954). Psychology research has also addressed the way context and experience can undermine positive academic mindsets, such as the theories of learned

helplessness (Seligman & Maier, 1967) and stereotype threat (Steele, 1997; Steele & Aronson, 1995). In Chapter 5 we review the literature on the relationship of four academic mindsets to academic performance, as well as the effects of learned helplessness and stereotype threat. Each of the four academic mindsets is briefly described here.

1. I belong in this academic community. The first mindset involves a sense that one has a rightful place in a given academic setting and can claim full membership in a classroom community. Educational theorists have long held that learning is a social activity and that understanding is constructed through interaction with others (Dewey, 1958; Vygotsky, 1978). Accordingly, students need to feel as though they belong to a community of learners and that their academic self is a "true" self (Harvey & Schroder, 1963; Oyserman, Bybee, & Terry, 2006). A long line of research evidence shows that having a sense of belonging in a school or classroom improves a student's academic performance.

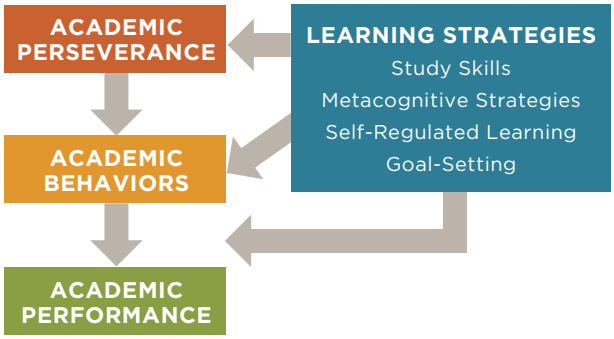
2. My ability and competence grow with my effort. The second mindset rests on the belief that one's academic ability can improve in response to one's efforts, rather than being fixed at a given level and outside of one's control. Notably, across the empirical literature, one's beliefs about intelligence and attributions for academic success or failure are more strongly associated with school performance than is one's actual measured ability (i.e., test scores).

3. I can succeed at this. A third mindset that impacts the degree to which students persevere in academic work and exhibit strong academic behaviors relates to beliefs about their abilities to succeed at a given task. Individuals tend to engage in activities that they feel confident in their ability to complete and to avoid those in which they lack such confidence (Bandura, 1986).

4. This work has value for me. A fourth mindset involves a student's sense that the subject matter he or she is studying is interesting and holds value. Value can be variously defined as the importance of doing well on a task (attainment value); gaining enjoyment by doing a task (intrinsic value); or serving a useful purpose or meeting an end goal that is important by completing a task (utility value) (Eccles et al., 1983).

Overall, the evidence clearly demonstrates that the four academic mindsets outlined above each increase students' academic perseverance and improve academic behaviors, leading to better performance as measured by higher grades. When a student feels a sense of belonging in a classroom community, believes that effort will increase ability and competence, believes that success is possible and within his or her control, and sees school work as interesting or relevant to his or her life, the student is much more likely to persist at academic tasks despite setbacks and to exhibit the kinds of academic behaviors that lead to learning and school success. Conversely, when students feel as though they do not belong, are not smart enough, will not be able to succeed, or cannot find relevance in the work at hand, they are much more likely to give up and withdraw from academic work, demonstrating poor academic behaviors which result in low grades. Concepts such as stereotype threat and learned helplessness rest upon the same theoretical underpinnings and illustrate ways that positive academic mindsets can be undermined by negative contextual conditions or experiences, thus interfering with students' academic performance. Chapter 5 provides a summary of the research on academic mindsets.

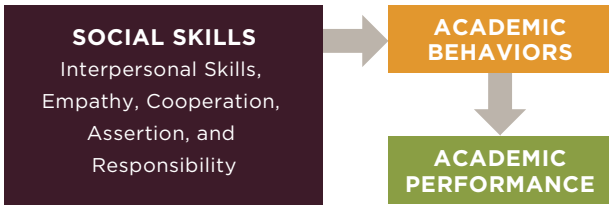
4. Learning Strategies



Learning Strategies are processes and tactics one employs to aid in the cognitive work of thinking, remembering, or learning. Effective learning strategies allow students to leverage academic behaviors to maximize learning. These include strategies to help one recall facts (e.g., mnemonic devices); strategies for monitoring one's own comprehension (such as while reading or doing math problems); and strategies to self-correct when one detects confusion or errors in

one's thinking. Learning strategies may also include goal-setting and time management, both of which help students manage the process of learning. Unlike the research on other noncognitive factors, which comes primarily from economists, motivation researchers, or developmental and social psychologists, the research on learning strategies also draws on work in cognitive science. Helping students to learn effectively is an area of research that bridges academic behaviors (e.g., studying), subject-specific cognitive domains of learning (e.g., understanding how to divide fractions in mathematics), metacognition, and self-regulated learning processes. Chapter 6 provides a summary of the research on learning strategies.

5. Social Skills



Social Skills are a fifth group of noncognitive factors which includes such interpersonal qualities as cooperation, assertion, responsibility, and empathy. Social skills are acceptable behaviors that improve social interactions, such as those between peers or between student and teacher. Social skills repeatedly appear in the literature as important for future work and life outcomes, although their direct relationship to academic performance is more tenuous.

Development of students' social skills has long been a focus of early childhood and elementary educators. In the primary grades, educators aim to develop students' social skills to enable them to work with peers and adults to accomplish academic goals. More recently, social skills have gained increasing attention as a critical factor for adolescents in connection with career readiness. Research has suggested that employers in the twenty-first century economy need workers with "people skills" that enable them to communicate effectively, work with diverse groups, and solve problems collaboratively (Casner-Lotto, Barrington, & Wright, 2006; Murnane & Levy, 1996). While the development of social skills may be an important educational goal in itself, particularly in the primary grades, social skills are also logically related to academic performance. For example, it stands to reason that cooperating in groups or participating appropriately in class discussions would lead to better academic performance. Perhaps social skills have a weak direct relationship with course grades because many classrooms—particularly at the high school level—still tend to rely on lecture-style instructional delivery which minimizes the social and cooperative aspects of learning. In contexts where individuals must work collaboratively in problem-solving teams, social skills are likely to be more directly related to performance.

As with our other noncognitive factors, most of the research and theory behind the development of social skills suggest that their effects on academic performance are largely indirect; they are enacted through students' behaviors in the classroom. Thus, we conceptualize social skills as affecting academic performance primarily by affecting academic behavior. Chapter 7 provides a summary of the research on social skills.

Putting Noncognitive Factors into One Framework

In reviewing the literature on these five noncognitive categories, we tried to conceptualize the relationships among factors as well as the relationship of each factor to academic performance, as measured by grades. **Figure 2.1** illustrates our working understanding of these relationships, although, as our review will make clear, much more research is needed to test the relative strengths of the paths in this model, the importance of each category controlling for the others, and the ways they interact. We anticipate that many noncognitive factors are mutually reinforcing and that relationships are often reciprocal. We used one-way arrows to illustrate the strongest hypothesized effect of each category on academic performance, but we anticipate that students' academic performance, in turn, will very likely affect their behaviors, their mindsets, their social interactions, and perhaps even their use of learning strategies. While the actual relationships among these factors are no doubt messier and more complex than indicated in the illustration, our review of the research suggests support for the ordering displayed in the model. For example, mindsets have been shown to affect academic perseverance, which

CHAPTER 9

Interpretive Summary

Leveraging Noncognitive Factors to Improve Student Outcomes

Since the mid-1980s, test score-based accountability has dominated American public education. This movement took on the force of federal law in 2001 with the No Child Left Behind Act, as every state in the country administered standardized tests to measure student and school performance. Ask any teacher, principal, or educational administrator about goals for the year; increasing test scores is the most likely response.

President Obama's first address to Congress signaled a shift in educational priorities. He committed his administration to ending the dropout crisis in the nation's public high schools and ensuring that by 2020 America would once again lead the world in the proportion of its population with college degrees. This shift has brought a host of education policies geared at increasing academic demand: adding graduation requirements, increasing participation in advanced coursework, and setting more rigorous curricular standards. The widespread adoption of the Common Core State Standards reflects an agreement across states to set a higher bar for college and career preparation.

What has not been talked about is that a shift to making high school and college completion our national educational goal requires a corresponding shift in educational policy and practice, *away from a focus on test scores* and toward a new emphasis on developing the cognitive and noncognitive factors that lead students to earn high course grades.

The emerging recognition of the importance of noncognitive factors to young people's long-term success raises new challenges for teachers seeking to prepare their students for college and careers. It also creates a conundrum for educators who have been told to focus on raising test scores, not only for purposes of accountability but also because test scores have been touted as strong indicators of student learning and college readiness. The evidence on the relationship between noncognitive factors and student grades—and between grades and long-term outcomes—challenges this focus on tests. If teachers want their students to be successful—both within their current courses and in their future endeavors—then teachers must attend to students' engagement in class material and their coursework performance, not just their tested performance. To make this shift, educators need to understand how best to help adolescents develop as learners in their classes. This should not be framed as an *additional* task for teachers, though for many it may mean teaching in new ways. By helping students develop the noncognitive skills, strategies, attitudes, and behaviors that are the hallmarks of effective learners, teachers can improve student learning and course performance while also increasing the likelihood that students will be successful in college.

The importance of students' grades—rather than test scores—for later outcomes requires that we better understand how to structure classrooms and schools in ways that improve student effort and performance in the daily tasks of the classroom. Of all the challenges posed by the implementation of the Common Core State Standards, this may be the greatest: if we are truly to be a nation of college-goers, we must not only raise the bar on *what* students learn but we must also leverage an understanding of noncognitive factors to teach adolescents *how* to become effective learners. In the absence of developing students as learners, current reform efforts are unlikely to succeed at increasing students' readiness for college.

This report grew out of the understanding that it is not enough to know that noncognitive factors matter for learning. Researchers from a range of disciplines have provided evidence that such factors are important to students' grades and long-term educational outcomes. However, little work has been done to bring clarity to this wide-ranging evidence, to examine its relevance for practice, or to review actionable strategies for classroom

use. Our goal was to develop a coherent and evidence-based framework for considering the role of noncognitive factors in academic performance. We conclude by summarizing the most promising levers for change as well as critical gaps in the knowledge base and in the link between research and practice.

Students Earn High Grades When They Show Perseverance and Strong Academic Behaviors

The best ways to improve students' perseverance and strengthen their academic behaviors is through *academic mindsets* and *learning strategies*. This is the central point emerging from our review. Academic behaviors and perseverance reflect the level of students' engagement in their work— the degree to which they are coming to class, completing assignments on time, participating, studying, trying to master material, taking time to do challenging work, and sticking with a task until it is done well. Students who do these things get higher grades, and students who do not do them struggle academically. This becomes increasingly true as students transition from the middle grades to high school and on to college. Strong academic behaviors and academic perseverance are the noncognitive *outcomes* that teachers want to achieve in developing their students as learners. These are the noncognitive factors most directly associated with good grades.

It is hard to change academic behaviors and academic perseverance directly without addressing academic mindsets and effective learning strategies. Ironically, trying to directly change behaviors and perseverance is not the best lever for improving students' academic performance. The critical levers for improving student grades seem to be through the development of academic mindsets and learning strategies. Academic mindsets strongly influence the degree to which students engage in academic behaviors, persevere at difficult tasks, and employ available learning strategies. In turn, the use of appropriate learning strategies strongly influences the quality and effectiveness of academic behaviors and helps students stick with a task and persevere despite obstacles. Thus, building students' academic mindsets and teaching them appropriate learning strategies are the best ways to improve academic behaviors and perseverance, which leads to better grades. Unfortunately, these are often areas in which teachers have little training. In the absence of a strong framework that clarifies the role of schools and classrooms in the development of noncognitive factors and a toolbox of strategies to effectively support this development, teachers often attribute differences in students' academic behaviors and perseverance to individual characteristics of their students—something they cannot control.

Unfortunately, teachers often misdiagnose poor academic behaviors and lack of perseverance not as a lack of strategies or a problem with mindsets but as indications that students are not motivated or do not care. Students who are not working hard in school are often diagnosed as being lazy or lacking motivation, with teachers seeing these as personal characteristics that students bring with them to the classroom. The conclusion that follows is this: if students would just work harder and not give up, they would do better in school; their academic performance is poor because either they do not care enough to try or they lack the grit or determination necessary for success.

Our research framework of noncognitive factors sheds a different light on the phenomenon of students who exhibit poor academic behaviors. Perhaps what looks like a lack of caring or persevering could be a student indicating that she is convinced that she cannot do the work. Another student may not have effective strategies for engaging in classroom tasks. Students who cannot see the relevance of a class may have difficulty finding a way to engage in the work. Others may withdraw from participating in classroom activities because they are afraid of public failure or feel ostracized by their peers. In our own research, we find that the vast majority of students want to succeed in school, but many obstacles get in the way of their putting forth effort.

Developing adolescents as learners requires paying attention to students' mindsets, skills, strategies, and behaviors as well as their content knowledge and academic skills. If students are not demonstrating strong academic behaviors, teachers need to be able to determine and address the obstacles that deter their learning. We hope that the framework presented in this report can serve as

a tool to diagnose potential underlying causes for weak engagement and poor academic behaviors and to develop strategies for re-engaging students as learners.

School and classroom contexts play a crucial role in shaping these noncognitive factors in individual students. Within a given course, students' sense of belonging, self-efficacy, and interest will be shaped by their experiences in the classroom, their interactions with the teacher and fellow classmates, their prevailing beliefs about their own ability, and the nature of the work they are asked to do. Their endorsement of a growth mindset will be shaped by the structure of learning opportunities and assessment practices, as well as by the messages they receive from teachers that emphasize ability or effort. Likewise, students are not likely to develop learning strategies in the absence either of explicit instruction or classwork that requires the use of such strategies.

It may be most helpful to think about noncognitive factors as properties of the interactions between students and classrooms or school environments. Rather than being helpless in the face of students who lack perseverance and good academic behaviors, teachers set the classroom conditions that strongly shape the nature of students' academic performance. The essential question is not how to change students to improve their behavior but rather how to create contexts that better support students in developing critical attitudes and learning strategies necessary for their academic success. Thus, teaching adolescents to become learners may require educators to shift their own beliefs and practices as well as to build their pedagogical skills and strategies to support student learning in new ways. Academic behaviors and perseverance may need to be thought of as creations of school and classroom contexts rather than as personal qualities that students bring with them to school.

The Role of Noncognitive Factors in Academic Performance: Implications for Research

The role of noncognitive factors in students' academic performance has gained increasing attention from both researchers and practitioners in recent years. While some very interesting and promising work has emerged recently, the state of the research evidence and the development of practice models still lag far behind the high level of interest. In this review, we were focused primarily on the implications and actionable pathways for teachers and classrooms that emerge from the research evidence. For this reason, we asked a different set of question of the research literature than one might ask in a traditional literature review conducted by an academic in this field. For each noncognitive factor, we asked:

- How is this factor related to academic performance?
- Is this factor malleable?
- What is the role of classroom context in shaping this factor?
- Are there clear, actionable strategies for classroom practice?
- Would changing this factor significantly narrow existing gaps in achievement by gender or race/ethnicity?

With this lens, we saw four major challenges that must be addressed if research on noncognitive factors is going to be useful for educational practice.

1. The need for conceptual clarity. One of the primary challenges to making research accessible to practitioners and relevant to policy is the lack of conceptual clarity among the many noncognitive factors that affect student performance. Much of the research conflates constructs that are conceptually very distinct. For example, work on social-emotional learning has used the demonstration of academic behaviors as indicators of having social-emotional core competencies (e.g., using studying and completing homework as measures of responsible decision-making). Likewise, academic tenacity has been described not only as showing persistence in tasks despite obstacles (the usual connotation of the word *tenacity*) but also as the mindsets that encourage tenacity—such as self-efficacy, sense of belonging, and a growth mindset. However, perseverance, mindsets, and behaviors are each conceptually distinct categories—a student can have a strong sense of self-efficacy but still not participate in a given class, for example. To really understand the mechanisms by which noncognitive factors affect academic performance requires conceptual clarity and a delineation of each step in complex interactive processes.

2. The need for direct evidence. A related shortcoming of some of the existing research is that researchers sometimes use noncognitive factors as a "catch-all" explanation for differences in student achievement without directly identifying or measuring specific factors. Some very influential research merely infers the existence of noncognitive factors when researchers are unable to find a measured cognitive explanation for differences in educational or workforce outcomes across different groups. In Heckman and Rubinstein's (2001) seminal study of the economic returns to a GED, for example, they attribute wage differences between GED recipients and high school graduates to differences in noncognitive skills without directly measuring any noncognitive skill differences or demonstrating their direct relationship to wages. Heckman and Rubinstein acknowledge this, explaining that there are too many different traits subsumed under the name "noncognitive skills" and no one way to measure them all. What they then attribute to differences in "noncognitive skills" is simply the difference in wages between high school graduates and GED recipients that could not be explained by tested achievement. Their evidence that noncognitive skills matter rests on their interpretation of the error term in statistical analysis, rather than the empirical identification of specific skills, traits, or behaviors that contribute to wage differences.

Clearly identifying and measuring specific noncognitive factors becomes particularly important when we try to understand why there are differences in educational attainment by race/ethnicity, gender, or income. Knowing what to do to reduce these gaps requires knowing the extent to which they reflect underlying differences between groups in specific noncognitive skills, beliefs, behaviors, or strategies, or whether attainment differences are better explained by other factors entirely. Without identifying or measuring what these important noncognitive factors are, research does little to help practitioners or policymakers take action to impact differences in students' noncognitive factors as it is not clear what they need to address.

It is also possible that practitioners might develop strategies that are ineffective or even counterproductive if researchers do not make clear distinctions between evidence on noncognitive factors and inference about them. For example, a much-cited study by Brian Jacob (2002) found that students' grades in middle school predict a large proportion of the gender gap in college enrollment and attributed differences in grades to noncognitive factors, reasoning that "conditional on cognitive ability, [grades are] determined by a variety of non-cognitive skills such as the ability to follow directions, work in groups, pay attention in class, and organize materials" (p. 591). The study did not actually measure students' ability to follow directions, work in groups, pay attention, or organize materials, and provided no evidence that there are gender differences in these behaviors. (It did measure time spent on homework and found that girls spent slightly more time per week than boys.) Yet practitioners might conclude from Jacob's assertion that they should invest time in further developing boys' academic behaviors. In fact, there are many different potential explanations for why boys in the middle grades have lower GPAs than girls, explanations that should be investigated if the GPA gap is to be addressed. For example, teachers might discriminate against boys when grading work. Parents could give boys more freedom to do their homework alone while monitoring their daughters more closely. Ten years ago, the American Association of University Women (AAUW) attributed the same gender differences we observe today—girls get better grades; boys get higher test scores—to gender bias in testing. Each of these interpretations is plausible, and there is nothing wrong with interpretation and debate; for research to be relevant for practitioners, however, it is important to delineate what is actually known from what seems promising but needs further study.

3. The need for more research on the role of school and classroom context in students' development and demonstration of noncognitive factors. Throughout this review, we have noted the role of classroom context in shaping noncognitive factors. Ultimately the practical goal of research on noncognitive factors is to help individual students become stronger learners who earn higher grades. This might suggest that a primary strategy to improve students' grades would be to focus on developing noncognitive factors as characteristics of individuals—implying that the "fix" is at the individual level. However, the research evidence to date suggests that trying to change noncognitive factors at the individual

level in isolation from context may not be effective in the long term. Our case studies of school transitions highlight the importance of context for the enactment of noncognitive factors. For example, the large rise in absences and decline in studying behaviors when students move into high school show that students who exhibit strong academic behaviors in one context might not do so in another. To what extent are noncognitive factors located within individuals in ways that are transferable across context, and to what extent are they dependent on context?

Intervention studies of academic mindsets suggest some long-term effects on student achievement. However, it is not clear if they are helping students perform better in a particular context or whether they have changed something fundamental about each student's academic identity that will transfer across contexts. For example, seventh-graders who benefit from a growth mindset intervention have been shown to improve their performance during seventh grade with lasting effects to eighth grade, but we do not know what will happen as these students move from middle grades to high school. Likewise, interventions that normalize difficulty in the first year of college or increase the sense of belonging of African American students on elite college campuses improves their college performance, but we do not know if these benefits transfer from college to the workplace. Teaching students learning strategies seems promising, but again there is little research on its effectiveness across school contexts. At this point, we do not know to what extent interventions that focus on individuals can have lasting impacts on their engagement in learning across contexts.

We also want to recognize the role of the larger school context in shaping student performance. Throughout this review, we have looked at evidence on the role of classroom context and the availability of classroom strategies, but we know that teachers do not work in isolation. School-wide initiatives and structures, as well as school culture and environment, play a role in shaping students' experiences and performance in the classroom (Bryk, Sebring, Allensworth, Luppescu, & Easton, 2009). Research is also needed on the role of school contexts in promoting positive academic mindsets and on the work of school leaders in providing supports and professional development for teachers to build their capacity to address noncognitive factors in the classroom. Whether the best approach to leveraging noncognitive factors to improve student performance is through changing school and classroom contexts to be more supportive of students as learners or through targeting interventions at the individual level to address individual challenges depends in large part on the transferability of effects across contexts.

Designing future studies to address longitudinal questions will be very important for research going forward.

4. Teachers need coherent, actionable strategies for developing students as learners in the context of regular classroom instruction. If researchers strive for conceptual clarity and precise identification and measurement of individual noncognitive factors, this will help illuminate the mechanisms whereby each individual factor interacts with the others to affect student performance. However, where researchers need to pull everything apart and understand how it works, teachers need a coherent, integrated approach to build academic mindsets, learning strategies, social skills, academic behaviors, and academic perseverance as part of their everyday classroom practice. We cannot expect a teacher to implement separate interventions for all of the noncognitive factors that matter for their students' performance. Instead, they need guidance about how best to build classroom contexts and utilize pedagogical strategies that will leverage the body of research on noncognitive factors as they teach content and skills.

This is not to say that teachers are not an important audience for the research on noncognitive factors or that teaching as a profession does not need to take this research into account. But teachers should not be expected to focus on noncognitive factors as "another thing" to teach in isolation from the development of content knowledge and core academic skills. Fortunately, research from the learning sciences shows the tight interconnection between cognitive and noncognitive factors in shaping student learning and academic performance. For example, the evidence suggests that positive academic mindsets and learning strategies are developed through supporting students in engaging in challenging work. Teachers can design their classrooms

so that they build mindsets, skills, behaviors, and strategies in pursuit of handling challenging content knowledge and developing core academic skills. Studies that seek to illuminate how this is all best pulled together in actual classrooms will provide an important step in bridging research and practice.

To the extent that we already have some knowledge base about how to develop positive mindsets and which learning strategies produce high learning gains, this knowledge needs to be much more accessible to teachers. Currently the vast majority of research on noncognitive factors is not written for a practitioner audience, and the literature is not available in places teachers are likely to go for professional learning. Bridging the gap between existing researcher knowledge and teacher practice is another important step.

There is also diffuse knowledge among practitioners that could inform practice broadly if it were systematically collected and disseminated. The most successful teachers may already have developed strategies that leverage noncognitive factors to engage students in learning. Researchers could gather evidence from practice to broaden our knowledge about how to do this. Such studies would need to be designed both to address unanswered questions and to incorporate what we already know. For example, we have strong evidence that noncognitive factors need to be understood along a developmental continuum. Separate studies of techniques and strategies used by effective instructors at the middle school, high school, and college levels would be helpful. Researchers should also consider gathering student-level data on mindsets, behaviors, skills, and strategies; any changes in these noncognitive factors should be measured over time for students in a given classroom as part of any study of effective classroom practices. In short, both empirical evidence and practice wisdom exists that could contribute to a broader understanding of the role and development of noncognitive factors in academic achievement, but this evidence and wisdom is too often isolated by disciplinary boundaries as well as the gulf between research and practice. Collectively, we still know too little about how teachers and school leaders can incorporate attention to noncognitive factors into the everyday work of schools and classrooms. Future research should aim to bridge this divide.

The Promise of Noncognitive Factors in Teaching Adolescents To Become Learners

As this review indicates, we know much about the role of noncognitive factors in academic performance. But there is still much to be learned about how to leverage noncognitive factors to transform educational practice from its current focus on content knowledge and testable academic skills to the broader development of adolescents as learners. Decades of research inform our understanding and point us towards promising practices in the classroom. Our conceptual framework organizes different categories of noncognitive factors and models how they fit together to affect student performance. This provides a foundation for future research and a framework for practice. Teaching adolescents to become learners requires more than improving test scores; it means transforming classrooms into places alive with ideas that engage students' natural curiosity and desire to learn in preparation for college, career, and meaningful adult lives. This requires schools to build not only students' skills and knowledge but also their sense of what is possible for themselves, as they develop the strategies, behaviors, and attitudes that allow them to bring their aspirations to fruition.

This is an abridged version of Farrington, C. A., Roderick, M., Allensworth, E., Nagaoka, J., Keyes, T., S., Johnson, D. W., & Beechum, N. (2012). *Teaching adolescents to become learners: The role of noncognitive factors in shaping academic performance - A critical literature review.* Chicago: University of Chicago Consortium on Chicago School Research. The full report is available on the CCSR website: https://ccsr.uchicago.edu/sites/default/files/publications/Noncognitive%20Report.pdf