Academic Mindsets and Behaviors, Prior Achievement, and the Transition to Middle School

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Jason Snipes and Alexander Jacobson   **October 2021**

Middle school is an important crossroad in a student's academic journey. As students enter middle school, their academic achievement and engagement frequently declines. This is true particularly for Black and Latinx students. Poor middle school grades are often a harbinger of poor performance in high school and beyond. In particular, having a grade point average (GPA) below 2.0 is a strong signal of continuing negative academic outcomes. Previous research has found that academic outcomes around the transition to middle school are related to, and might even be driven by, academic mindsets, including growth mindsets (such as beliefs about the malleability of academic ability and the payoff to effort) and performance avoidance (fears of failure and the desire to avoid academic effort), and resulting academic behaviors (such as completing homework).

This study examined the relationship between 2016/17 grade 5 student responses to a Clark County School District (Nevada) survey on levels of academic mindsets and behaviors and the predicted probability of earning a low GPA (below 2.0) at the end of the first semester of grade 6 (the first year of middle school) in 2017/18. Grade 5 students who reported high levels of growth mindset and academic behavior and low levels of performance avoidance had a lower predicted probability of having a GPA below 2.0 in the first semester of grade 6. Once student scores on grade 5 state standardized math and English language arts achievement exams were accounted for, levels of academic mindsets and behaviors among grade 5 students with scores at or above the district median did not predict meaningful differences in the probability of having a GPA below 2.0 in the first semester of grade 6. However, among grade 5 students with prior academic achievement below the district median, students who reported high levels of growth mindset and academic behaviors and low levels of performance avoidance had a lower predicted probability of having a GPA below 2.0 in the first semester of grade 6, even after differences in individual grade 5 prior academic achievement were accounted for. These patterns were essentially the same for all racial/ethnic groups as well as for both English learner students and non–English learner students.

Why this study?

Ensuring that all students graduate on time and ready for college is an important goal for school districts across the country, including the Clark County School District (CCSD) in Nevada. Although average graduation rates have improved, disparities remain between racial/ethnic groups and between English learner students and non–English learner students. While the 2019 CCSD on-time graduation rate was 86 percent overall, it was 90 percent for White students, 76 percent for Black students, and 82 percent for Latinx[1] students (Nevada Department of Education, 2020). Moreover, there are meaningful differences across student groups in their level of preparation for postsecondary education or careers, even among students who graduate from high school on time. For example, grades, even more than test scores, are a documented predictor of student success in college (Allensworth & Clark, 2020; Eller & DiPrete, 2018; Hodara & Cox, 2016; Hodara & Lewis, 2017). Previous research has reported that grade point average (GPA) differs significantly between White students and their Black and Latinx counterparts, that these gaps grow over time (Borman et al., 2000, 2021), and that many students graduate from high school unprepared for college coursework (Eller & DiPrete, 2018; Hodara & Cox, 2016).

> For additional information, including survey measures, detailed results, information on missing data, and student group analysis, access the report appendixes at https://go.usa.gov/xMGUH.

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1. CCSD refers to this group of students as Hispanic.

The transition to middle school is a key period when many students either move toward graduation and college readiness or begin an academic slide that can end in failing to graduate and be ready for college (Borman et al., 2021; Eccles, 2008; Kurlaender et al., 2008). For many students the changes in academic demands that come with middle school, along with difficulty navigating increasingly complex academic and social contexts, result in a decline in academic performance and engagement. This can be reflected in difficulties with grades, attendance, and behavior that sometimes continue through the end of high school, including failure to achieve on-time graduation and readiness for college (Alspaugh, 1998; Anderman, 2003; Balfanz et al., 2007; Borman et al., 2016; Borman et al., 2021; Cook et al., 2012; Eccles, 2008).

Previous research suggests that academic mindsets can affect academic success (see box 1 for definitions of key terms). A belief in the malleability of academic ability and in payoffs to effort (growth mindset) is thought to support academic engagement and success (Dweck, 2002; Dweck et al., 2011; Yeager & Walton, 2011). As students approach middle school, they tend to gravitate toward explanations of academic success and failure that emphasize fixed traits such as ability or intelligence, rather than effort or persistence (Dweck, 2002). Such conceptions appear to reduce academic effort and school engagement, which in turn undermines academic success (Dweck, 2002; Farrington et al., 2012; Yeager & Walton, 2011). Fears of failure and embarrassment that make students reluctant to extend themselves academically (performance avoidance) are often tied to negative stereotypes about their racial/ethnic group and undermine student engagement and participation in school, as well as their academic success (Borman, 2017; Eccles, 2008; Farrington et al., 2012; Steele & Aronson, 1995; Walton & Spencer, 2009).

Box 1. Key terms

Academic behaviors. Behaviors relevant to academic performance, including coming to class ready to work (for example, arriving with the necessary supplies and materials), attending class regularly, paying attention and participating in class, and devoting adequate time out of class to studying and homework (Farrington et al., 2012, 2014). The current study measured academic behaviors using student self-reports on items from a Clark County School District (CCSD)–administered annual student survey on growth mindsets, performance avoidance, and academic behaviors (see appendix A).

Academic mindsets. Student attitudes, beliefs, perceptions, and disposition about themselves, their academic potential, and their relationship to school (Dweck et al., 2011). This report focuses on two dimensions of academic mindsets: performance avoidance and growth mindset. Both dimensions are measured through student self-reports on the CCSD–administered survey (see appendix A).

Grade 5 students. CCSD students enrolled in grade 5 during the 2016/17 school year.

Grade 6 students. CCSD students enrolled in grade 6 during the 2017/18 school year.

Growth mindset. A dimension of academic mindsets that refers to the belief that intelligence and academic ability are not fixed but are malleable and can be increased through effort and learning (Dweck et al., 2011).

Low grade point average (GPA). A GPA below 2.0, calculated using a traditional 0–4 scale and including all courses.

Meaningful differences. Differences of at least 5 percentage points, which the study team established as the criterion for meaningful differences in this study. Differences of less than 5 percentage points, even if they are statistically significant, are not considered meaningful and receive minimal mention in this report.

Performance avoidance. The tendency or desire to reduce or reject overt academic effort to avoid failure or embarrassment. Performance avoidance is inversely related to growth mindset (Farrington et al., 2014; also see appendix B).

Positive academic mindsets and behaviors. The set of academic mindsets and behaviors associated with increased academic engagement and performance. These included high student reported levels of growth mindset and academic behaviors and low reported levels of performance avoidance on the CCSD–administered survey (see appendix A). Students at the 75th percentile of the CCSD distribution on levels of growth mindset and academic behaviors and at or below the 25th percentile on levels of

performance avoidance were classified as having a **high level of positive academic mindsets and behaviors.** Students at the 25th percentile on levels of growth mindset and academic behaviors and at the 75th percentile on performance avoidance were classified as having a **low level of positive academic mindsets and behaviors.** Students at the 50th percentile on all three measures were classified as having a **median level of positive academic mindsets and behaviors.**

Prior academic achievement. The average of a student's grade 5 math and English language arts scores on the **Smarter Balanced Assessment Consortium (SBAC)** standardized state tests. Students were classified into three prior academic achievement groups: below the 25th percentile of achievement, from the 25th to the 50th percentile, and 51st percentile and above.

Typical students refers to students with typical grade 5 academic achievement for their prior academic achievement group (below the 25th percentile of achievement, from the 25th to the 50th percentile, and 51st percentile and above). This translates into the median grade 5 SBAC achievement level for all students within each group (for example, median grade 5 SBAC scores among students with grade 5 SBAC scores at the 51st percentile and above, or the median grade 5 SBAC scores among students with grade 5 SBAC scores from the 25th to the 50th percentile).

Unsuccessful transition to middle school. Having a GPA below 2.0 in the first semester of grade 6.

Positive academic mindsets include beliefs more consistent with a growth mindset and less consistent with performance avoidance. These mindsets are hypothesized to facilitate students' willingness to participate in the kinds of behaviors that increase academic success, such as preparing for class and completing homework assignments. These positive academic behaviors help generate academic success and improve school experiences, reinforcing the positive academic mindsets that encouraged students' academic engagement in the first place. This reinforcement supports continuing engagement in academic behaviors, which in turn fosters continuing academic improvement and success, and so on. This positive recursive cycle, which is hypothesized to improve student engagement and outcomes and to generate sustained academic improvements that grow over time (figure 1), is at the core of multiple psychosocial interventions that have generated significant lasting effects on student outcomes (Borman, 2017; Borman et al., 2019; Dweck et al., 2011; Farrington et al., 2012; Snipes et al., 2012; Yeager & Walton, 2011; Yeager et al., 2016). Grade 8 measures of growth mindset, performance avoidance, and academic behaviors have predicted CCSD students' probability of being on track for high school graduation at the end of grade 9 (Snipes & Tran, 2016).

Exploring the relationships between factors surrounding academic mindset, academic behaviors, and academic achievement, and the transition to middle school could shed light on decisions about which approaches CCSD, as well as schools and districts elsewhere, might want to emphasize in supporting students' transition to middle school. To the extent that documented meaningful relationships exist between student reports of positive

Figure 1. Positive recursive cycle
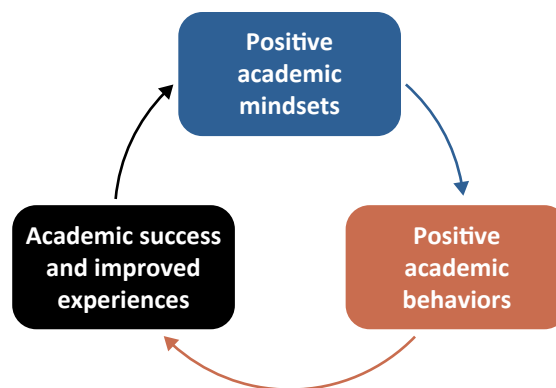
Source: Authors.

academic mindsets and successful transition to middle school, districts and schools might want to investigate whether targeted supports or interventions directed to academic mindsets, academic behaviors, or both generate positive effects on the transition to middle school. For example, districts might implement or test several interventions (such as belonging, self-affirmation, and growth mindset interventions) that target these psychosocial outcomes (Borman, 2017; Borman et al., 2019; Cohen et al., 2009; Yeager & Walton, 2011). Districts might also choose to develop their own approaches to supporting these academic mindsets and beliefs. However, if no meaningful relationships exist, districts and other stakeholders might consider investing intervention resources elsewhere or perhaps investing less in collecting data on academic mindsets and behaviors.

Research questions

The current study, conducted by the Regional Educational Laboratory West at the request of CCSD, explored the relationship between academic mindsets, academic behaviors, and academic achievement and the probability that CCSD students experience an unsuccessful transition from elementary to middle school (from grade 5 to grade 6). Previous research in CCSD suggests that, of various predictors used as early warning indicators, having a GPA below 2.0 is among the strongest signals that a student will fall off track for high school graduation by the end of grade 9 (Snipes & Tran, 2016). In particular, only 31 percent of grade 8 CCSD students with a low GPA were on track for high school graduation at the end of grade 9 (as indicated by having received sufficient credits to progress to grade 10 and by having no more than one semester with a failing grade).

With that as the background, this study defined an unsuccessful transition to middle school as having a GPA below 2.0 in the first semester of grade 6. The study examined the extent to which three grade 5 measures of positive academic mindsets and behaviors predicted the probability of CCSD students having a low GPA in the first semester of grade 6. It also examined whether these relationships remained after student-level prior academic achievement in grade 5 (based on standardized math and English language arts test scores) was accounted for. The study examined these patterns for grade 5 students with standardized scores above the district median and for students with scores below the median on the state math and English language arts Smarter Balanced Assessment Consortium (SBAC). Finally, the study analyzed the results for several student sociodemographic groups, including race/ethnicity, and English learner status.

The study addressed the following research questions for CCSD, using data for the 2016/17 school year (grade 5) and the 2017/18 school year (grade 6):

1. What percentage of grade 5 students had a low GPA (below 2.0) at the end of the first semester of grade 6? What were the sociodemographic characteristics of these students?

2. To what extent did grade 5 student reports of levels of academic mindsets and behaviors, by themselves, predict the probability of having a low GPA in first semester of grade 6?

3. After individual students' prior academic achievement (math and English language arts SBAC scores) in grade 5 was accounted for, to what extent did student reports of levels of academic mindsets and behaviors in grade 5 predict the probability of having a low GPA in the first semester of grade 6?

4. Among students in specific sociodemographic groups (including Black, Latinx, and English learner students), to what extent did student reports of levels of academic mindsets and behaviors in grade 5 predict the probability of having a low GPA in the first semester of grade 6 for students in groups in the lowest quartile of grade 5 academic achievement, in the second lowest quartile of grade 5 academic achievement, and with grade 5 test scores above the district median (holding individual achievement constant within each of these groups)?

Box 2. Data sources, sample, and methods

Data sources. The analysis is based on Clark County School District (CCSD) administrative student data for grade 5 and 6 for the 2016/17 and 2017/18 school years and grade 5 districtwide student survey data from a CCSD survey administered in spring 2017.

Sample and missing data. The original population of interest consisted of 19,336 students who were enrolled in CCSD in grade 5 in the 2016/17 school year who were also enrolled in grade 6 in CCSD in the 2017/18 school year, excluding students receiving special education services and students enrolled in nonregular schools. Because the study focused on the transition to middle school, the population of students was limited to those for whom transitioning from grade 5 to grade 6 entailed attending a new school. The final sample with complete data consisted of 11,986 students (62 percent) who were in the population of interest and who provided answers to the spring 2016/17 survey on measures of growth mindset, performance avoidance, and academic behavior. Survey nonresponse was the main source of missing data, as reflected in incomplete records of student grade 5 survey data. Some systematic, measurable differences were found between the original population and the analytic sample (see table C1 in appendix C). Factors such as student race/ethnicity and English learner status, as well as school-level averages of these variables, were related to survey response rates (see tables C2–C6). The study team applied multiple imputation (Graham, 2009) to adjust all estimates for the difference between the original population and the analytic samples. The estimates generated using imputed data did not differ meaningfully from the estimates generated for the initial analytic sample (see table C7). Once missing data corrections were applied, the final analytic sample consisted of 19,336 students.

Methodology. Basic tabulations and percentages were calculated to determine the percentage of the sample with a low grade point average (GPA) in the first semester of grade 6, a significant indicator of an elevated risk of school failure. The study team used statistical tests of group differences to assess the statistical significance of any differences in the percentages of students who had a GPA below 2.0 in the first semester of grade 6 by student race/ethnicity, gender, and English learner status. Multilevel logistic regression models, with students nested within schools, generated estimates of the relationships between student and school characteristics and the probability of having a low GPA in the first semester of grade 6. Initial models estimated the relationships between students' reported levels of academic mindsets and behaviors. Additional models measured these same relationships but added grade 5 Smarter Balanced Assessment Consortium math and English language arts scores to account for students' prior academic achievement. All predictors were centered around the district mean and divided by the district standard deviation to create comparable scores. Analyses also examined these relationships among several student groups: students with different levels of grade 5 prior academic achievement, of different racial/ethnic groups, and by English learner student status. Grade 5 student achievement groups were defined based on students' positions in the distribution of grade 5 academic achievement within the district as a whole.

Predicted probabilities. The predicted probabilities presented in the main report were generated using the coefficients from the logistic regressions that estimated the relationships between student or school characteristics and the probability of having a GPA below 2.0 in the first semester of grade 6. Predicted probabilities were calculated holding every other variable in the model constant at the median for the sample and substituting different values for the variables of interest into the logit equation to calculate a predicted probability for each value presented. The same approach was used for calculating predicted probabilities for different levels of positive academic mindsets and behaviors for student groups based on prior achievement and sociodemographic characteristics. First, separate models were estimated for each prior achievement and sociodemographic group. Then the value for grade 5 prior achievement was held constant at the median within each student group, and predicted probabilities were calculated at low, median, and high levels of positive academic mindsets and behaviors (see box 1). The student group models and associated coefficients and statistics are in appendix B.

Limitations. First, this study was descriptive, and thus the findings should not be interpreted as proving that students' academic mindsets caused, in whole or in part, academic difficulties. By controlling for grade 5 test scores, the study might have also partly controlled for differences in academic mindsets and behaviors that existed before grade 5; if those earlier academic mindsets and behaviors influenced grade 5 test scores, the relationship between grade 5 academic mindsets and behaviors and grade 6 GPA could be understated. This study examined only three dimensions of academic mindsets and behavior, and thus it cannot speak to the extent to which other psychosocial factors might be related to GPA or the extent to which students experienced difficulties in the transition to middle school. The timeframe of the study also limited the extent to which growth mindset, performance avoidance, and academic behaviors measured in the year before middle school (grade 5) could have affected students' middle school

academic trajectories or the extent to which these measures predict success for different groups of students. Finally, the study suffered from a high level of missing data, which could also plausibly affect the results.

Note: As a sensitivity analysis, the predictive analyses for this study were conducted for several outcomes, including a continuous measure of first-semester grade 6 GPA and whether grade 6 students ended their first semester with a greater than 50 percent predicted probability at the end of grade 8 of being at risk of not graduating from high school on time (based on a previously generated model using first-semester grade 6 outcomes to predict grade 8 risk status). With the exception of the percentages of students considered not to have made a successful transition to grade 6, the patterns did not differ with the outcome chosen.

Findings

This section presents findings from the study's main analyses (see appendix B for detailed results). First, it presents the percentages of grade 5 CCSD students in 2016/17 who had a GPA below 2.0 in the first semester of grade 6 and differences in these percentages across student sociodemographic groups, to illustrate the size and composition of student groups that might be at risk of low achievement. Second, to show how supports for positive academic mindsets and behaviors might fit into broader strategic goals related to students' successful transition to middle school (from grade 5 to grade 6), the section presents findings on the relationship between grade 5 student reports of the level of academic mindsets and behaviors and the predicted probability of having a low GPA in the first semester of grade 6. Finally, it presents findings regarding how this relationship differs for specific sociodemographic student groups and illustrates how any implications might depend on the student population of focus.

In the first semester of grade 6, 19 percent of 2016/17 grade 5 students had a grade point average below 2.0, but the percentages differed across students by race/ethnicity, gender, and English learner status

Among CCSD students enrolled in grade 5 in 2016/17 and grade 6 in 2017/18, just under one in five (19 percent) had a GPA below 2.0 in the first semester of grade 6. The analysis showed meaningful and statistically significant differences across students grouped by race/ethnicity, gender, and English learner status in the percentages of 2016/17 grade 5 students who had a low GPA in the first semester of grade 6. While 6 percent of Asian students and 10 percent of White students had a low GPA in the first semester of grade 6, 33 percent of Black students, 22 percent of Latinx students and Native American students, and 15 percent of multiracial students and Native Hawaiian students also had a low GPA (figure 2).

Figure 2. The percentage of 2016/17 grade 5 students with a low first-semester grade 6 grade point average differed by race/ethnicity, gender, and English learner student status

Percent of students with a grade point average below 2.0
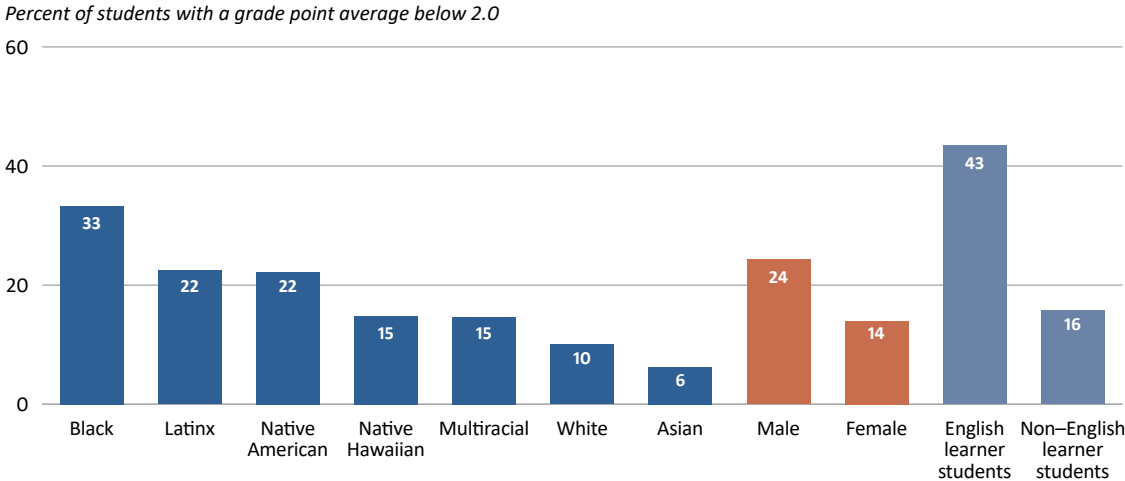
Note: Population size = 19,336 students. Differences across race/ethnicity: $X^2 = 27,490$, $p < .001$; differences by gender: $X^2 = 12,045$, $p < .001$; differences by English learner status: $X^2 = 36,3843$, $p < .001$.

Source: Authors' analysis of 2016/17 and 2017/18 Clark County School District student records data.

Boys were more likely than girls to have a GPA below 2.0 at the end of grade 6: 24 percent of male grade 5 students compared with 14 percent of female grade 5 students had a GPA below 2.0 by the end of the first semester of grade 6. The greatest disparities, however, were by English learner status. Whereas 43 percent of grade 5 English learner students had a low GPA below by the end of the first semester of grade 6, only 16 percent of grade 5 non–English learner students did (see figure 2).
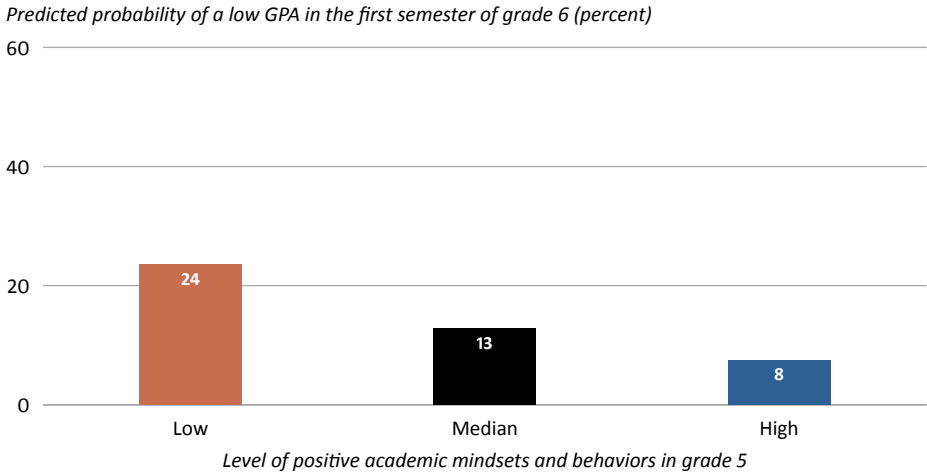
Grade 5 students who reported high levels of positive academic mindsets and behaviors had a lower predicted probability of having a low GPA in the first semester of grade 6

When grade 5 SBAC scores were not accounted for, grade 5 CCSD students who reported high levels of growth mindset and academic behaviors and low levels of performance avoidance (see box 1) were significantly less likely to have a GPA below 2.0 in the first semester of grade 6 (figure 3). Grade 5 students who reported low levels of positive academic mindsets and behaviors had a 24 percent predicted probability of having a low GPA in the first semester of grade 6. In contrast, grade 5 students who reported high levels of positive academic mindsets and behaviors had an 8 percent predicted probability of having a low GPA in the first semester of grade 6, a difference of 16 percentage points. In other words, grade 5 students who reported high levels of growth mindset and academic behaviors and low levels of performance avoidance were less likely to earn a low GPA in their transition to middle school.

After differences in student prior academic achievement were accounted for for, grade 5 student reports of positive academic mindsets and behaviors did not predict meaningful differences in the probability of having a low GPA in the first semester of grade 6

Grade 5 math and English language arts SBAC scores were also a significant predictor of students' grades in the first semester of grade 6 (see table B1 in appendix B). Thus, the analysis was repeated using grade 5 student

Figure 3. High levels of positive academic mindsets and behaviors among 2016/17 grade 5 students predicted a lower probability of having a low grade point average in the first semester of grade 6

Predicted probability of a low GPA in the first semester of grade 6 (percent)

Level of positive academic mindsets and behaviors in grade 5

GPA is grade point average.

Note: Sample size = 19,336 students. The F-statistic for a joint significance test for all behaviors and mindset variables was 281.14 ($p < .001$). The figure shows, for example, that students who reported a high level of positive academic mindsets and behaviors in grade 5 had an 8 percent predicted probability of a GPA below 2.0 in the first semester of grade 6, while students who reported a low level of positive academic mindsets and behaviors in grade 5 had a 24 percent predicted probability. A low level of positive academic mindsets and behavior indicates scoring at the 25th percentile of growth mindset and academic behaviors and at the 75th percentile of performance avoidance, a median level indicates scoring at the median on all three measures, and a high level indicates scoring at the 75th percentile of growth mindset and academic behaviors and the 25th percentile of performance avoidance. Predictions were based on a multilevel logistic regression using grade 5 student reports of the levels of growth mindset, academic behavior, and performance avoidance to predict a dichotomous variable indicating whether a student had a first-semester grade 6 GPA below 2.0 at each positive academic mindsets and behaviors level (see table B1 in appendix B for detailed regression results). The predicted mean matching method was used for imputation of missing values.

Source: Authors' analysis of 2016/17 and 2017/18 Clark County School District student records data.

reports of the level of academic mindsets and behaviors to predict the probability of having a GPA below 2.0 in the first semester of grade 6, this time with grade 5 math and English language arts SBAC scores held constant. Once the analysis accounted for these individual differences in grade 5 achievement (that is, compared students with the same level of grade 5 achievement), differences in reported levels of academic mindsets and behaviors in the full sample did not predict meaningful differences in the predicted probability of grade 5 students having a low GPA in the first semester of grade 6. For example, among students with median grade 5 achievement, those who reported high levels of positive academic mindsets and behaviors had a 10 percent predicted probability of having a low GPA in the first semester of grade 6, while those who reported low levels had a 6 percent predicted probability, a difference of only 4 percentage points (figure 4).

Among students with grade 5 prior academic achievement below the median, students who reported high levels of positive academic mindsets and behaviors were substantially less likely to have a low first-semester grade 6 grade point average, even when individual student differences in grade 5 achievement were controlled for

Previous research suggests that students with weaker math and English language arts skills have more difficulty transitioning to middle school (Eccles, 2008). Therefore, the study team repeated the analysis of the relationship between grade 5 academic mindsets and the predicted probability of having a GPA below 2.0 in the first semester of grade 6 for student groups based on grade 5 prior academic achievement.

Figure 4. After individual differences in 2016/17 grade 5 students' prior academic achievement were controlled for, differences in grade 5 levels of positive academic mindsets and behaviors did not predict meaningful differences in the probability of having a low grade point average in the first semester of grade 6
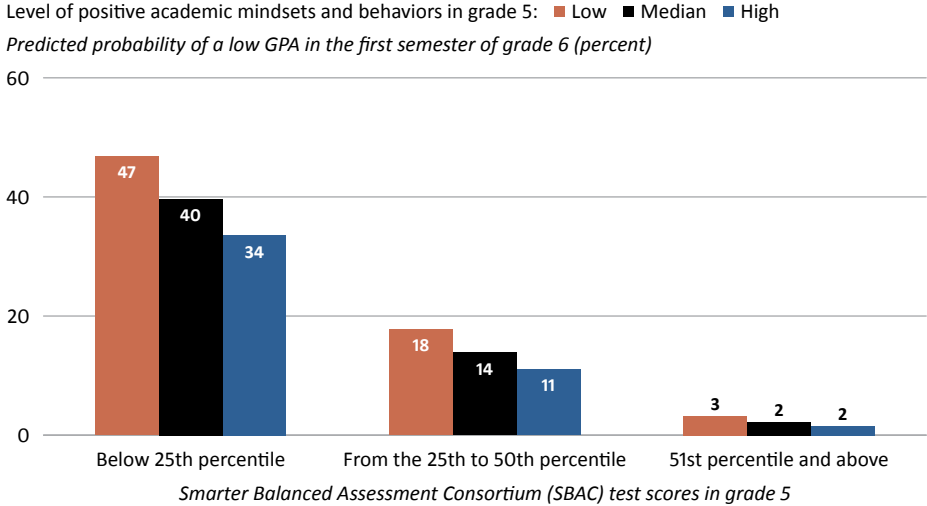

Predicted probability of a low GPA in the first semester of grade 6 (percent)

Level of positive academic mindsets and behaviors in grade 5
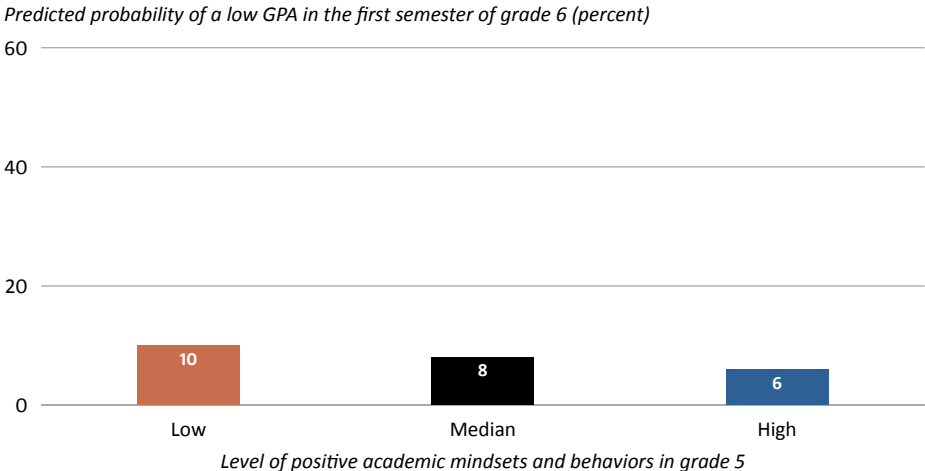
GPA is grade point average.

Note: Sample size = 19,336 students. Differences associated with each variable were statistically significant at *p* < .001. Prior academic achievement was defined as the average of grade 5 standardized SBAC scores in math and English language arts. The figure shows, for example, that students with median SBAC scores in grade 5 who reported a high level of positive academic mindsets and behaviors in grade 5 had a 6 percent predicted probability of a GPA below 2.0 in the first semester of grade 6, while students with median SBAC scores in grade 5 who reported a low level of positive academic mindsets and behaviors in grade 5 had a 10 percent predicted probability of having a low GPA in the first semester of grade 6. A low level of positive academic mindsets and behavior indicates scoring at the 25th percentile of growth mindset and academic behaviors and at the 75th percentile of performance avoidance, a median level indicates scoring at the median on all three measures, and a high level indicates scoring at the 75th percentile of growth mindset and academic behaviors and the 25th percentile of performance avoidance. Predictions were based on a multilevel logistic regression using student grade 5 SBAC scores to predict a dichotomous variable indicating whether a student had a first-semester grade 6 GPA below 2.0 at each positive academic mindsets and behaviors level, with SBAC scores held constant at the median (see table B1 in appendix B for detailed regression results). The predicted mean matching method was used for imputation of missing values.

Source: Authors' analysis of 2016/17 and 2017/18 Clark County School District student records data.

The findings for students with grade 5 prior academic achievement below the district median differed from the findings for the full sample of students and for students with prior academic achievement above the median. Among grade 5 students with prior academic achievement below the median, differences in reported levels of positive academic mindsets predicted meaningful differences in the predicted probability of having a GPA below 2.0 in the first semester of grade 6, even after individual differences in prior achievement were controlled for. This difference in predicted probabilities was larger among students who had the lowest prior achievement (figure 5). Among students in the bottom quartile of grade 5 prior academic achievement, typical students (see box 1) who reported low levels of positive academic mindsets and behaviors had a 47 percent predicted probability of having a low GPA in the first semester of grade 6, while typical students with high levels of positive academic mindsets and behaviors had a 34 percent predicted probability, a 13 percentage point difference (see figure 5). However, among students between the 25th and 50th percentiles in grade 5 prior academic achievement, typical students who reported low levels of positive academic mindsets and behaviors had an 18 percent predicted probability of having a low GPA in the first semester of grade 6, while students who reported high levels of positive academic mindsets and behaviors had an 11 percent predicted probability of having a low GPA, a difference of 7 percentage points.

Figure 5. The relationship between 2016/17 grade 5 student academic mindsets and behaviors and first-semester grade 6 grade point average was meaningful only among grade 5 students with prior academic achievement below the district median

Level of positive academic mindsets and behaviors in grade 5: ■ Low ■ Median ■ High
Predicted probability of a low GPA in the first semester of grade 6 (percent)

Smarter Balanced Assessment Consortium (SBAC) test scores in grade 5

GPA is grade point average.

Note: Sample size = 4,836 students with prior academic achievement below the 25th percentile, 4,840 students with prior academic achievement from the 25th to the 50th percentile, and 9,612 students with prior academic achievement at the 51st percentile and above. The *F*-statistics for a joint significance test for all behaviors and mindset variables for each model were 24.73 ($p < .001$), 18.39 ($p < .001$), and 20.29 ($p < .001$). Prior academic achievement was defined as the average of grade 5 standardized SBAC scores in math and English language arts. The figure shows, for example, that students with average grade 5 SBAC scores below the 25th percentile and with a low level of positive academic mindsets and behaviors in grade 5 had a 47 percent predicted probability of a GPA below 2.0 in the first semester of grade 6, students with SBAC scores below the 25th percentile and with a median level of positive academic mindsets and behaviors in grade 5 had a 40 percent predicted probability of a low GPA in the first semester of grade 6, and students with SBAC scores below the 25th percentile and with a high level of positive academic mindsets and behaviors in grade 5 had a 34 percent predicted probability of a low GPA in the first semester of grade 6. A low level of positive academic mindsets and behaviors indicates scoring at the 25th percentile of growth mindset and academic behaviors and at the 75th percentile of performance avoidance, a median level indicates scoring at the median on all three measures, and a high level indicates scoring at the 75th percentile of growth mindset and academic behaviors and the 25th percentile of performance avoidance. Predictions were based on a multilevel logistic regression using student grade 5 reports of the levels of growth mindset, academic behavior, and performance avoidance and SBAC scores to predict a dichotomous variable indicating whether a student had a first-semester grade 6 GPA below 2.0 at each positive academic mindsets and behaviors level, with SBAC scores held constant at the median within a given student group (see table B4 in appendix B for detailed regression results). The predicted mean matching method was used for imputation of missing values.

Source: Authors' analysis of 2016/17 and 2017/18 Clark County School District student records data.

Among students with grade 5 prior academic achievement above the district median, after individual differences in grade 5 achievement were accounted for, differences in grade 5 levels of positive academic mindsets and behaviors did not predict meaningful differences in the probability of having a low GPA in the first semester of grade 6

Among the group of grade 6 students with prior academic achievement above the district median (at the 51st percentile or higher), once prior student achievement was accounted for, typical students had very low (3 percent or lower) predicted probabilities of having a first semester GPA below 2.0. Among these students, when individual differences in grade 5 prior academic achievement were held constant, differences in grade 5 student reports of positive academic mindsets and behaviors did not generate meaningful differences in the predicted probability of having a low GPA in the first semester of grade 6 (see figure 5). Among the group with high prior academic achievement, and with individual differences in prior achievement held constant, otherwise typical students who reported low levels of positive academic mindsets and behaviors had a 3 percent predicted probability of having a low GPA in the first semester of grade 6, while students who reported high levels of positive academic mindsets and behaviors had a 2 percent predicted probability. (Because there were no meaningful differences in patterns for students from the 51st to the 75th percentiles and the 76th to 99th percentiles of prior academic achievement, the findings for students with grade 5 prior academic achievement above the median were reported together; see appendix B.)

Among students with grade 5 prior academic achievement below the district median, positive academic mindsets and behaviors predicted meaningful differences in the probability of having a low grade point average in the first semester of grade 6 for every racial/ethnic group and among both English learner students and non–English learner students
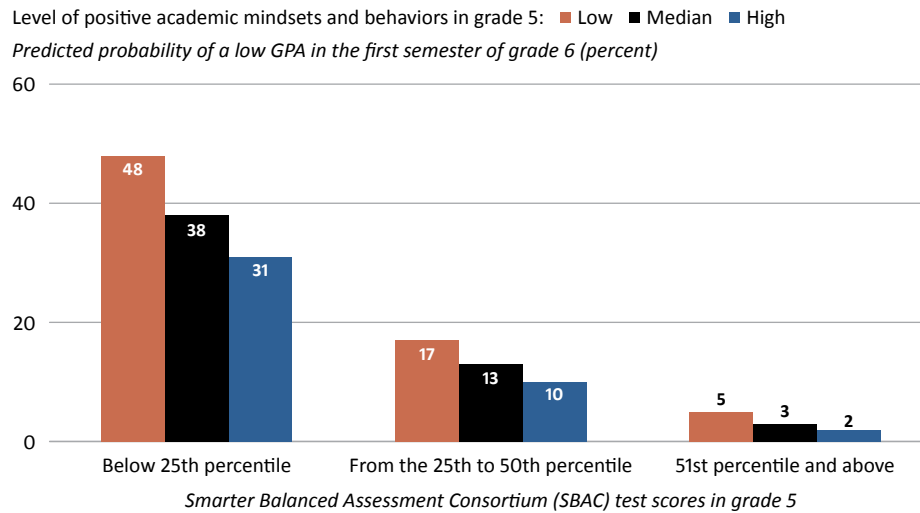
Results for grade 5 CCSD students in the bottom two quartiles of the district's achievement distribution were generally consistent for every racial/ethnic group. In other words, students who reported high levels of positive academic mindsets and behaviors had a substantially lower predicted probability of having a GPA below 2.0 in the first semester of grade 6 than their counterparts who reported low levels of positive academic mindsets and behaviors. Results for Latinx students and English learner students are presented here, while results for other racial/ethnic groups are presented in figures B3 and B4 in appendix B.

For example, among Latinx students in the lowest quartile of grade 5 prior academic achievement, the predicted probability of having a low GPA in the first semester of grade 6 was 17 percentage points higher for typical grade 5 Latinx students who reported low levels of positive academic mindsets and behaviors (48 percent) than for typical grade 5 Latinx students who reported high levels of positive academic mindsets and behaviors (31 percent; figure 6).

Among grade 5 Latinx students with grade 5 prior academic achievement between the 25th and 50th percentiles, the difference between students who reported low levels of positive academic mindsets (17 percent) and behaviors and their counterparts who reported high levels (10 percent) was 7 percentage points (see figure 6).

A similar pattern was found for English learner student and non–English learner students as well as for all racial/ethnic groups (figure 7; see also figures B2, B3, and B4 in appendix B). One exception was the finding of no meaningful differences in the predicted probability of having a GPA below 2.0 in the first semester of grade 6 among English learner students who scored between the 25th and 50th percentiles on the SBAC.

Figure 6. After individual differences in 2016/17 grade 5 students' prior academic achievement were controlled for, the relationship between grade 5 student academic mindsets and first-semester grade 6 grade point average among Latinx students was meaningful only among students with prior academic achievement below the district median

Level of positive academic mindsets and behaviors in grade 5: ■ Low ■ Median ■ High

Predicted probability of a low GPA in the first semester of grade 6 (percent)

Smarter Balanced Assessment Consortium (SBAC) test scores in grade 5
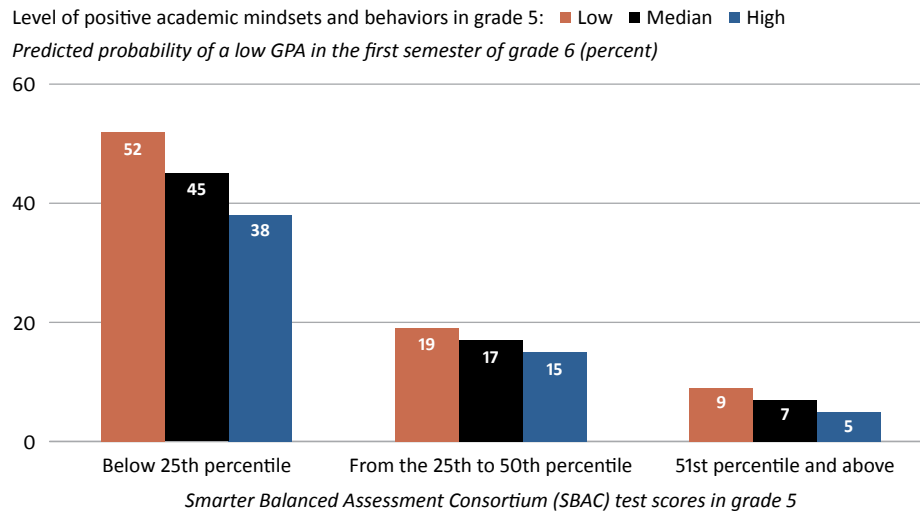
GPA is grade point average.

Note: Sample size = 2,918 students with prior academic achievement below the 25th percentile, 2,668 students with prior academic achievement from the 25th to the 50 percentile, and 3,884 students with prior academic achievement at the 51st percentile and above. The *F*-statistics for a joint significance test for all behaviors and mindset variables for each model were as follows: 18.25 (*p* < .001), 10.56 (*p* < .001), and 7.99 (*p* < .001). Prior academic achievement was defined as the average of grade 5 standardized SBAC scores in math and English language arts. The figure shows, for example, that Latinx students with average grade 5 SBAC scores below the 25th percentile and with a low level of positive academic mindsets and behaviors in grade 5 had a 48 percent predicted probability of a GPA below 2.0 in the first semester of grade 6. Latinx students with average grade 5 SBAC scores below the 25th percentile and with a median level of positive academic mindsets and behaviors in grade 5 had a 38 percent predicted probability of a low GPA in the first semester of grade 6. And Latinx students with average grade 5 SBAC scores below the 25th percentile and with a high level of positive academic mindsets and behaviors in grade 5 had a 31 percent predicted probability of a low GPA in the first semester of grade 6. A low level of positive academic mindsets and behaviors indicates scoring at the 25th percentile of growth mindset and academic behaviors and at the 75th percentile of performance avoidance, a median level indicates scoring at the median on all three measures, and a high level indicates scoring at the 75th percentile of growth mindset and academic behaviors and the 25th percentile of performance avoidance. Predictions were based on a multilevel logistic regression using student grade 5 reports of the levels of growth mindset, academic behavior, and performance avoidance and SBAC scores to predict a dichotomous variable indicating whether a student had a first-semester grade 6 GPA below 2.0 at each positive academic mindsets and behaviors level, with SBAC scores held constant at the median within a given student group (see table B6 in appendix B for detailed regression results). The predicted mean matching method was used for imputation of missing values.

Source: Authors' analysis of 2016/17 and 2017/18 Clark County School District student records data.

Among students with grade 5 prior academic achievement above the district median, positive academic mindsets did not predict meaningful differences in the probability of having a low GPA in the first semester of grade 6 for any racial/ethnic group, for English learner students, or for non–English learner students

The patterns that held true across the CCSD population as a whole held true for each student group examined. First, students with grade 5 prior academic achievement above the district median had no more than a 9 percent predicted probability of having a GPA below 2.0 in the first semester of grade 6, regardless of the student group or reported levels of academic mindsets and behaviors (see figures 6 and 7 and figures B2–B4 in appendix B). Moreover, within each student group examined, the difference in the predicted probability of having a low GPA in the first semester of grade 6 between grade 5 students who reported high levels of positive academic mindsets and behaviors and grade 5 students who reported low levels was always 5 percentage points or less.

Figure 7. After individual differences in 2016/17 grade 5 students' prior academic achievement were controlled for, the relationship between grade 5 student academic mindsets and behaviors and first-semester grade 6 grade point average among English learner students was meaningful only among students with prior academic achievement below the 25th percentile

Level of positive academic mindsets and behaviors in grade 5: ■ Low ■ Median ■ High

Predicted probability of a low GPA in the first semester of grade 6 (percent)

Smarter Balanced Assessment Consortium (SBAC) test scores in grade 5

GPA is grade point average.

Note: Sample size = 1,657 students with prior academic achievement below the 25th percentile, 591 students with prior academic achievement from the 25th to the 50 percentile, and 96 students with prior academic achievement at the 51st percentile and above. The *F*-statistics for a joint significance test for all behaviors and mindset variables for each model were as follows: 8.14 (*p* < .001), 0.80 (*p* > .05), and 0.27 (*p* > .05). Prior academic achievement was defined as the average of grade 5 standardized SBAC scores in math and English language arts. The figure shows, for example, that English learner students with average grade 5 SBAC scores below the 25th percentile and with a low level of positive academic mindsets and behaviors in grade 5 had a 52 percent predicted probability of a GPA below 2.0 in the first semester of grade 6. English learner students with average grade 5 SBAC scores below the 25th percentile and with a median level of positive academic mindsets and behaviors in grade 5 had a 45 percent predicted probability of a low GPA in the first semester of grade 6. And English learner students with average grade 5 SBAC scores below the 25th percentile and with a high level of positive academic mindsets and behaviors in grade 5 had a 38 percent predicted probability of a low GPA in the first semester of grade 6. A low level of positive academic mindsets and behaviors indicates scoring at the 25th percentile of growth mindset and academic behaviors and at the 75th percentile of performance avoidance, a median level indicates scoring at the median on all three measures, and a high level indicates scoring at the 75th percentile of growth mindset and academic behaviors and the 25th percentile of performance avoidance. Predictions were based on a multilevel logistic regression using student grade 5 reports of the levels of growth mindset, academic behavior, and performance avoidance and SBAC scores to predict a dichotomous variable indicating whether a student had a first-semester grade 6 GPA below 2.0 at each positive academic mindsets and behaviors level, with SBAC scores held constant at the median within a given student group (see table B8 in appendix B for detailed regression results). The predicted mean matching method was used for imputation of missing values.

Source: Authors' analysis of 2016/17 and 2017/18 Clark County School District student records data.

Limitations

There are several limitations to keep in mind when interpreting the results of this study. First, the study was descriptive and should not be interpreted as proving that students' mindsets cause, in whole or in part, academic difficulties.

Second, the study examined only three dimensions of academic mindsets and behaviors (growth mindset, performance avoidance, and academic behaviors) and did not consider the extent to which other psychosocial factors might be related to GPA in grade 6 or to student difficulties transitioning to middle school. A variety of studies have suggested the potential for other psychosocial factors to hinder or support successful transitions from elementary to middle school. For example, previous research suggests that "stereotype threat"—the fear of confirming negative stereotypes about one's racial/ethnic group—significantly undermines academic success among Black and Latinx students and that it operates through mechanisms other than beliefs about the malleability of ability (Borman, 2017; Steele & Aronson, 1995; Walton & Spencer, 2009).

Third, the timeframe of the study might not have been long enough to capture the full extent of the decline in grades that typically occurs in middle school, which is not instantaneous. Factors such as growth mindset, academic

behaviors, and performance avoidance might take more than a semester to generate meaningful changes in grades among students with similar levels of academic preparation (Borman et al., 2016, 2021; Cohen et al., 2009). Analyses involving additional years of data could shed more light on the extent to which growth mindset, academic behaviors, and performance avoidance measured in the year before middle school affect students' middle school academic trajectories and the extent to which these measures predict success for different groups of students.

Fourth, the study suffered from a high level of missing data, which could affect the results. Only 62 percent of the analysis population had the survey data necessary to calculate the academic mindset and behavior variables, and students without survey data differed significantly from students with survey data in the percentage of Black and Latinx students (see table C1 in appendix C). Although the study team applied state-of-the-art corrections for missing data (Graham, 2009; What Works Clearinghouse, 2020), and testing indicated that the imputations did not add bias to the estimates (see appendix C), it is still possible that unobserved factors related to whether key measures were missing generated bias in the estimates. If so, it is not possible to know how this bias affected the pattern of findings in this report.

Implications

Nearly one in five CCSD students had a GPA below 2.0 as they made the transition to middle school. The rates were even higher for Black, Latinx, and English learner students. This is consistent with previous research underscoring the importance of more effectively preparing students for the transition to middle school and supporting them through the transition. The findings of this study suggest that education stakeholders might consider incorporating supports for positive academic mindsets and behaviors as a part of this strategy, particularly for low-achieving students. Even after individual differences in prior achievement were controlled for, differences in grade 5 measures of growth mindset, performance avoidance, and academic behaviors were related (as a group) to significant differences in how well students navigated the transition to middle school. These relationships seemed to be meaningful among lower-achieving grade 5 students and appeared to be largest among the lowest-achieving students.

Black, Latinx, English learner, and other systematically underserved students are more likely to leave elementary school with low levels of academic achievement, as well as to exhibit patterns of disproportionate decline in academic achievement. Therefore, effective strategies for supporting positive academic mindsets might be particularly beneficial for these students. Previous research suggests that several low-cost, easily implemented interventions might support the development of positive academic mindsets and generate significant positive effects on student achievement (Borman, 2017; Borman et al., 2019; Snipes et al., 2012; Yeager & Walton, 2011). If successful, such efforts might improve the chances that students who enter middle school with weaker academic preparation could avoid low grades in their first semester as well as reduce disparities in academic outcomes across student racial/ethnic groups and English learner student groups. However, focusing interventions and supports for positive academic mindset solely on lower-achieving students runs the risk of isolating and stigmatizing those students, potentially undermining the effectiveness of the supports and even creating the opposite of the intended effect (Borman, 2017; Borman et al., 2018; Yeager & Walton, 2011). Therefore, to the extent that schools and districts implement these interventions, they should consider gradewide and schoolwide approaches.

Finally, this study also showed clearly and consistently that, within and across student groups, and even after measures of positive academic mindsets and behaviors were accounted for, grade 5 students with higher prior academic achievement (higher standardized test scores) were less likely to end the first semester of grade 6 with a low GPA. Among students with higher grade 5 math and English language arts SBAC scores, positive academic mindsets and behaviors were not a prerequisite for avoiding a low GPA during the transition to middle school. This suggests that strategies for supporting positive academic mindsets, despite their potential importance for some students, are unlikely to substitute for investments in improving elementary students' academic skills, particularly among the lowest-performing students.

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