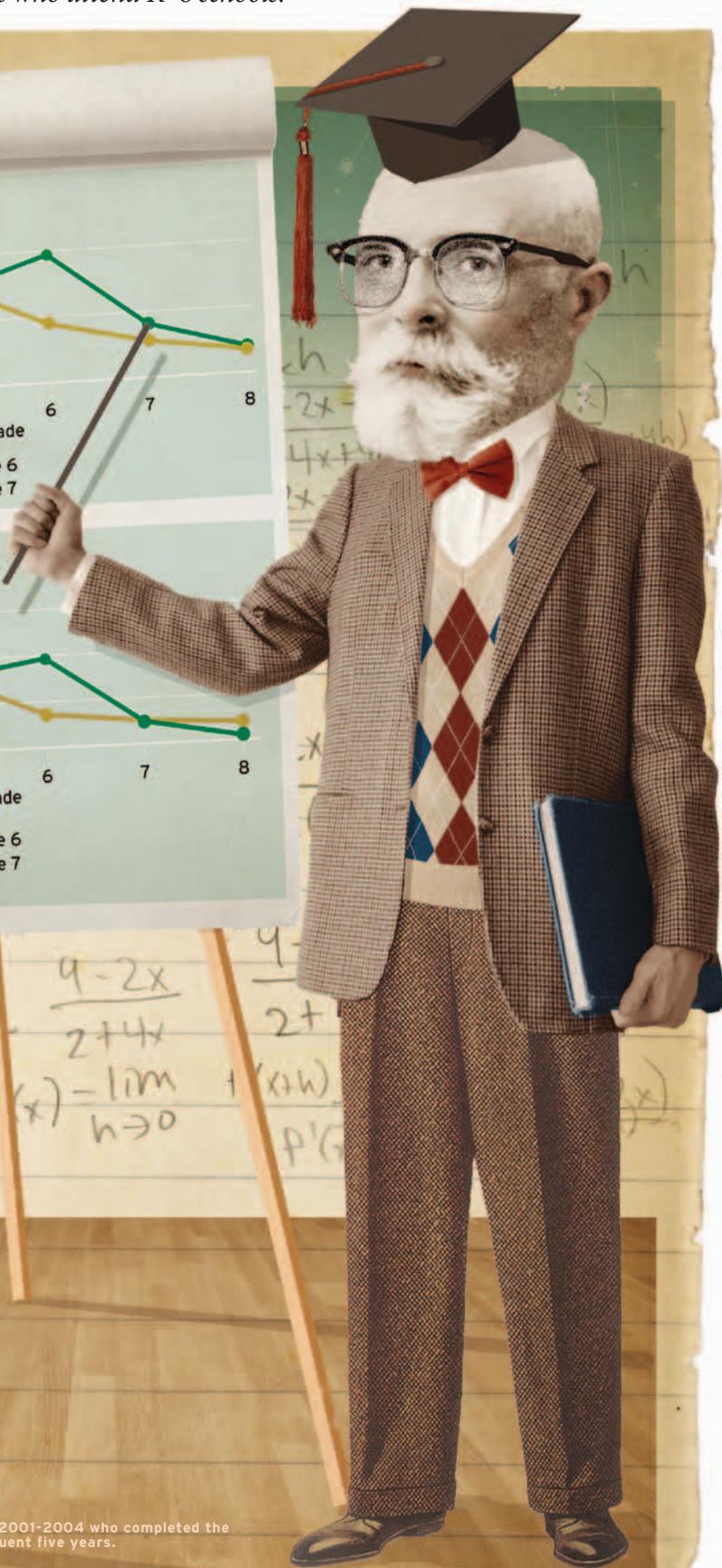
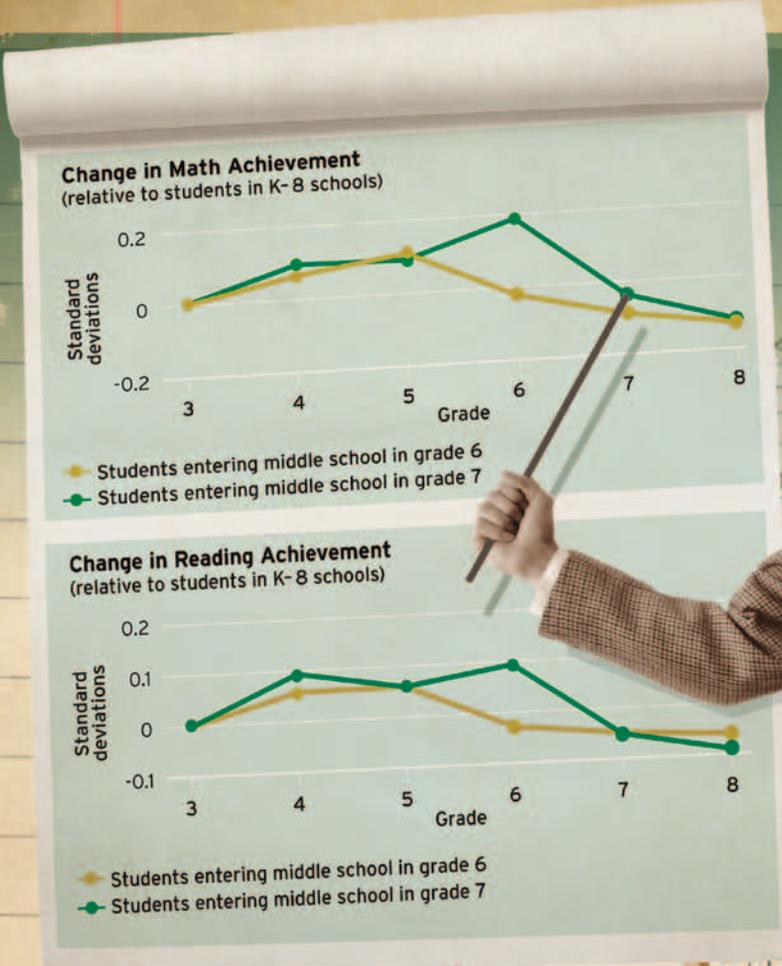


# Middle-School Plunge (Figure 1)

Students who move to middle schools for grade 6 or grade 7 lose ground in both reading and math compared to their peers who attend K-8 schools.



Note: Based on Florida students enrolled in grade 3 from 2001-2004 who completed the state test in both math and reading in each of the subsequent five years.

SOURCE: Authors' calculations



# The Middle School

In 2010, the Charlotte-Mecklenburg (North Carolina) school district shuttered four of its eight middle schools, opting to serve students in elementary schools spanning kindergarten through grade 8. In so doing, it followed in the footsteps of urban school districts such as Baltimore, Milwaukee, Philadelphia, and New York City, all of which have in the past decade expanded their reliance on the once ubiquitous K–8 model.

Not all school systems are moving in that direction. In Cambridge, Massachusetts, a district with surprisingly low student performance given the substantial per-pupil resources at its command, the school committee has decided to try to boost student achievement by abandoning its K–8 model in favor of having separate middle schools that serve grades 6 through 8 (though, in an unusual twist, each of the latter will be housed in the same facility as an elementary school).

In short, policymakers nationwide continue to wrestle with a basic question: At what grade level should students move to a new school? In the most common grade configuration in American school

districts, public school students make two school transitions, entering a middle school in grade 6 or 7 and a high school in grade 9. This pattern reflects the influence of enrollment pressures and pedagogical theories that, over the past half century, all but eliminated the K–8 school from the American education landscape. A small fraction of students do attend public schools encompassing grades K–8, 6–12, or even K–12, however. We exploit this variation by comparing the achievement trajectories of Florida students entering a middle school or a high school to those of their peers who do not make those transitions.

Our study extends research conducted in New York City (see “Stuck in the Middle,” *research*, Fall 2010), in which Jonah Rockoff and Benjamin Lockwood found that entering a middle school causes a sharp drop in student achievement relative to the performance of those remaining in K–8 schools. It is hard to know whether one can generalize from results from the nation’s largest city (and school district), however, especially when it employs a complex

Plunge

**Achievement tumbles when young students change schools**

by MARTIN R. WEST and GUIDO SCHWERDT

procedure for assigning students to middle schools. Also, the New York City study was unable to follow students after 8th grade, making it impossible to know whether the negative impacts that were observed were temporary or extended into high school. This is a critical question inasmuch as a key rationale for middle school is its potential for easing the transition to high school. What is lost at the first transition may be more

in the subsequent years they spend in such schools. Nor do we find any sign that the middle-school students catch up with those who remained in the K–8 environment once all of them have entered high school. On the contrary, students entering a middle school in grade 6 are more likely not to be enrolled in any Florida public school as 10th graders (despite having been enrolled in grade 9), a strong indication that they have dropped out of school by that time.

## **Students entering a middle school in grade 6 are more likely not to be enrolled in any Florida public school as 10th graders, a strong indication that they have dropped out.**

than gained at the second, which is presumably less abrupt for the middle-school child than for the one entering high school directly from an elementary-school environment.

To explore these issues, we use statewide data covering all students in Florida public schools who were in grades 3 to 10 between 2000 and 2009. Although a large majority of Florida students enter a middle school in grade 6, some do so in grade 7. Still others attend K–8 schools and avoid the middle-school transition altogether. To determine whether entering a middle school in grade 6 or grade 7 has any effect on achievement, we examine whether students experience a drop in test scores relative to students in K–8 schools that coincides with their transition to the new school. In the same way, we compare the learning trajectories of students entering high school in grade 9 to those of students who attend K–12, 6–12, or 7–12 schools in order to determine whether high-school transitions affect achievement.

Our results cast serious doubt on the wisdom of the middle-school experiment that has become such a prominent feature of American education. We find that moving to a middle school causes a substantial drop in student test scores (relative to that of students who remain in K–8 schools) the first year in which the transition takes place, not just in New York City but also in the big cities, suburbs, and small-town and rural areas of Florida. Further, we find that the relative achievement of middle-school students continues to decline

We also find that the transition to high school causes a small drop in student achievement for all students who make this transition (as distinct from those in schools with 6–12 grade configurations). However, this drop holds far less policy significance both because of its size and because the decline does not appear to persist beyond grade 9.

The achievement drops we observe as students move to both middle and high schools suggest that moving from one school to another (or simply being in the youngest grade in a school) adversely affects student performance. The size and persistence of the effect of entering a middle school, however, suggests that such transitions are particularly damaging for adolescent students or that middle schools provide lower-quality education than K–8 schools provide for students at the same point in their education.

### **Data and Method**

We draw the data for our analysis from the Florida Department of Education’s PK–20 Education Data Warehouse. The data contain state math and reading test scores for all Florida students attending public schools in grades 3 to 10 from the 2000–01 through 2008–09 school years. They also include information on the school each student attends and its location as well as student characteristics such as ethnicity, gender, special education classification, and eligibility for a free or reduced-price lunch.

We use different samples of students for different parts of our analysis. First, to estimate the effect of entering a middle school in grade 6 or 7, we examine only students enrolled in grade 3 between 2001 and 2004 who completed the state test in both math and reading in each of the subsequent five years. Second, to investigate whether the effects of middle-school entry persist through grades 9 and 10, we examine only students enrolled in grade 3 in 2001 or 2002

who were tested in both subjects each of the following seven years. Finally, to estimate the effect of entering high school in grade 9, we examine students enrolled in grade 6 between 2001 and 2005 who were tested in both math and reading in the following four years.

Our strategy for identifying the effects of alternative grade configurations on student achievement parallels and extends that of Rockoff and Lockwood's study of New York City middle schools mentioned above. Specifically, we examine changes in individual students' achievement over time, focusing on differences in the timing of students' entry into middle school that result from the grade configuration of the school the student attended in 3rd grade. For example, we are interested in whether students who attended a K-6 school in 3rd grade experience a drop in their achievement in 7th grade relative to students who attended a K-8 school in 3rd grade and thus did not switch schools between grades 6 and 7.

The key assumption of our methodology is that there are no unobserved differences between students who in 3rd grade attended schools that had these different grade configurations that affect achievement precisely in the year when students enter middle school. In other words, we are assuming that the negative effect of a transition is not anticipated by parents and reflected in the choice of a school with a particular grade configuration in grade 3. We conduct an analogous analysis of high-school entry, taking advantage of the different grade configurations of the schools students attended in 6th grade.

Because we compare the achievement of individual students to themselves over time, our analysis takes into account all student characteristics (both observed and unobserved) that do not change over time. In addition, we also control for whether the individual student had been retained in a grade, whether the student had ever been retained, and whether the student attends a charter school (which in Florida are more likely than traditional public schools to have K-8 configurations).

### The Middle-School Cliff

We find that students who will enter a middle school in 6th or 7th grade have positive achievement trajectories in math and reading from 3rd grade to 5th, relative to their counterparts who will never enter a middle school because they attend a school that continues through 8th grade. Achievement in both subjects falls dramatically in 6th grade for students who enter middle school in that grade. Students who will enter middle school in grade 7 continue to improve relative to their K-8 peers through

grade 6, but experience a sharp drop in achievement upon entering middle school in grade 7.

Specifically, we find math achievement falls by 0.12 standard deviations and reading achievement falls by 0.09 standard deviations for transitions at grade 6 (see Figure 1). Students who make the transition at grade 7 experience even larger drops in their achievement of 0.22 and 0.15 standard deviations in math and reading, respectively. National data indicate that student achievement increases by roughly 0.30 standard deviations in math and 0.25 standard deviations in reading each year for typical 6th- and 7th-grade students. The drops in achievement we observe for students entering middle schools therefore amount to between 3.5 and 7 months of expected learning over the course of a 10-month school year.

Just as troubling is the fact that these students' relative performance in both subjects continues to decline in subsequent middle-school grades. After three years in a middle school, students who entered in 6th grade score 0.23 standard deviations in math and 0.14 standard deviations in reading worse than we would have expected had they attended a K-8 school. After two years in a middle school, students who entered in 7th grade underperform by 0.31 standard deviations in math and 0.15 standard deviations in reading.

We also find little evidence that students who attend middle school make larger achievement gains than their peers in grades 9 and 10, by which time most Florida students have

## **The drops in achievement we observe for students entering middle schools amount to between 3.5 and 7 months of expected learning over the 10-month school year.**

entered high school. In addressing this issue we must limit our attention to the two cohorts of students entering 3rd grade prior to 2001 or 2002, whose progress we are able to follow through the 10th grade. Although the math achievement of students who entered middle school in 7th grade improves by 0.05 standard deviations in 9th grade relative

to students who attended K–8 schools, the same pattern is not evident in reading or in either subject for the much larger group of students who entered middle school in 6th grade (see Figure 2). In other words, we can safely reject the hypothesis that students who attend middle schools benefit at the transition to high school from their previous experience with school transition or from the specific educational programs available in middle schools.

Investigating the transition to high school, we find that students moving to a new high school between grades 8 and 9 suffer a small drop in achievement of 0.03 standard deviations in math and 0.04 standard deviations in reading (relative to those in grade 6–12 schools or schools with another configuration that requires no transition at this point). However, their relative achievement trajectories become positive again after this drop at the transition point.

We supplement our analysis on math and reading achievement with similar analyses of the effects of entering a middle school on the probability of students' not being enrolled in a Florida public school in 10th grade (a proxy for dropping out of high school by this time) and on being retained in 9th grade (often a strong predictor that a student will leave school prior to graduation). Our results suggest that entering a middle school in 6th grade increases the probability of early dropout by 1.4 percentage points (or 18 percent). Although entering a middle school in 7th grade does not appear to increase early dropout, it increases the probability that a student will be retained in 9th grade by 1 percentage point. Both results provide additional cause for concern with the middle-school model.

Is it possible that our results reflect differences across school districts that employ alternative grade configurations? We explore this question by conducting our test-score analysis separately for schools in Miami-Dade County. With more than 345,000 students, Miami-Dade is the largest district in Florida and offers a wide range of grade configurations for students up through grade 8. We find that the negative effects of entering a middle school for grade 6 or grade 7 are, if anything, even more pronounced in Miami-Dade County than they are statewide.

### **Not Just an Urban Problem**

This result for Miami-Dade County raises the possibility that the negative effects of middle-school entry are only notable in urban settings. We address this issue by looking separately at the effects of entering a middle or high school across communities of varying sizes. Using Census Bureau classifications,

we group students into three categories according to the location of the school they attended in 3rd grade: 1) a large or midsize city, 2) suburbia (specifically, the urban fringe of a large or midsize city), and 3) towns and rural areas. The results suggest that the negative effects of entering a middle school are most pronounced in cities, but they remain sizable even in rural areas, confirming that the negative effects of configurations that separate the middle-school grades are by no means limited to urban school districts.

## **Black students in particular demonstrate large relative gains in math achievement prior to entering a middle school, but then suffer larger drops both at and following the transition.**

We also examine whether the middle-school effect varies across subgroups of students defined in terms of prior test performance, ethnicity, and gender. Students whose 3rd-grade scores were below the statewide median saw substantially larger declines in math scores at both the middle- and high-school transition points than higher-achieving students. These patterns are consistent with the theory that lower-achieving students have access to fewer educational resources outside of school and may therefore be at higher risk of being adversely affected by school transitions. We find no clear indication that the negative effect differs in size for higher- and lower-achieving students in reading, however.

Results for students of different ethnicities follow a similar pattern. Grade configuration has a larger effect on the math scores of traditionally disadvantaged subgroups than on other students. Black students in particular demonstrate large relative gains in math achievement prior to entering a middle school but then suffer larger drops both at and following the transition. Again, however, we find only small and statistically insignificant differences between the effects estimated for students of different ethnicities in reading. We find no differences in the effects for girls and boys.

**Potential Explanations**

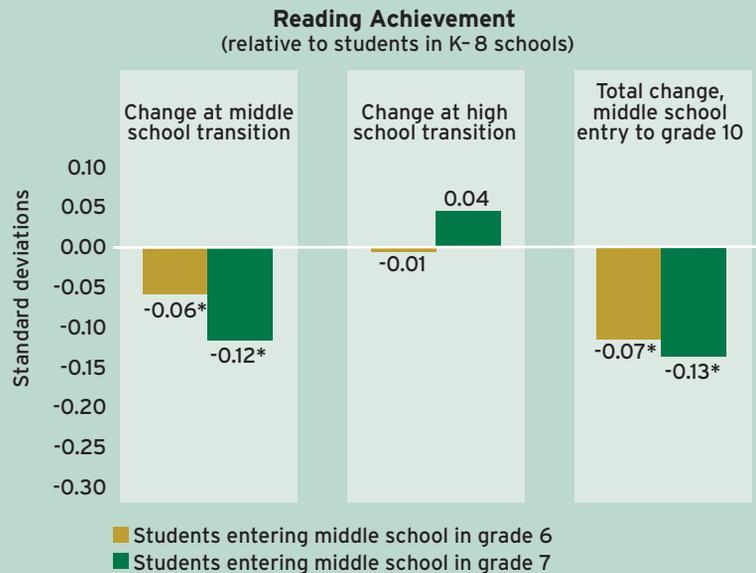
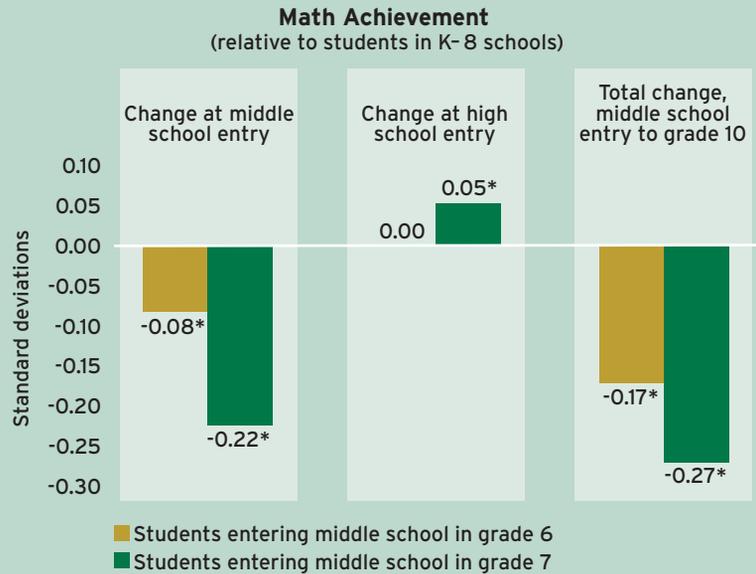
Our results confirm that transitions into both middle schools and high schools cause drops in student achievement but that these effects are far larger for students entering middle schools. One possible interpretation of this pattern is that school transitions are more disruptive for younger students, perhaps because they are more susceptible to the negative influence of older students. Yet our estimates suggest that the effect of middle-school entry on student achievement is larger for students entering in grade 7 than for students entering in grade 6. Moreover, the fact that relative achievement continues to decline after students' initial entry into middle schools suggests that average educational quality in Florida is lower in stand-alone middle schools than in schools serving grades K-8.

To explore why this might be the case, we first examine several characteristics of Florida elementary, middle, and K-8 schools. The most striking difference across school types involves cohort sizes (the average number of students in each grade). Although middle schools offer far fewer grades than K-8 schools, Florida middle schools on average enroll 146 more students than their K-8 counterparts; as a result, typical grade cohorts are almost three times as large. Florida middle schools also spend 11 percent less per student and have higher student-teacher ratios than K-8 schools, suggesting a potential role for differences in available resources. In contrast, we find no evidence that differences in observed teacher characteristics could explain our findings. Average teacher experience and average teacher salaries are similar across school types, while the share of the school's instructional staff without prior experience is modestly higher in K-8 schools.

We conduct two analyses to shed light on whether these observed differences between middle schools and K-8 schools are likely to contribute to differences in school quality. First, we rerun our test-score analysis while controlling for these differences and find a similar pattern of results. Second, we examine whether the size of the drop in relative achievement suffered by students entering middle school in grade 6 varied with the characteristics of the middle school they attended.

**No Recovery (Figure 2)**

*There is little indication that students who attend middle schools fare better at the transition to high school than their K-8 peers. By 10th grade, students who attended middle schools perform at considerably lower levels in math and reading than would be expected had they attended a K-8 school.*



**Note:** Based on Florida students enrolled in grade 3 in 2001 and 2002 who completed the state test in both math and reading in each of the subsequent seven years.

**SOURCE:** Authors' calculations

The results of this analysis again provide little evidence that low middle-school quality stems from differences in the school characteristics we can observe.

Middle schools could also differ from K–8 schools in their educational practices in ways that lead to lower student-achievement gains. To explore this possibility, we draw on a unique survey of Florida school principals conducted in 2003–04 to document responses to the state’s high-stakes accountability system. Confidentiality requirements preclude us from linking survey responses to specific schools, but we can document any differences in the average responses offered by principals of different school types.

We find few significant differences in the educational practices of the two groups of schools in our study. In particular, we observe no differences in the length of the school day or in measures of the extent to which schools had adopted specific policies to help low-performing students, policies to improve the performance of ineffective teachers, and incentives to reward highly effective teachers. If anything, these measures suggest that middle schools are more likely to have policies aimed at improving student achievement. We also find no differences across school types when we measure the degree of teacher autonomy.

A final set of survey items asked not about specific policies or practices but about the school’s overall climate. On

**We find suggestive evidence that the overall climate for student learning is worse in middle schools than in schools that serve students from elementary school through the 8th grade.**

these items, middle-school principals expressed significantly lower levels of agreement with statements indicating that their new and veteran teachers were excellent. This suggests that teachers in these schools may be less well equipped to deal with the challenges presented by their students. More middle-school principals also agreed with the statement that parents are worried about violence in the school.

Although differences on the remaining items were statistically insignificant, they consistently point in the direction of middle schools having less-favorable school climates than K–8 schools.

In short, we find little evidence that the negative effects of attending a middle school are attributable to differences in resources, cohort sizes, or educational practices. We do, however, find suggestive evidence that the overall climate for student learning is worse in middle schools than in schools that serve students from elementary school through the 8th grade. This suggests a final potential interpretation of our results that is directly related to the choice of grade configuration: students may benefit from being among the oldest students in a school setting that includes very young students, perhaps because they have greater opportunity to take on leadership roles. This interpretation could account for both the gains in relative achievement made by students in K–5 and K–6 schools prior to entering middle schools and the superior performance of K–8 students relative to their peers in middle schools. A possible, if unlikely, alternative explanation is that students entering schools with different grade configurations have different growth trajectories for reasons having nothing to do with their schooling environment.

Taken as a whole, our results suggest that school transitions lower student achievement but that attending middle schools in particular has adverse consequences for American students. Especially when considered along with those of other recent studies, our findings clearly support ongoing efforts in urban school districts to convert stand-alone elementary and middle schools into schools with K–8 configurations. They are also relevant to the expanding charter-school sector, which has the opportunity to choose grade configurations without the disruption caused by school closures. More research is needed to see whether policy or pedagogical innovations can mitigate the effects of middle school. In the meantime, policymakers should exercise caution before extending the middle-school experiment to school districts that still enjoy the K–8 configuration.

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