

**KIPP Middle Schools:  
Impacts on Achievement and  
Other Outcomes**

Executive Summary

February 27, 2013

Christina Clark Tuttle  
Brian Gill  
Philip Gleason  
Virginia Knechtel  
Ira Nichols-Barrer  
Alexandra Resch



**MATHEMATICA**  
Policy Research



Mathematica Reference Number:  
06441.910

Submitted to:  
KIPP Foundation  
135 Main Street, Suite 1700  
San Francisco, CA 94105  
Project Officer: Danielle Stein Eisenberg

Submitted by:  
Mathematica Policy Research  
1100 1st Street, NE  
12th Floor  
Washington, DC 20002-4221  
Telephone: (202) 484-9220  
Facsimile: (202) 863-1763  
Project Director: Philip Gleason

**KIPP Middle Schools:  
Impacts on Achievement and  
Other Outcomes**

Executive Summary

February 27, 2013

Christina Clark Tuttle  
Brian Gill  
Philip Gleason  
Virginia Knechtel  
Ira Nichols-Barrer  
Alexandra Resch

**MATHEMATICA**  
Policy Research



## EXECUTIVE SUMMARY

The Knowledge Is Power Program (KIPP) is a rapidly expanding network of public charter schools whose mission is to improve the education of low-income children. As of the 2012–2013 school year, 125 KIPP schools are in operation in 20 different states and the District of Columbia (DC). Ultimately, KIPP’s goal is to prepare students to enroll and succeed in college. Prior research has suggested that KIPP schools have positive impacts on student achievement, but most of the studies have included only a few KIPP schools or have had methodological limitations.

This is the second report of a national evaluation of KIPP middle schools being conducted by Mathematica Policy Research. The evaluation uses experimental and quasi-experimental methods to produce rigorous and comprehensive evidence on the effects of KIPP middle schools across the country. The study’s first report, released in 2010, described strong positive achievement impacts in math and reading for the 22 KIPP middle schools for which data were available at the time.

For this phase of the study, we nearly doubled the size of the sample, to 43 KIPP middle schools, including all KIPP middle schools that were open at the start of the study in 2010 for which we were able to acquire relevant data from local districts or states. This report estimates achievement impacts for these 43 KIPP middle schools, and includes science and social studies in addition to math and reading. This report also examines additional student outcomes beyond state test scores, including student performance on a nationally norm-referenced test and survey-based measures of student attitudes and behavior.

**The average impact of KIPP on student achievement is positive, statistically significant, and educationally substantial.** KIPP impact estimates are consistently positive across the four academic subjects examined, in each of the first four years after enrollment in a KIPP school, and for all measurable student subgroups. A large majority of the individual KIPP schools in the study show positive impacts on student achievement as measured by scores on state-mandated assessments. KIPP produces similar positive impacts on the norm-referenced test, which includes items assessing higher-order thinking. Estimated impacts on measures of student attitudes and behavior are less frequently positive, but we found evidence that KIPP leads students to spend significantly more time on homework, and that KIPP increases levels of student and parent satisfaction with school. On the negative side, the findings suggest that enrollment in a KIPP school leads to an increase in the likelihood that students report engaging in undesirable behavior such as lying to or arguing with parents. We describe these findings in more detail in the pages below.

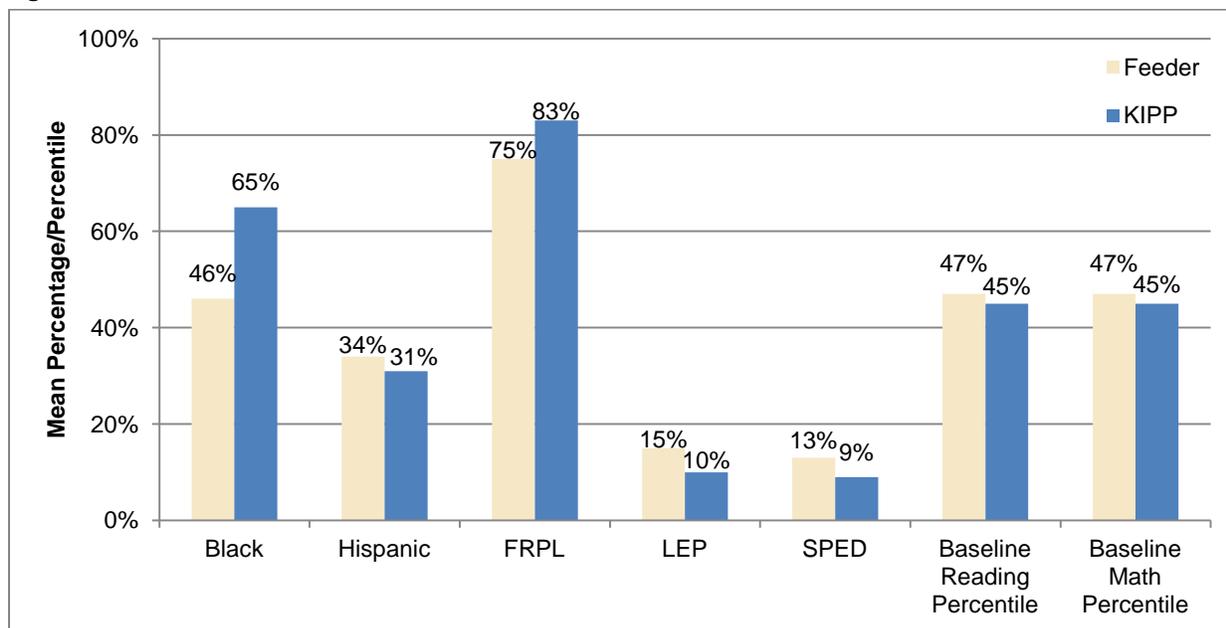
### Who Attends KIPP, and How Do KIPP Students Proceed Through Middle School?

To examine the characteristics of the students who enter KIPP schools (typically in 5th grade) we compared the 4th grade characteristics of future KIPP students and their elementary school classmates; that is, non-KIPP students in the same districts attending the same elementary feeder schools from which KIPP middle schools draw students. We also examined patterns of grade repetition and early exit from KIPP schools, as compared with other middle schools nearby.

Data on student characteristics provided little evidence that KIPP “creams” or selectively enrolls higher-performing students, though students entering KIPP are less likely to have received special education services. For most identifiable characteristics, the students entering KIPP schools look much like other students in their neighborhoods: low-achieving, low-income, and non-white.

Nearly all KIPP students (96 percent) are either black or Hispanic, and more than four-fifths (83 percent) are from households with incomes low enough to be eligible for free or reduced-price lunch (FRPL)—percentages that are higher than those of the KIPP students’ feeder schools (Figure ES.1). The typical KIPP student scored at the 45th percentile within the district in reading and math prior to entering KIPP, an achievement level significantly lower than the average in their own elementary schools. In contrast, KIPP students are somewhat less likely than students at their feeder schools to have received special education services (9 versus 13 percent) or be classified as having limited English proficiency (LEP, 10 versus 15 percent) when they were in elementary school.

**Figure ES.1. Student Baseline Characteristics: KIPP vs. Feeder Schools**



Note: All differences are statistically significant at the 0.05 level, two-tailed test.

On average, students do not leave KIPP schools at unusually high rates prior to middle school completion. The proportion of entering students who transfer before 8th grade is identical at KIPP and non-KIPP district schools (37 percent). However, KIPP schools are consistently more likely than local district schools to have students repeat a grade.

### How Does KIPP Affect Student Achievement?

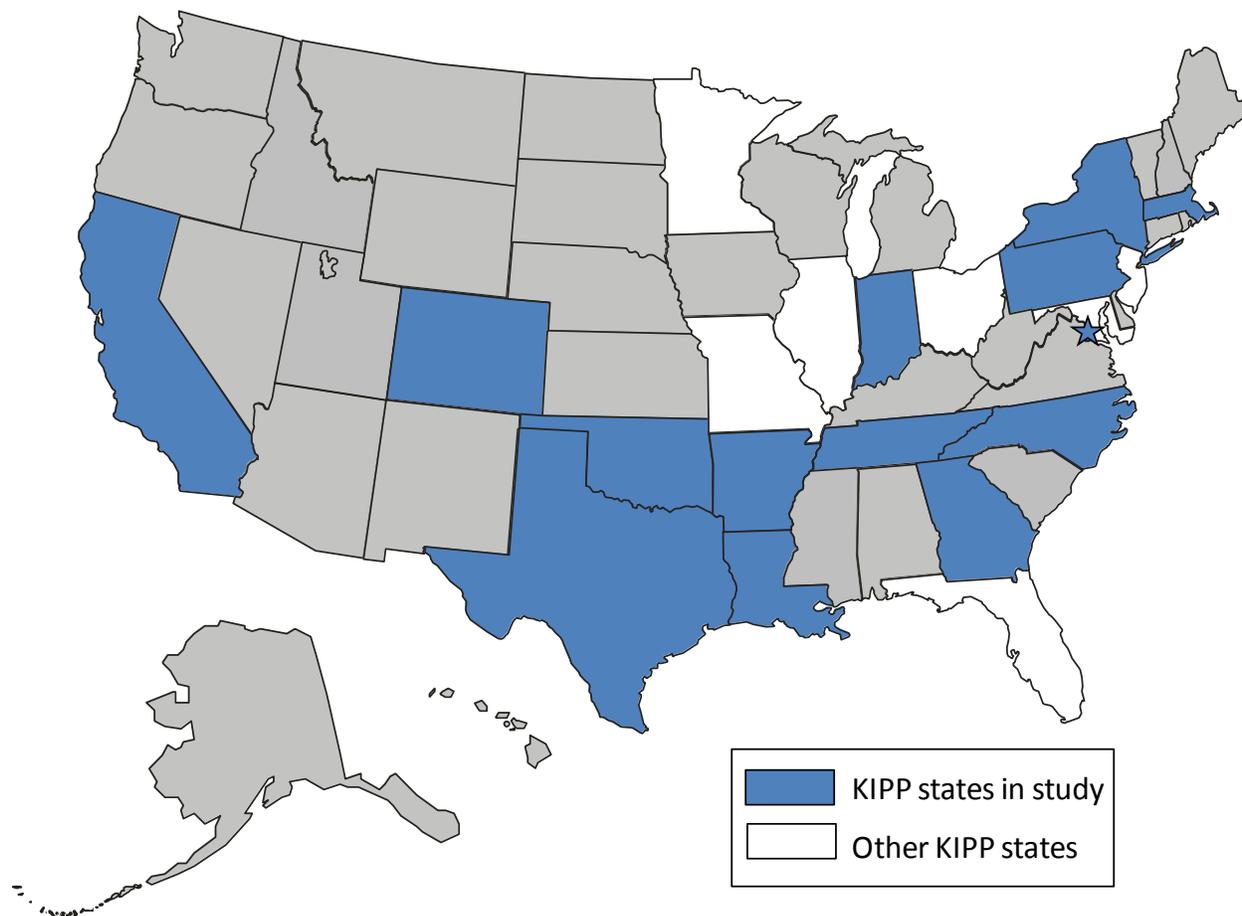
We examined KIPP impacts on students’ performance on state assessments across four subject areas—reading, math, science, and social studies. We also measured impacts on a nationally norm-referenced test that incorporates items assessing higher-order thinking skills. Our primary method of analysis was a matched comparison group design that produced impact estimates for 41 KIPP schools. This design used propensity score matching techniques to identify a set of non-KIPP district students who, based on their characteristics and achievement trajectories in elementary school, closely resemble KIPP students. Using statistical controls for small remaining differences between the groups, we then compared the achievement trajectories of the KIPP students and comparison students on state assessments in each of the first four years after KIPP entry (typically grades 5–8). Our estimates of KIPP’s impact reflect the effect of having ever enrolled at KIPP—students who leave before completing 8th grade remain part of the KIPP “treatment group” after

leaving, thereby ensuring that we do not artificially inflate KIPP's estimated impact by focusing only on students who persist at KIPP for four years.

We also used a lottery-based design as an alternative, experimental method of estimating impacts for a subset of 13 KIPP schools (including 2 schools not included in the matched comparison sample of 41 schools). We compared a treatment group of students offered admission to a KIPP school on the basis of receiving a winning draw in the school's randomized admissions lottery with a control group of students who applied to the school and participated in the lottery but who did not receive a winning draw. The lottery design uses random assignment to form treatment and control groups, making it essentially a randomized experiment—the gold standard for estimating impacts. The design guarantees that the treatment group of students is similar to the comparison group on all key characteristics, including baseline test scores and demographics, as well as items that we cannot measure such as motivation and parental support.

Despite the rigor of the lottery design, we cannot use it as our primary approach because most schools do not have enough lottery participants to support the design. Fortunately, the matched comparison design produces estimates of KIPP's achievement impacts that are not significantly different from the experimental estimates. When we apply the matching approach to the same students and schools included in a lottery-based analysis, we find that the impact estimates produced by the two methods are very similar, with no statistically significant differences. The success of the matching approach in replicating the lottery-based results provides more confidence in the results produced by the matching approach with the full set of 41 KIPP schools.

The 41 schools in the matched study comprise a majority of all KIPP middle schools in a majority of the states served by KIPP (Figure ES.2) as of the 2009–2010 school year. At that point, there were 53 KIPP middle schools in operation across 20 states and DC. Another 10 middle schools operated by KIPP had closed or lost their KIPP affiliation by 2010. Of these 63 middle schools operating in 2009–2010 or earlier, we included all KIPP schools (38 operating, 3 closed) located in states and/or school districts that could provide at least three consecutive years of complete, longitudinally linked student-level data for both traditional public and charter schools. For each school in the matching sample, we were able to calculate impacts for between 2 and 10 cohorts per school, with outcomes observed between the 2001–2002 school year and the 2010–2011 school year. These 41 schools are similar to the full population of KIPP middle schools on a variety of operational dimensions and student characteristics, suggesting the possibility of generalizing the matched comparison estimates to the full population of KIPP schools.

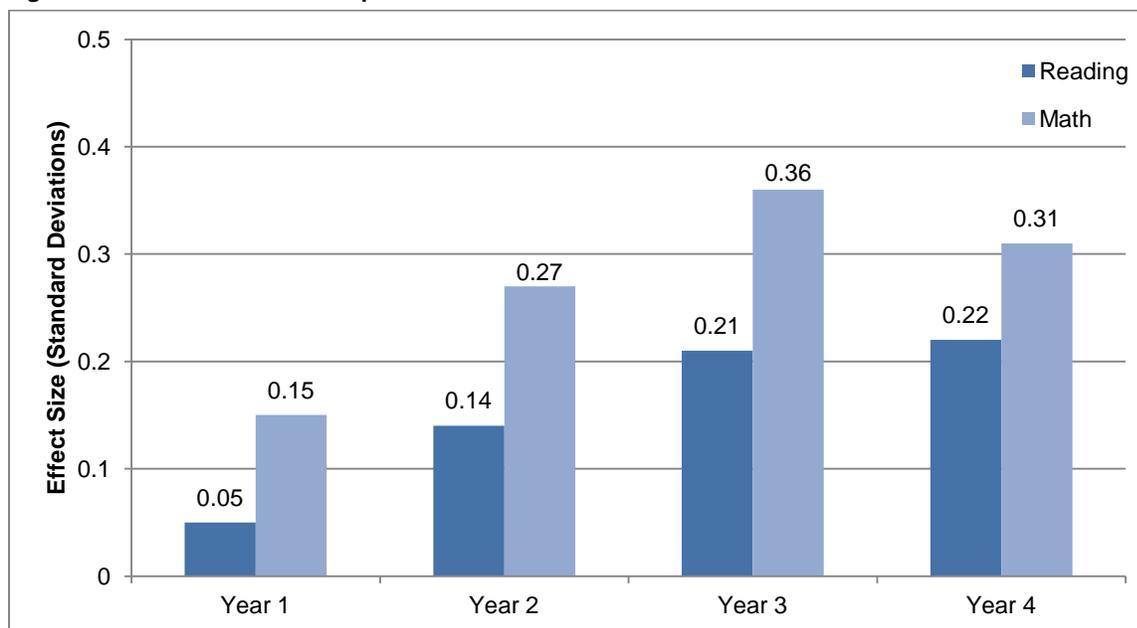
**Figure ES.2. Location of KIPP Schools in the Study**

Our impact estimates suggest four key results related to how KIPP affects student achievement:

**Key finding 1: KIPP middle schools have positive and statistically significant impacts on student achievement across all years and all subject areas examined.**

The estimated effects of KIPP on student achievement are consistently positive. In each of the four years after KIPP entry, KIPP has a statistically significant positive impact on students' performance on state assessments in both reading and math, based on the matched comparison group design (Figure ES.3). The impacts for student subgroups are similar to the average overall impact among all KIPP students. This is true on average across KIPP and for most of the 41 KIPP schools in the matched comparison analysis.

KIPP schools also positively affect student achievement in science and social studies. We measured these impacts in whatever grade states administered tests in these subjects (typically 8th grade). The estimated impacts of KIPP are positive and statistically significant in both science and social studies, and the magnitudes of these effects are similar to the estimated impacts in math and reading after three to four years.

**Figure ES.3. KIPP Estimated Impacts on Student Achievement**

Note: All impacts are statistically significant at the 0.05 level, two-tailed test.

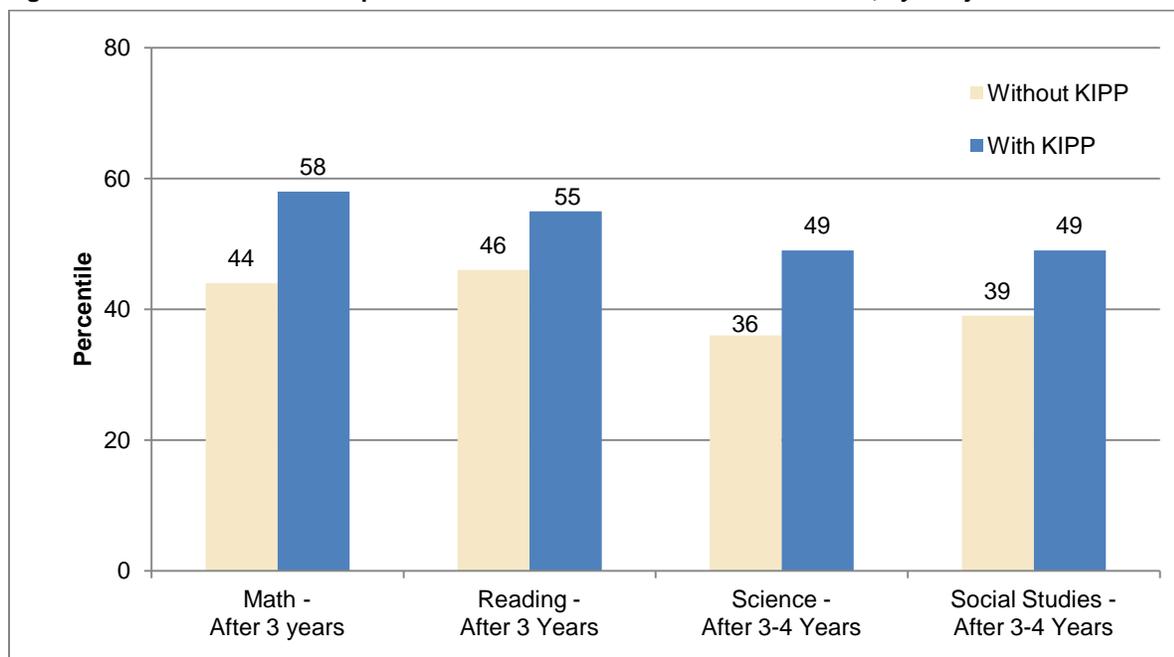
**Key finding 2: The magnitude of KIPP's achievement impacts is substantial.**

Across the KIPP schools in the analysis sample, average impacts in all subjects are large enough to be educationally meaningful. Three years after enrollment, the estimated impact in math is 0.36 standard deviations, equivalent to moving a student from the 44th to 58th percentile of the district's distribution (Figure ES.4). This impact estimate suggests that the average KIPP middle school produces approximately 11 months of additional learning growth in math for its students after three years (Bloom et al. 2008). The size of the math impact produced by KIPP schools after three years is equivalent to about 40 percent of the local black-white test score gap.

The average impact of KIPP after three years in reading (0.21 standard deviations) is somewhat smaller than that for math—equivalent to moving a student from the 46th to 55th percentile. Compared to national norms, this estimated reading impact represents approximately eight months of additional learning growth (Bloom et al. 2008). The three-year reading impact is equivalent to about 26 percent of the local black-white test score gap in reading.

KIPP's impact in science after three to four years (0.33 standard deviations) is equivalent to moving a student from the 36th to 49th percentile, representing approximately 14 months of additional learning growth. KIPP's impact in social studies after three to four years (0.25 standard deviations) is equivalent to moving a student from the 39th to 49th percentile, representing about 11 months of extra learning growth in social studies. KIPP's science and social studies impacts are equivalent to about a third of the local black-white test score gap in these subjects.

Evidence on the magnitudes of estimated impacts of other charter school management organizations (CMOs) suggests that KIPP is among the highest-performing charter networks in the country (Furgeson et al. 2012).

**Figure ES.4. KIPP Estimated Impacts on Student Achievement in Percentiles, by Subject**

Note: For math and reading, the figure shows the impact of KIPP on the scores of tests taken three years after enrollment in a KIPP school; for science and social studies, the figure shows the impact on scores of tests taken three years after enrollment for some student cohorts and four years after enrollment for other student cohorts. The blue bar represents the mean percentile rank of KIPP students in the relevant analysis sample, relative to local jurisdictions. The beige bar represents this observed mean rank minus the average KIPP impact estimate in each subject. In all four subjects, the difference in percentiles represents an impact that is statistically significant at the 0.05 level, two-tailed test.

**Key finding 3: The matched comparison design produces estimates of KIPP’s achievement impacts similar to estimates of the same impacts based on an experimental, lottery-based design.**

A possible criticism of the matched comparison group design is that we can never be completely certain that we are accounting for unmeasured factors that lead some students to enroll in KIPP schools. It is possible, for example, that students who apply to KIPP differ from other students in their elementary schools with regard to educational motivation. If this characteristic is not captured in prior test scores or other variables in our data set, this omitted student characteristic could lead to bias in our estimates of the KIPP achievement effect. Fortunately, for a subset of schools, we are able to implement a lottery-based design that does not suffer from this limitation.

In the subset of schools in the lottery-based analysis, the estimated impacts of KIPP on student achievement in math and reading are similar to the estimates from the matched comparison design. As mentioned above, this is true when we used the exact same sample of KIPP students and carefully replicated the lottery-based estimates using the matched comparison approach. This is also true when we compared the lottery-based estimates to the original matched comparison group design estimates for those schools, which are based on a larger number of cohorts and students than the lottery-based estimates. In other words, the analysis revealed no evidence of bias in KIPP’s estimated achievement impacts based on a matched comparison group design when compared with those based on an experimental, lottery-based design for the subset of KIPP schools for which both

designs are possible. This finding supports our use of the matched comparison group design for generating achievement impact estimates for the broader set of KIPP schools.

**Key finding 4: In the lottery sample, average KIPP impacts on a nationally normed, low-stakes test that includes items assessing higher-order thinking skills were similar to impacts on high-stakes state tests.**

In the KIPP schools included in the lottery-based analysis, we administered a low-stakes, nationally norm-referenced assessment (the TerraNova, which included constructed response items in the reading component) to test the robustness of the results found on state assessments. The magnitude of the estimated impacts of these KIPP schools on the study-administered test was consistent with the positive point estimates found on the state assessments. However, because a smaller sample of students took the TerraNova, statistical power is limited and the reading estimate does not achieve statistical significance. The math estimate is statistically significant.

This finding is important for two reasons. First, because the test results did not have consequences for students, teachers, or schools, the TerraNova results suggest that the positive impacts of KIPP are not a result of “teaching to the test” on state assessments. Second, TerraNova results taken alongside the positive impacts in science and social studies suggest that KIPP is doing more academically than simply improving students’ basic skills in reading and math.

## How Does KIPP Affect Student Behavior and Attitudes?

In addition to affecting students’ academic achievement, KIPP may influence student behaviors and attitudes related to long-term academic success. For KIPP schools in the lottery sample, we used the experimental design to estimate impacts on various measures of student behavior and attitudes. Notable findings from this analysis include:

- Students enrolled at KIPP spend an additional 35 to 53 minutes on homework per night than they would have in a non-KIPP school, completing an average of more than two hours of homework per night (according to student and parent self-reports) as a result.
- KIPP has no statistically significant effect on a variety of measures of student attitudes that may be related to long-run academic success. The estimated KIPP impacts on indices of student-reported self-control, academic self-concept, school engagement, effort/persistence in school, and educational aspirations are not statistically significant.
- KIPP has no statistically significant effect on several measures of student behavior, including self-reported illegal activities, an index of good behavior, and parent reports of behavior problems. However, KIPP has a negative estimated effect on a student-reported measure of undesirable behavior, with KIPP students more likely to report behaviors such as losing their temper, arguing or lying to their parents, or giving their teachers a hard time.
- Winning an admissions lottery to KIPP has a positive effect on students’ and parents’ satisfaction with school. In addition, the parents of KIPP students are less likely to report that their child’s school is too easy.

## Are the Characteristics of KIPP Schools Associated with Impacts?

While most KIPP schools have significant positive impacts on student achievement, some KIPP schools have more positive impacts than others. This raises the question of whether there are particular characteristics of some schools that make them more successful. Ultimately, we would like to understand the conditions under which KIPP schools are most likely to promote the academic achievement of their students so that successful practices and conditions can be replicated.

The factors that drive the success of KIPP schools could not easily be determined in our analysis. Few of the school characteristics we examined are strongly correlated with the estimated impacts of the KIPP schools in the study sample. For example, class size, teacher experience and professional development opportunities are not associated with impacts. The lack of significant correlations between these school characteristics and impacts may be explained, in part, by the limited sample size of 38 schools for which impact estimates and school characteristics were available, affecting our ability to detect small to moderately-sized relationships.

Nonetheless, we identified two factors related to the strength of KIPP schools' impacts on student achievement. One is the approach of the KIPP school toward student behavior and school culture. KIPP's impact on student achievement is larger in schools where principals report a more comprehensive school-wide behavior system. This finding is consistent with the findings of several other recent studies of charter schools (Angrist et al. 2011; Dobbie and Fryer, 2011; Furgeson et al. 2012). Under comprehensive school-wide behavior systems, schools have clearly defined and consistently enforced rewards for good behavior and consequences for negative behavior.

Second, the length of the school day and how time is used are also significantly associated with impacts. All KIPP schools have longer-than-normal school days (with an average KIPP school day of more than nine hours), but some have longer days than others. Overall, average impacts on student achievement are smaller in KIPP schools with a particularly extended school day. This counterintuitive relationship appears to be driven by the fact that, in these schools, the additional time tends to be spent in non-core academic activities. In contrast, average impacts on student achievement are larger in KIPP schools in which relatively more time is spent on core academic activities.

It is difficult to isolate the elements that create a successful KIPP school. This may be because KIPP's approach aims to integrate multiple strategies in concert—which is why KIPP believes that no single factor is responsible for creating a high functioning KIPP school. Nonetheless, the variance in impacts achieved by KIPP schools suggests that there may be operational differences among the schools. More research is needed to identify exactly what makes each school more or less successful than its peers. In future work evaluating the KIPP network's effort to "scale up," we will address this and other key questions in more detail. We will calculate impacts for additional KIPP schools and generate separate impacts by school year (not only by number of years a student is enrolled), giving us a larger sample for analyzing factors that can be correlated to KIPP impacts and the opportunity to observe how the impacts of individual KIPP schools change over time. In addition, this work will enable us to estimate the effectiveness of newer KIPP schools, including elementary and high schools. Finally, as the network matures, researchers will be able to calculate longer-term impacts on students, assessing KIPP's progress towards its goals of seeing more students to and through college.

# **MATHEMATICA** **Policy Research**

[www.mathematica-mpr.com](http://www.mathematica-mpr.com)

Improving public well-being by conducting high quality, objective research and surveys

Princeton, NJ ■ Ann Arbor, MI ■ Cambridge, MA ■ Chicago, IL ■ Oakland, CA ■ Washington, DC

Mathematica® is a registered trademark of Mathematica Policy Research