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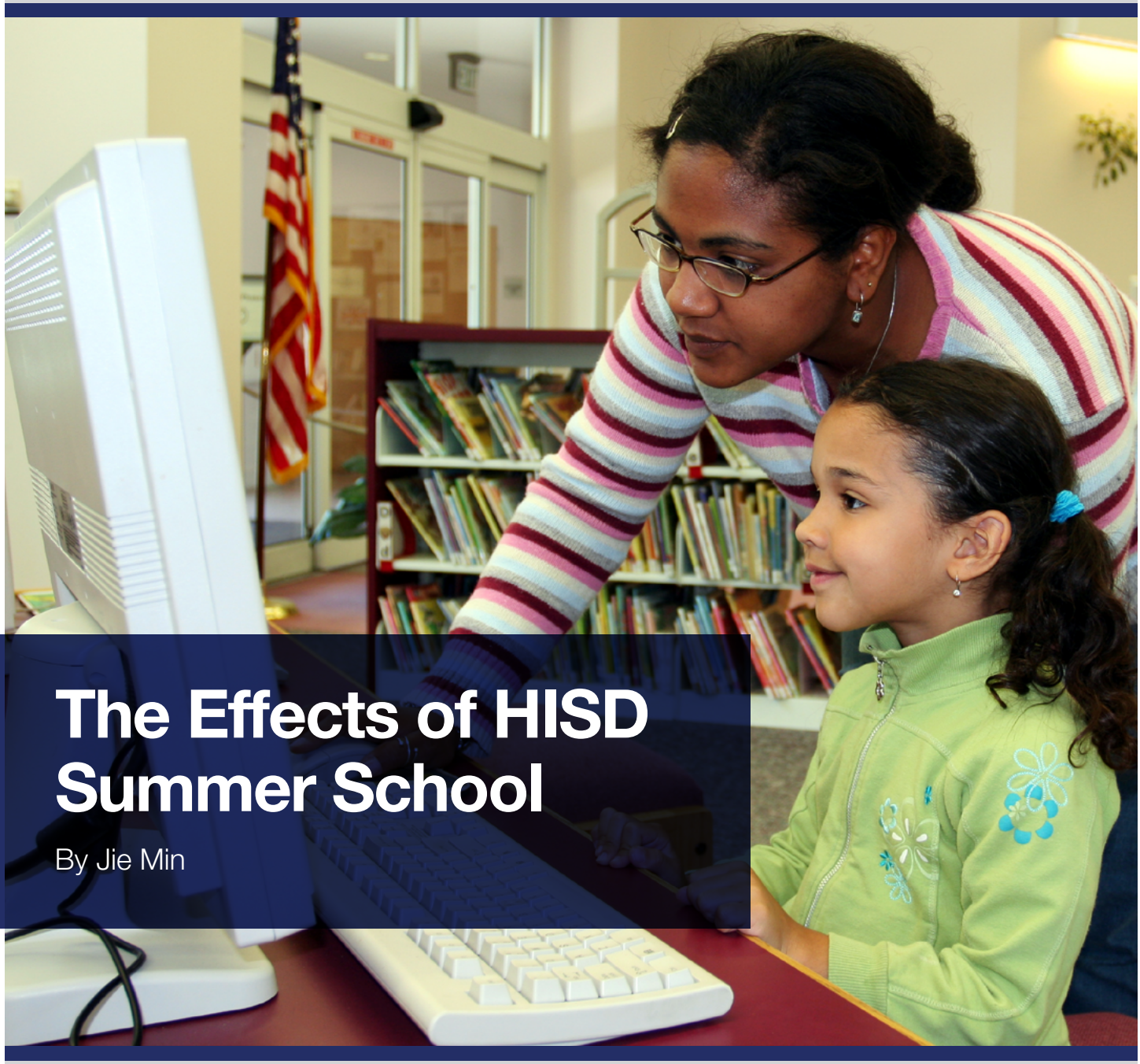

The Effects of HISD Summer School

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Abstract

This study compared the summer learning rates of students who attended Houston Independent School District (HISD) 2016 summer school to similar students who did not attend, for both promoted and retained students. For students between 1st and 2nd grade and those between 2nd and 3rd grade, summer learning rates were faster for both promoted and retained students who attended HISD summer school than comparable students who did not attend, but these differences were not statistically significant, likely due to the small number of students in each group. Similarly, promoted students between 4th and 5th grade and retained students between 6th and 7th grade who attended summer school had faster learning rates than comparable students who did not attend summer school, but they were not statistically significant. For these students, it was unclear whether HISD summer school was beneficial. However, for students between 5th and 6th grade and those between 7th and 8th grade, there is evidence that HISD summer school was not beneficial for either promoted or retained students. This is also true for retained students between 4th and 5th grade and promoted students between 6th and 7th grade.

Introduction

Relative to the academic year, learning rates typically slow down in the summer, especially for economically disadvantaged students (Entwisle and Alexander 1992; Burkam et al. 2004; Downey and Condron 2016). As such, various types of summer interventions have been implemented throughout the country, especially those geared toward students from disadvantaged backgrounds who experience the most summer learning loss (Cooper et al. 2000; McEachin et al. 2016). Despite the wide array of summer interventions, relatively little is known about whether these programs are effective. This study provides an assessment of the effectiveness of HISD 2016 summer school, which the district offered both to retained students (which was required and needed for promotion) as well as promoted students (which was not required but available for summer enrichment). It should be noted that promoted students who marginally fail are more likely to attend summer school than other promoted students, because they tend to be highly recommended by their schools/teachers to do so. Since promoted and retained students attend HISD summer school for different purposes, the effectiveness of summer school was examined separately for the two groups.

Research questions

- Among promoted students, what is the effect of attending HISD summer school relative to those who did not attend? Do these effects vary by grade level?
- Among retained students, what is the effect of attending HISD summer school relative to those who did not attend? Do these effects vary by grade level?
- Among students who attended HISD summer school, how do the summer learning rates of retained students compare with promoted students?

Data

This study used the 2015–16 and 2016–17 Istation's Indicators of Progress (ISIP), as well as 2015–16 Promotion Standards Data. The sample was restricted to students in grades 1, 2, 4, 5, 6, and 7 during the 2015–16 academic year and followed them through their subsequent grades. The ISIP tests used different grading scales for grades 1–3 (usually under 300 points) and grades 4–8 (usually above 1500 points). As such, students in grade 3 during the 2015–16 academic year were eliminated due to the difficulty in assessing their progress toward grade 4 because of inconsistent grading scales.

The study focused on students' ISIP reading scores at four time points: the beginning of the 2015–16 fall semester, the end of the 2015–16 spring semester, the beginning of the 2016–17 fall semester, and the end of the 2016–17 spring semester, so as to capture both academic year and summer learning rates. Students were not tested exactly on the first day of school nor on the last day of school, and test dates varied by school. Students were tested several weeks after the start of the school year and several weeks before the end of the school year, and the testing window was about two weeks long, both in the fall and in the spring. This means that the amount of time between the spring test date and the fall test date of the following academic year was about five months, significantly longer than the actual summer break which was only three months long. To get a more accurate estimate of summer learning, the reading scores were extrapolated to what students would have obtained at the beginning and end of summer. The dependent variables were students' extrapolated ISIP overall reading scores at the four time points listed above.

The key independent variable was HISD summer school attendance type[1] in the summer of 2016, a four-category variable (1=promoted & not attend summer school, 2=promoted & attend summer school, 3=retained & not attend summer school, 4=retained & attend summer school). The other independent variables included race/ethnicity, gender, age, economic disadvantage status, limited English proficiency, gifted/talented program, magnet program status, and special education status.[2]

Methods

A Piecewise Linear Model (PLM) was used to fit an individual learning trajectory for each student as he/she progressed through two sequential school years and the summer in-between. PLM allows the trajectories to differ in each phase in terms of their learning rates, while taking account of the independent variables listed in the data section. The ISIP reading scores were modeled as repeated observations (level one) nested within students (level two). To take the clustering effects at the school level into account, vce(cluster school ID) options in Stata were used.

Average summer learning rates were estimated using the difference between the test score at the beginning of the 2016–17 fall semester and the score at the end of the previous 2015–16 spring semester, divided by the number of summer months. Controlling for a variety of independent variables, Figures 1–6 illustrate the learning rates of students in grades 1, 2, 4, 5, 6, and 7. Models were run separately for different grade levels.

To explore the robustness of the results further, the effect of HISD summer school was estimated using a Fuzzy Regression Discontinuity design. The treatment of attending HISD summer school can be considered as a discontinuous function of students' overall yearly average scores. Students who were just below the criteria were mandated to attend the summer program, while those who were just above the criteria were not required to. The assignment of attending HISD summer school was obeyed quite well but not without exceptions, since there were a few students who were mandated to attend summer school but did not actually attend, and vice versa. To deal with the non-compliance issue, a fuzzy regression discontinuity design, rather than a sharp regression discontinuity, was conducted. Although only a small proportion of students did not comply with the assignment they received, there might be unobserved student attributes that not only caused the noncompliance but also affected the outcome to be measured. To solve the potential endogeneity (selection into treatment depends partially upon starting level of outcome variable) associated with participation in summer school, instrumental variables—the assignment of attending summer school, that is, promotion status at the end of the 2015–16 academic year—was utilized. To construct a comparable sample, the first promotion criterion—overall yearly average score of 70—was used as the cut-off point, and the analytic samples were restricted to three bandwidths—students who fell within 0.2, 0.3, and 0.5 standard deviations of the cut-points of the corresponding grade level. The estimation of the treatment effect in a fuzzy regression discontinuity was implemented by a 2-stage least squares analysis.

Findings of Piecewise Linear Model (see Figures 1–6)

Figures 1–6 are based on post-estimation from the Piecewise Linear Models, which means that they take account of the student factors listed in the data section. For students between 1st and 2nd grade and those between 2nd and 3rd grade, summer learning rates were faster for both promoted and retained students who attended HISD

1 Whether a student has attended summer school was identified by using variables from the Promotion Standards data. Students with non-missing information on either summer campus ID, present days, or absent days were categorized as a program attendee; otherwise, they were categorized as one who did not attend.

2 These variables were obtained from the Istation's Indicators of Progress (ISIP) data.

summer school than comparable students who did not attend, but these differences were not statistically significant, likely due to the small number of students in each group. Similarly, promoted students between 4th and 5th grade and retained students between 6th and 7th grade who attended summer school had faster learning rates than comparable students who did not attend summer school, but they were not statistically significant. For these students, it is unclear whether HISD summer school was beneficial. However, for students between 5th and 6th grade and those between 7th and 8th grade, there is evidence that HISD summer school was not beneficial for either promoted or retained students. This is also true for retained students between 4th and 5th grade and promoted students between 6th and 7th grade.

Findings of Fuzzy Regression Discontinuity (see Table 1)

Table 1 presents the results from a two-stage least squared (2SLS) instrumental variable (IV) approach. The coefficient for summer school attendance is an unbiased estimate of the local average treatment effect (LATE), which measures the difference in reading scores between students who were mandated to attend summer school and actually did so with similarly achieving students who were not required to attend summer school and did not participate. The LATEs are not statistically significant at the .05 level except for students between 4th and 5th grade, suggesting that for most students, HISD summer school participation did not increase their reading scores at the beginning of the next academic year. As the bandwidths around the thresholds become larger, the statistical (non) significance of LATE generally holds, with one exception (students between 5th and 6th grade). For students between 4th and 5th grade, the estimates of LATE remain significant, but become smaller as the bandwidth become broader. Despite the sign on the attend coefficient switches direction as the bandwidth changes for students between 1st grade and 2nd grade, students between 2nd and 3rd grade, students between 6th and 7th grade, and those between 7th and 8th grade, the coefficient remains non-significant. This means there is little evidence that HISD summer school was beneficial for these students.

Conclusion

Overall, the benefits of HISD 2016 summer school are unclear for both promoted and retained students. For both promoted and retained students between 5th and 6th grade and those between 7th and 8th grade, as well as retained students between 4th and 5th grade and promoted students between 6th and 7th grade, there is no evidence that HISD summer school was beneficial. One speculation for these findings involves small sample sizes. The analyses were conducted separately by grade level, which might include small sample sizes for certain groups that are likely to affect the statistical power of the results.[3]

An alternative explanation is that the HISD 2016 summer program consisted of only 22 days of instruction, which might not be long enough for the program to take effect. Hazelton et al. (1992) suggested that 35 extra days would be needed to produce a noticeable change in student achievement, and Roderick et al. (2004) found large gains in students' reading performance from a 30 day summer program. Moreover, meta analyses provided stronger evidence that an instructional duration between 60 and 120 hours is most suitable for a summer program (Cooper et al. 2000), and reading programs of between 44 and 84 hours in length have the largest effects on reading achievement (Lauer et al. 2006). However, simply adding a few extra days of instruction is not enough to result in impressive changes in student achievement (Cooper 2004). For robust changes to take place, extra days of instruction must be accompanied by appropriate curriculum, qualified teachers, and student participation (McEachin et al. 2016).

Limitations

1. An important caveat should be kept in mind when interpreting results from the fuzzy regression discontinuity analyses. Since the analytic sample only includes compliers who scored closely around the cut-points in each grade level, the local average treatment effects identified in this study can not speak to students who are non-compliers and scored closely around the threshold, nor students who did not score around the threshold—either high-performing or extremely low-performing.
2. The available data do not include enough information on the features of summer school, such as subject of instruction (e.g., reading, math, social studies, etc.), length (hours) of instruction per day, test scores during summer school, class size, teacher qualifications, quality of instruction, etc.

3 The sample size for the retained & not attend summer school group is quite small, which ranges from 11 to 36 students across the six grade levels in this study.

Improvements to HISD 2018 Summer School

The Interventions Office at Houston Independent School District has made the following adjustments to the 2018 summer program for elementary and middle school students:

1. Universal screener results for reading and math were added to the promotion criteria.
2. Teachers were to use screener results to identify specific summer learning goals for students based on their individual needs.
3. The Interventions department partnered with curriculum to redesign summer courses in a way that provides teachers with tools for re-teaching the most commonly identified misunderstandings as well as tools for differentiation.
4. The Interventions department also partnered with Scholastic to implement the use of literacy kits which include instruction based on three components: Literacy skills, Engagement skills, and Social-emotional development. Teachers were trained on the use of these kits based on the grade levels that they were assigned for summer.
5. Teachers were provided with checkpoints and data trackers so that they could ensure that students were mastering concepts daily according to their specific learning profile established by the Grade Placement Committee.
6. Students took the reading and or math screener at the end of the summer session to determine if there was improvement in their scores as compared to the End-of-Year screening window.
7. The end of summer screening results was added as a criterion to consider when Grade Placement Committees met to determine promotion status for students.

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Table 1. Effects of Attending HISD Summer School on Student Reading Scores[4]

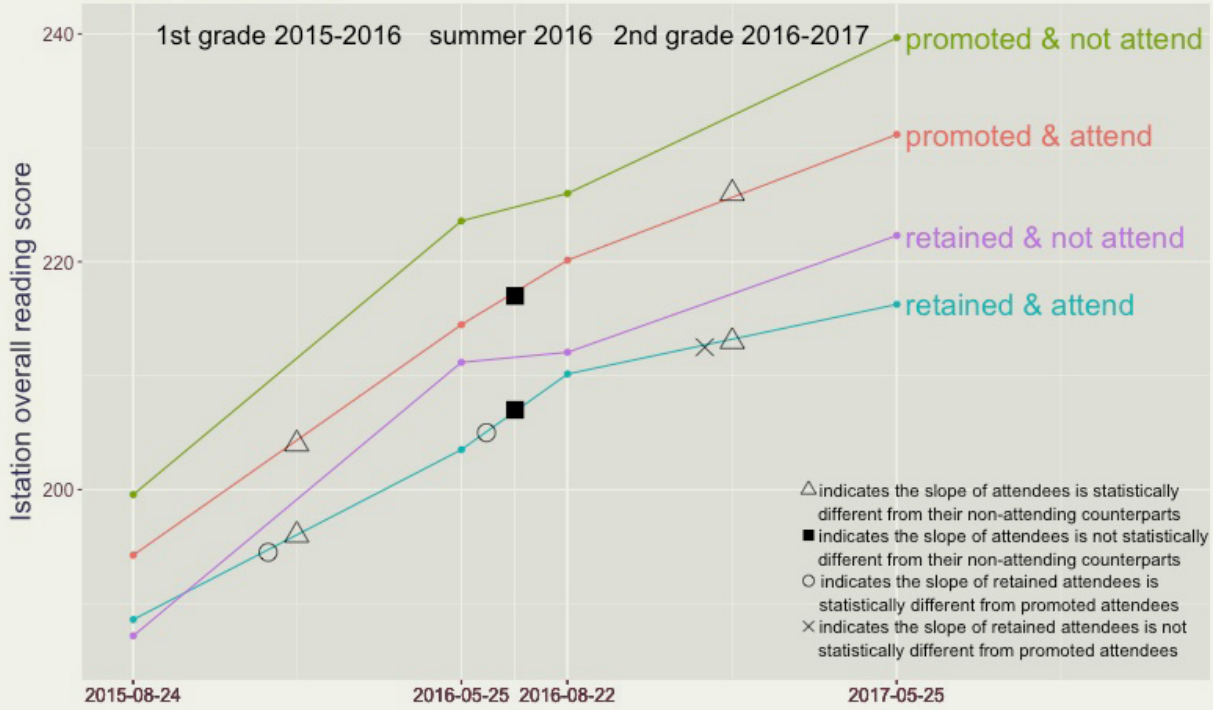
Bandwidth Sample	± .2 SD	± .3 SD	± .5 SD
Grade 1[5]	1.159	–1.266	–1.613
Grade 2	2.564	–1.851	–2.601
Grade 4	78.359*	58.58**	26.18*
Grade 5	–26.319	–51.609	–59.455*
Grade 6	3.095	–10.058	–9.926
Grade 7	1.956	19.649	–1.625

Note: *p<.05 **p<.01 ***p<.001

4 The model has controlled for a variety of student characteristics: race/ethnicity, gender, economically disadvantage status, limited English proficienty, and special education status.

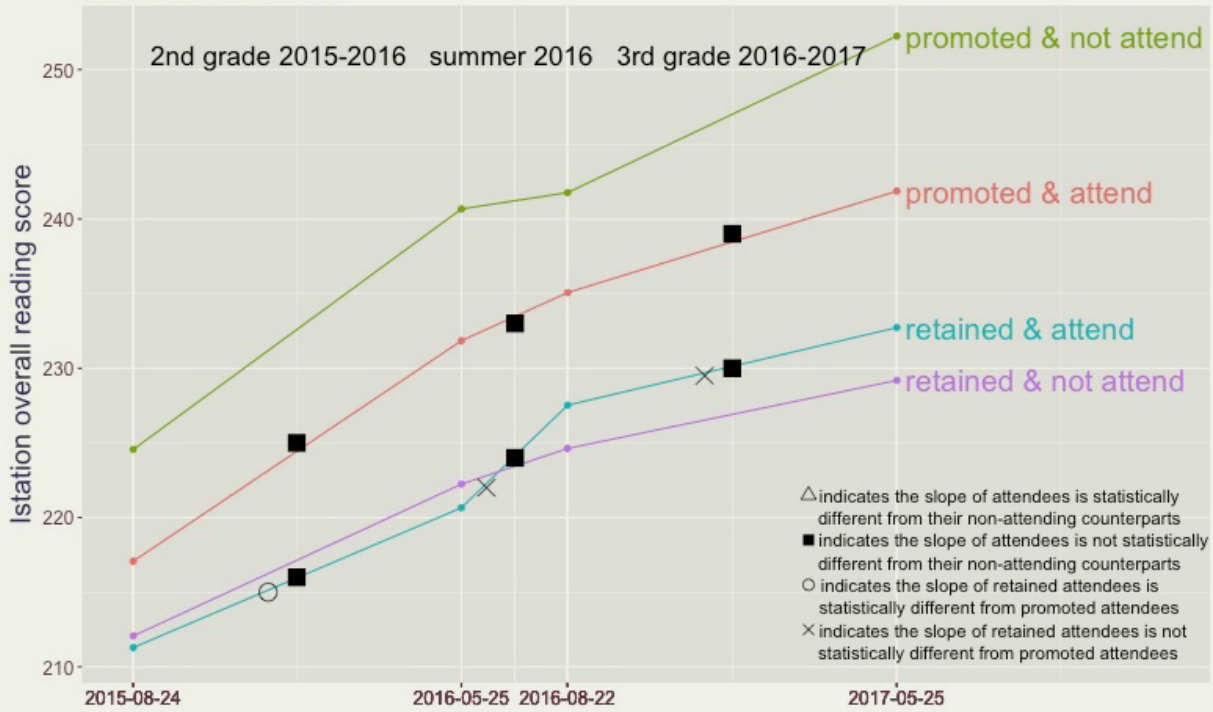
5 Grade 1, 2, etc. here refers to students attend/not attend summer school after Grade 1, 2, etc.

Figure 1. Reading Scores for Promoted and Retained Students
(Grade 1 in 2015-16)



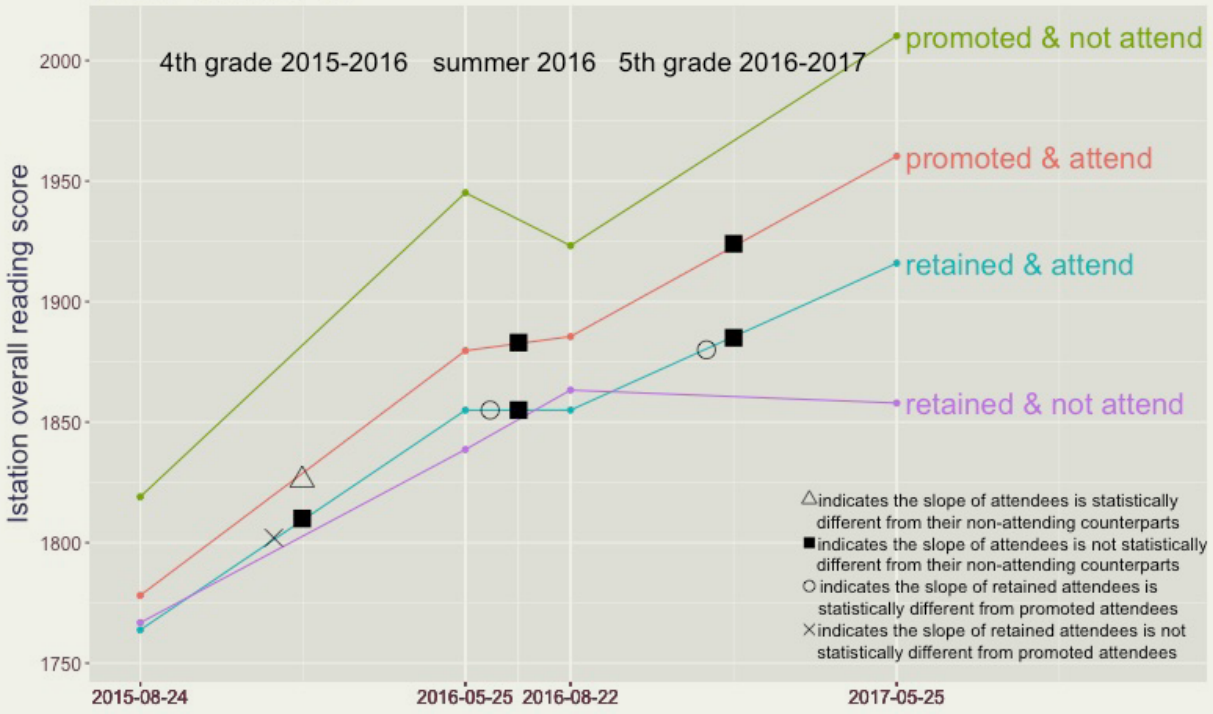
Note: The model has controlled for a variety of student characteristics: race/ethnicity, gender, age, economic disadvantage status, limited English proficiency, gifted/talented program, magnet program status, and special education status.

Figure 2. Reading Scores for Promoted and Retained Students
(Grade 2 in 2015-16)



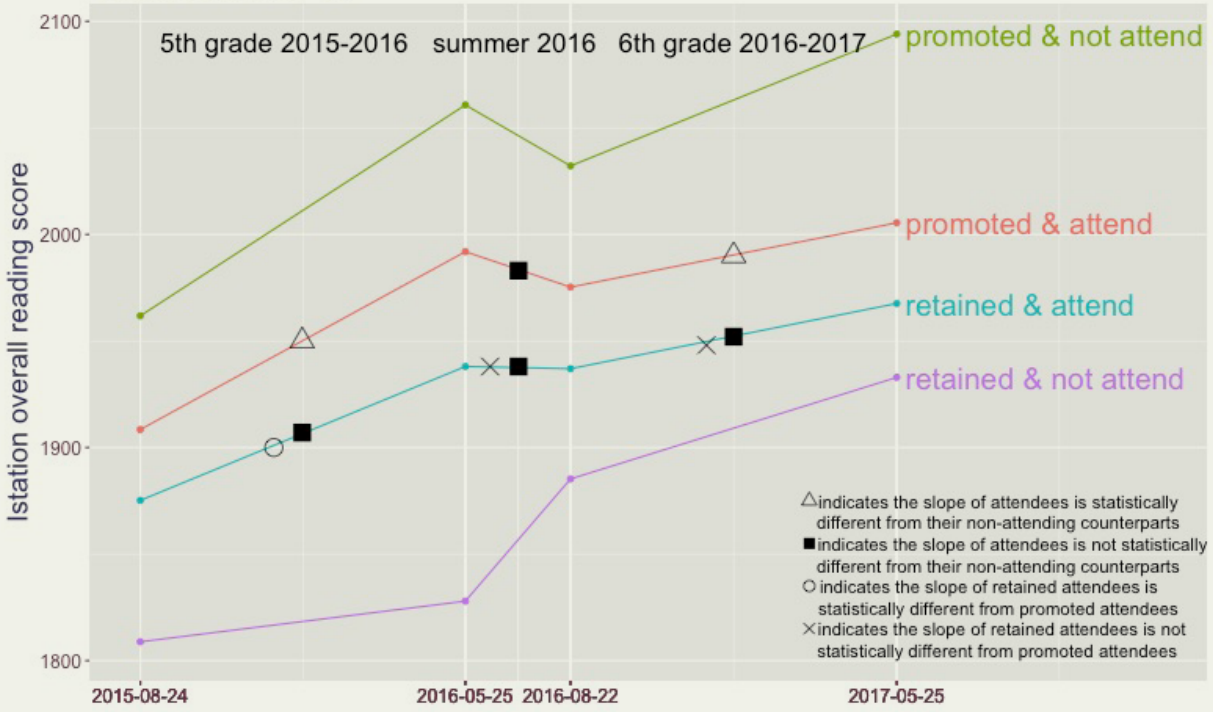
Note: The model has controlled for a variety of student characteristics: race/ethnicity, gender, age, economic disadvantage status, limited English proficiency, gifted/talented program, magnet program status, and special education status.

Figure 3. Reading Scores for Promoted and Retained Students
(Grade 4 in 2015-16)



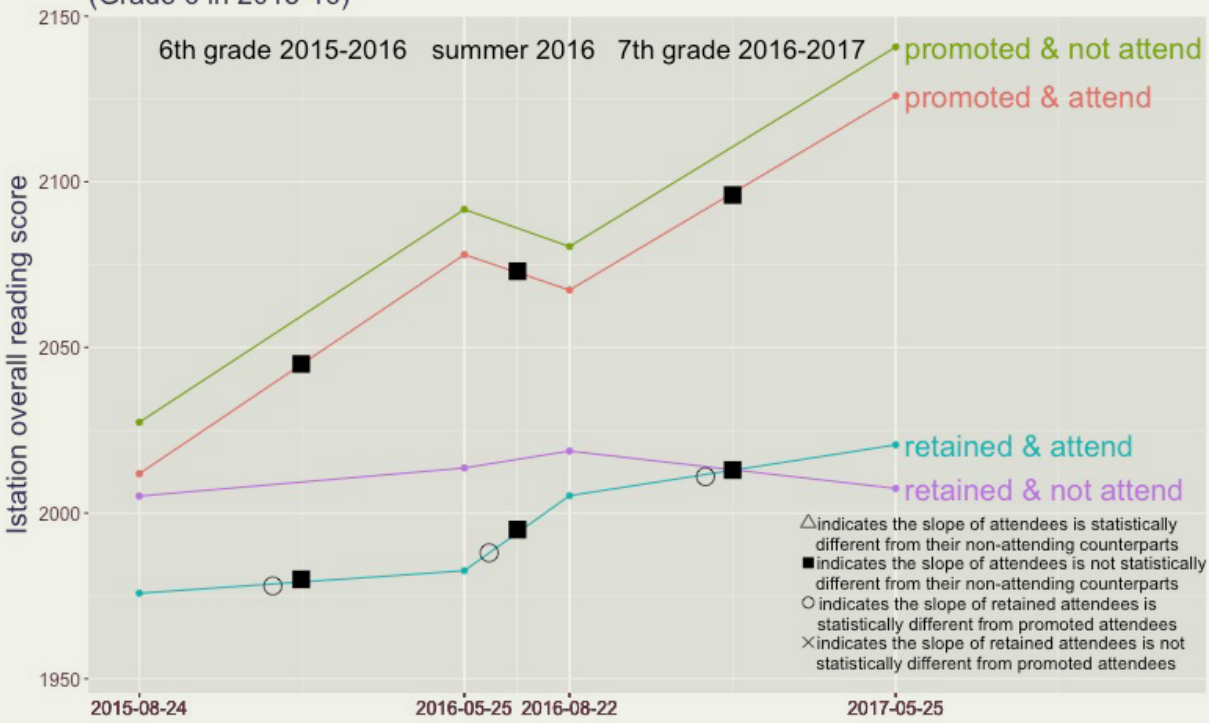
Note: The model has controlled for a variety of student characteristics: race/ethnicity, gender, age, economic disadvantage status, limited English proficiency, gifted/talented program, magnet program status, and special education status.

Figure 4. Reading Scores for Promoted and Retained Students
(Grade 5 in 2015-16)



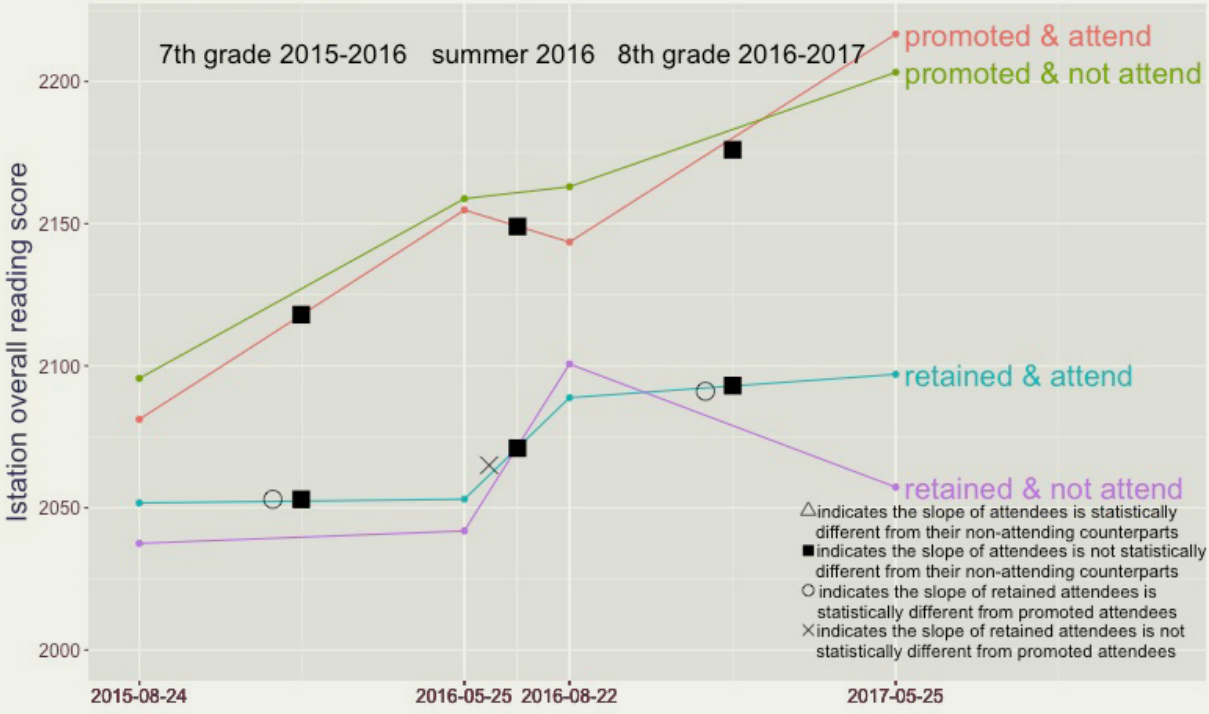
Note: The model has controlled for a variety of student characteristics: race/ethnicity, gender, age, economic disadvantage status, limited English proficiency, gifted/talented program, magnet program status, and special education status.

Figure 5. Reading Scores for Promoted and Retained Students
(Grade 6 in 2015-16)



Note: The model has controlled for a variety of student characteristics: race/ethnicity, gender, age, economic disadvantage status, limited English proficiency, gifted/talented program, magnet program status, and special education status.

Figure 6. Reading Scores for Promoted and Retained Students
(Grade 7 in 2015-16)



Note: The model has controlled for a variety of student characteristics: race/ethnicity, gender, age, economic disadvantage status, limited English proficiency, gifted/talented program, magnet program status, and special education status.

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