

A Study of All-Girls Secondary Schools Supported by the Young Women's Preparatory Network in Texas School Districts

James E. Pustejovsky, *Assistant Professor, The University of Texas at Austin, Educational Psych Dept*
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What We Studied

The Young Women's Preparatory Network (YWPN) is a private foundation that supports single-sex, college preparatory schools throughout Texas. Over the past fifteen years, the organization has worked through public-private partnerships to establish and support public, all-girls secondary schools in districts across Texas. This study evaluated the effects of attending the seven established all-girls schools in the YWPN, relative to attending a co-educational school in the same district, on attendees' educational trajectories. To account for pre-existing differences, we identified matched comparison groups of students who attended co-educational schools, but who closely resembled students who attended YWPN schools in the same district on an array of background characteristics, including measures of demographics and academic performance during elementary school. We evaluated impacts on a broad range of measures of academic performance and behavior during middle and high school, as well as progression into post-secondary education. Relative to comparable students who attended co-educational schools, students who attended YWPN schools showed stronger academic performance on tests of math and science during middle school and high school, but effects varied from district to district. Compared to similar students in co-educational schools, YWPN students completed similar levels of math coursework but more science coursework in high school. Students in YWPN schools received less formal discipline compared to what they might have experienced if they had attended co-educational schools. Although students in YWPN schools graduated from high school at rates similar to matched comparison students, YWPN students had higher rates of enrollment in post-secondary education, particularly in 4-year colleges and universities. Study findings suggest sustaining support for the all-girls schools in the YWPN and highlight several directions for further research on YWPN schools.

The schools in the YWPN are focused on empowering and providing opportunity for students from disadvantaged backgrounds. Their college preparatory culture emphasizes leadership, STEM subjects, and health and wellness; the schools also provide college-bound counseling and standardized test preparation.

The establishment of the YWPN schools is part of a broader trend in U.S. public education towards offering single-sex educational environments. As of 2015-16, over 100 stand-alone all-girls schools and over 100 stand-alone all-boys schools were in operation across the U.S., with many more schools offering single-sex classes on co-educational campuses. However, single-sex education remains controversial. While proponents emphasize the potential of all-girls schools to empower students by reducing biases and negative stereotypes¹⁻³, critics counter that sex-segregated schooling could actually reinforce stereotypes and biases by increasing the salience of gender distinctions and reducing opportunities for students to learn to interact in mixed-gender environments.⁴⁻⁶

Besides these theoretical debates, there is a large research base comparing educational outcomes of students in single-sex school environments to those of students in co-educational environments.⁷ However, much of the existing research does little to account for pre-existing differences between students who select each type of schooling, which limits its

relevance for understanding the causal effects of single-sex schools.⁸ A few recent studies have used stronger research designs⁹⁻¹¹, but these studies have been conducted in education systems and cultural contexts that are very different from the U.S., making their findings of limited relevance to U.S. schools. Very little credible research evidence is available on single-sex schools in the context of public, secondary education in the U.S.

After over a decade of growth, YWPN schools have enrolled over 6000 students for middle grades and over 2500 students for high school, in the Dallas, Austin, San Antonio, Lubbock, Fort Worth, Houston, and Grand Prairie independent school districts.¹ Sufficient historical data now exist to begin examining the impacts of the YWPN schools on students' educational outcomes. This study aims to do so, by evaluating the effects of attending the seven established all-girls schools in the YWPN, relative to attending a co-educational school in the same district, on attendees' educational trajectories. Our main guiding research question was: *For students who enrolled in a YWPN school in 6th grade, what are the average effects of attending that single sex school versus attending a co-educational school on academic performance and behavior during middle school and high school, and on college matriculation?*

How We Analyzed the Data

The central challenge in evaluating the impacts attending a single-sex school in the YWPN is that students who were admitted and elected to attend these schools had distinct academic and demographic profiles before they entered 6th grade. In particular, YWPN students tended to score substantially higher on state standardized tests of reading and math during the elementary grades than students in co-educational schools in the same districts (Appendix Figure A1).²

Furthermore, compared to co-educational schools in the same districts, YWPN schools had higher shares of gifted students, more students eligible for reduced-price lunch, fewer students eligible for free lunch, lower shares of students receiving special education, and fewer students designated as limited English proficiency (Appendix Figure A2). In the presence of such differences in student background characteristics, simply comparing outcomes of students who attend YWPN versus those who attend co-educational schools is not a valid basis for inferring the causal impacts of the schools. This is because any differences in outcomes could be the result of pre-existing differences between the groups, rather than a consequence of actually attending one or the other type of school. We address this challenge by identifying matched comparison groups of students who attended co-educational schools, but who had background characteristics that closely resembled those of students who attended YWPN schools in the same district. Because these matched comparison groups are very similar to the group of YWPN students on important background characteristics, they can provide a fair, apples-to-apples point of comparison.

Our analysis focused on students who enrolled in the seven established YWPN schools as first-time 6th graders between the 2007-08 and 2014-15 school years and who remained in their initial schools through the end of 8th grade. We constructed matched comparison groups from among female students who 1) started as first-time 6th graders in the same year and same school district as each cohort of YWPN students and 2) remained in their initial school through the completion of 8th grade.³ From among these students, we identified matched comparison groups that closely resembled YWPN students based on five domains of student background characteristics, including: student demographics, geography, educational service enrollment, behavioral indicators, and measures of academic performance during the

¹ The eighth school in the YWPN opened in Ysleta ISD in 2016-17. We did not include this school in the evaluation because there was insufficient historical data to evaluate it.

² One exception was Grand Prairie, where the YWPN school does not use selective admissions. Here, students in the YWPN school had levels of academic performance during elementary school that were largely similar to those of students entering co-educational middle schools.

³ We also included students who attended a K-6 co-educational elementary school, entered a new school in the same district for 7th grade, and remained through completion of 8th grade.

elementary grades.⁴ The result was a set of matched comparison groups consisting of students who attended co-educational schools, but whose background characteristics were very similar to those of students starting at YWPN schools. The similarity of the groups held both overall and by district (Appendix Figures A1 and A2).

What We Discovered

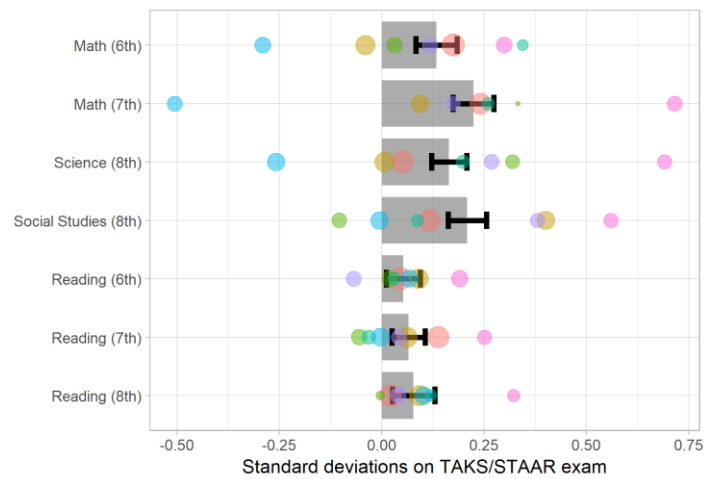
We evaluated the effects of attending YWPN schools on a broad range of measures of academic performance and behavior during middle and high school, as well as progression into post-secondary education.⁵

Middle school academic performance. Relative to matched comparison students, students who attended YWPN schools scored higher on state-wide standardized tests of academic performance, particularly in math, science and social studies. However, these differences varied widely across districts, with some YWPN schools showing negative effects, some showing effects close to zero, and some showing strongly positive effects. Impacts on middle school reading performance were smaller than in math and represented very small changes in student proficiency levels.

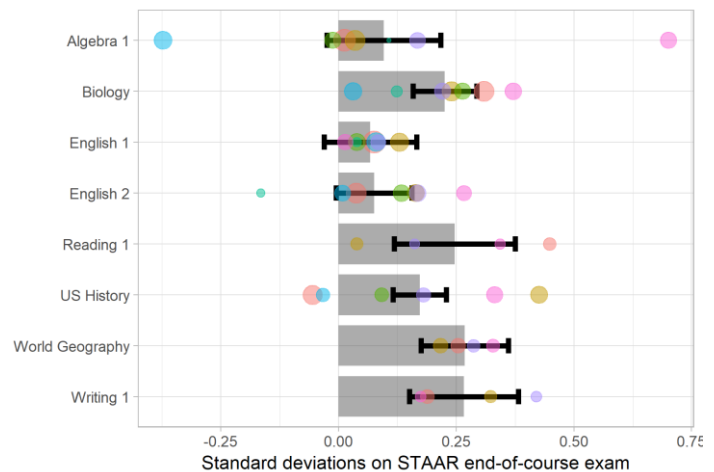
High school academic performance. Effects of attending YWPN schools on STAAR end-of-course exam performance were mostly small. In English, Language Arts, and Humanities subjects, attending a YWPN school led to near-zero or small average gains in academic performance, which were mostly consistent across districts. Average effects on Algebra 1 performance were small, on average, but varied widely from district to district. The average impact on Biology exam performance was positive but varied across districts, following a pattern similar to that of impacts on math and science performance during middle school.

Figure 1. Estimated impacts of attending YWPN schools on academic performance and course completion. Grey bars represent average impacts across districts, with 95% confidence intervals indicated by black error bars. Colored dots represent district-specific impact estimates.

a) Impacts on middle school academic performance.



b) Impacts on high school academic performance.



c) Impacts on high school math and science course completion.



⁴ To identify suitable comparison groups, we used propensity score re-weighting methods¹², with propensity scores estimated by a recently developed machine learning algorithm called the generalized boosted regression model.^{13,14} We estimated separate propensity score models for each district.

⁵ To estimate impacts, we used regression-adjusted estimates of average performance among students who attend YWPN schools, contrasted with the average performance of students in the matched comparison groups.

High school math and science courses. A limitation of using STAAR end-of-course exams to understand students' academic trajectories is that most of these tests are completed early in high school. To assess student progress later in high school, we also examined patterns of course-taking in STEM subjects. Across districts, students who attended a YWPN school completed and passed similar amounts of math coursework compared to if they had attended a co-educational school in the same district.

However, the effects varied across districts, and two YWPN schools had positive impacts on math course completion. By the end of their 7th year since starting 6th grade (when most students graduated from high school), students who attended YWPN schools completed and passed an average of 0.4 additional semesters of science coursework than comparable students in co-educational schools. As with math coursework, impacts varied across schools, possibly due to the use of less conventional science course sequences.

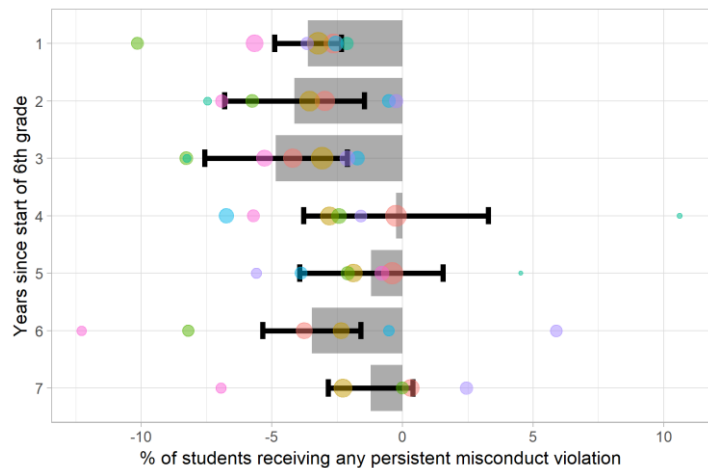
Student discipline. Because single-sex environments might have consequences for the socialization and behavior of students who attend them, we also examined impacts of attending YWPN schools on rates of student interaction with formal school discipline systems. Students in YWPN schools received less formal discipline compared to what they might have experienced if they had attended co-educational schools. During middle school, attending YWPN schools led to beneficial reductions in student formal discipline, which were consistent across schools. During high school, the impacts of attending YWPN schools on student discipline were negative or neutral and more variable from district to district. Although the average impacts were small in terms of the absolute number of students affected, they represent meaningful and beneficial reductions in formal discipline.

High School Graduation. For five YWPN schools with available data, we found near-zero average impacts of attending a YWPN school on high school graduation rates, as both YWPN students and matched comparison students had very high rates of on time graduation. Students who entered 6th grade at a YWPN school would likely have graduated on time even if they had attended a co-educational school.

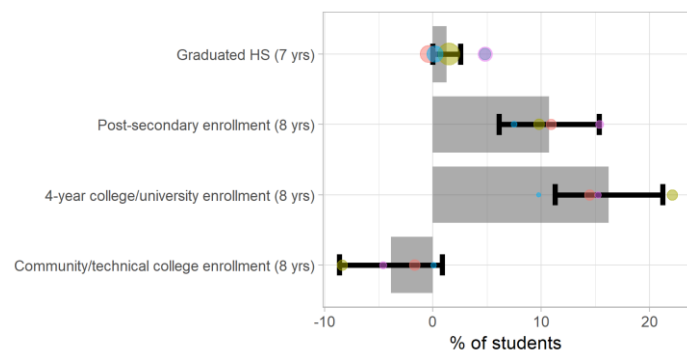
Post-secondary enrollment. Enrollment in post-secondary education represents a critical indicator of students' longer-term educational trajectories and of whether the organizational goals of YWPN are being achieved.⁶ Relative to

Figure 2. Estimated impacts of attending YWPN schools on student discipline, graduation and post-secondary enrollment. Grey bars represent average impacts across districts, with 95% confidence intervals indicated by black error bars. Colored dots represent district-specific impact estimates.

a) Impacts on percentage of students who receive any persistent misconduct violation, by years since starting 6th grade.



b) Impacts on graduation and post-secondary enrollment rates.



⁶ Post-secondary results were based on a subsample of students from four YWPN schools (in Dallas, Austin, San Antonio, and Lubbock), who started 6th grade between the 2006-07 and 2009-10 school years, because these are the only cohorts whose post-secondary enrollment could be tracked.

attending a co-educational school in the same district, students who attended one of the four earliest-established YWPN schools had substantially higher rates of post-secondary enrollment within seven years of starting 6th grade.

Improvements were driven by large impacts on rates of enrollment in 4-year colleges and universities. The pattern of effects suggests that attending a YWPN school helped students who might otherwise enroll in a community college to instead start at a 4-year college. A consistent pattern of positive effects on post-secondary enrollment rates appeared across the districts with available data.

Policy Recommendations

This evaluation took a high level view of understanding the effects of attending YWPN schools, focusing on average effects for students who attended one of seven schools in the YWPN network between 2007-08 and 2014-15. These schools were established and are supported through a partnership between the public independent school districts and the YWPN foundation. The primary policy implication of this study is that sustained support for these partnerships is warranted in light of the schools' beneficial impacts on academic performance and behavior during middle school and their marked positive impacts on college enrollment.

Study findings also point towards the need for further research on the YWPN schools, along several lines. First, future descriptive and qualitative research should investigate variables beyond academic performance, such as teacher and student gender-related attitudes, student self-concept, educational goals, and career aspirations. Of particular interest would be to identify specific practices in place at YWPN schools that promote a college-bound culture. Second, given the high degree of school-to-school variation in some impacts, it would be useful to investigate curricular and organizational differences between schools, such as variation in mathematics instructional practices and variation in academic press, in order to identify best practices that could be shared across YWPN schools. Third, future research could examine longer-term indicators of educational trajectories, including persistence and degree attainment. Finally, it would be valuable to investigate the choice sets of students who attend YWPN schools (or who would consider attending one), in order to better understand the set of alternatives among which students and families select. This could help to clarify the potential impacts of expanding the schools or making major changes in admissions practices.

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Appendix Additional Figures

Figure A1

Elementary school academic performance of YWPN students, matched comparison students, and all female students in co-educational schools, by district and across districts.

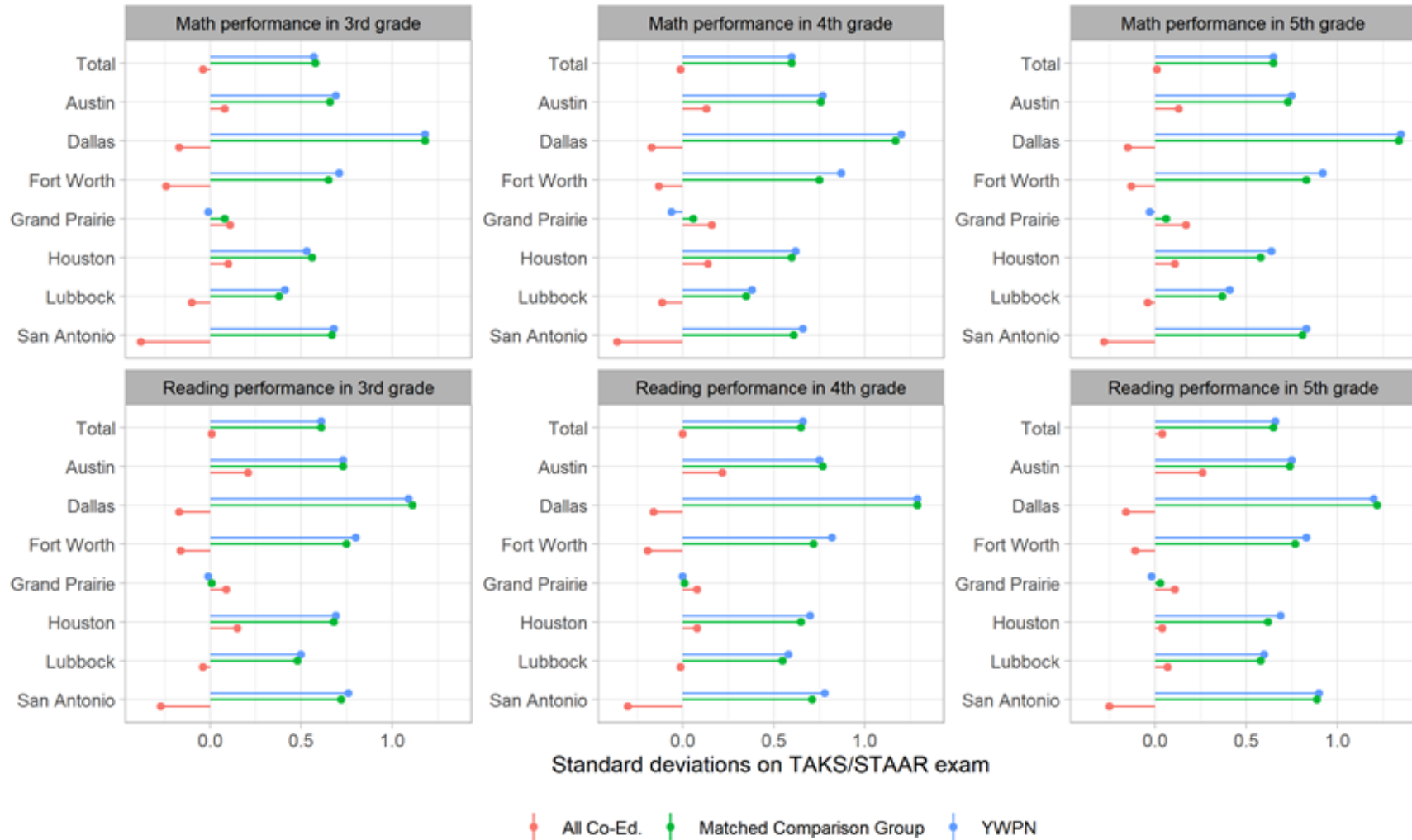
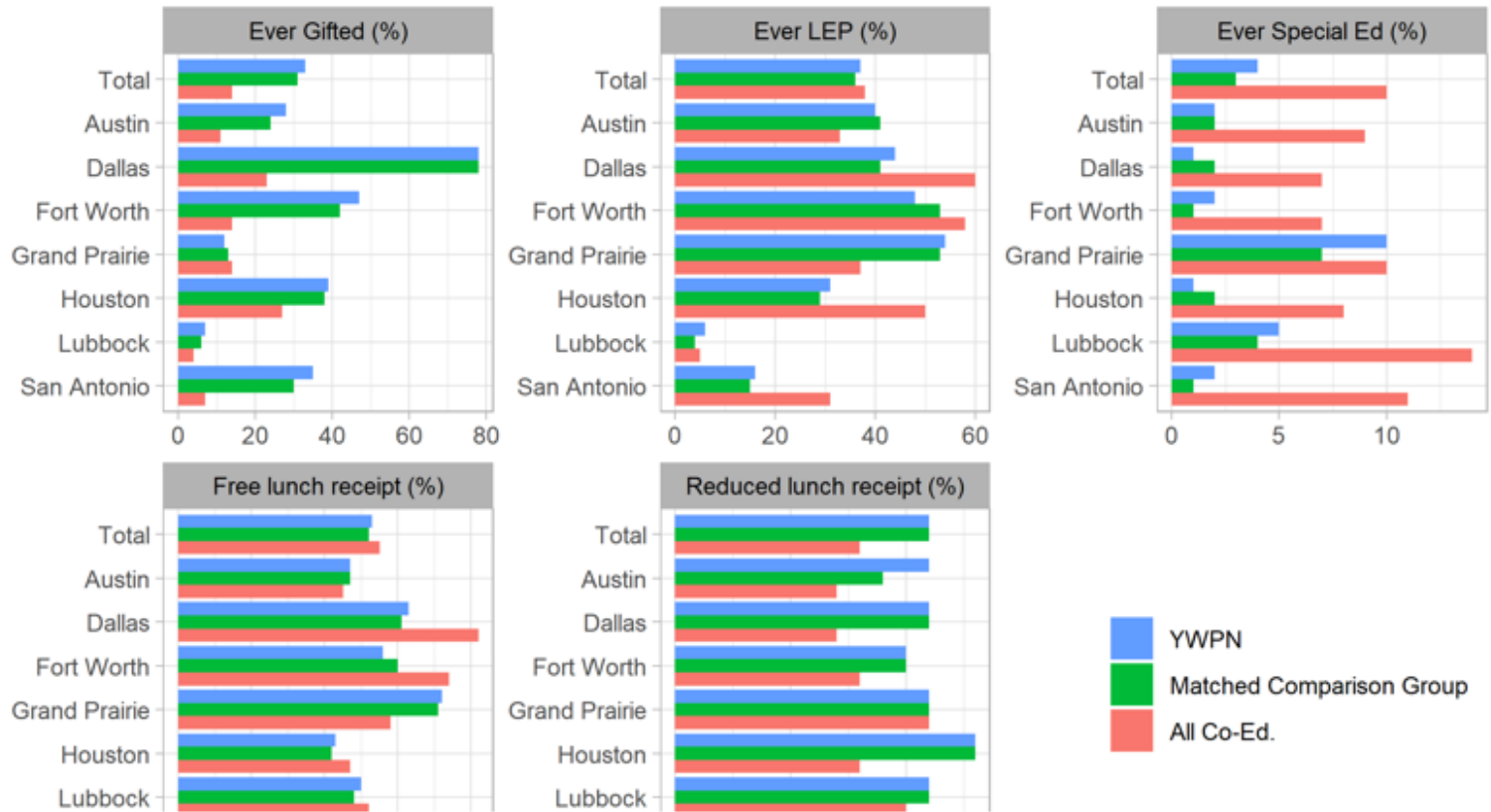


Figure A2

Demographic characteristics of YWPN students, matched comparison students, and all female students in co-educational schools prior to start of 6th grade, by district and across districts. LEP = Limited English proficiency.



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