Effects of the KCS Scholarship on High School Outcomes: First Cohort

Revised Analysis Brief
August 2019

This revised brief updates an earlier version from May 2019. The brief now includes additional outcomes of college preparation in high school from the College Advising Corps.[1]

When students apply for a traditional scholarship, the Kansas City Scholars (KCS) program uses a rubric to assign points to various characteristics and achievements. The program has a target number of scholarships to award, and applicants (more accurately, eligible submissions) with the highest "scores" receive the scholarship until the target is reached. The minimum number of points needed to receive a scholarship is called the "cut score" or threshold.[2] This procedure facilitates a rigorous method for estimating the impact of the traditional scholarships on outcomes: a regression discontinuity design (RDD). The logic of this method is to compare outcomes for scholarship awardees whose scores are "just above" the threshold to non-awardee students whose scores are "just below" the threshold. Because the scores for the two groups are similar, and we confirm other student characteristics that may affect outcomes are similar as well, we infer that the only difference between the groups is the scholarship award, and that any differences in outcomes can be attributed to it.

In this brief, we estimate the impacts of the scholarship on high school outcomes for the first cohort of traditional scholarship awardees, which were announced in Spring 2017, at the end of students' junior year. Specifically, we examine senior year GPA and cumulative course taking in certain subjects. (Since essentially all students graduates high school on time, we do not examine this outcome.) For awardees, these data were collected by high school college advisers, sent to the KCS office, and minimally processed for the Upjohn evaluation team. For non-awardees, the Upjohn team, with assistance from KCS, collected the data in early Spring 2019 through requests to individual high schools.

Additionally, for the subset of KCS applicants who attended a high school with a College Advising Corps (CAC) program, we examine whether 1) students applied to at least one college, 2) they were accepted to at least one college, 3) they completed the FAFSA, 4) they met with a CAC adviser at least once, 5) they met with a CAC adviser at least three times, 6) they visited a college campus, and 7) they met with a college representative. These data were collected by CAC and sent to the Upjohn team in July 2019.

Results

Figures 1 through 3 present the results graphically, comparing averages for students with cut scores just high enough for them to receive the KCS scholarship with the control group of

---

[1] We are very thankful both to participating high schools and to the College Advising Corps for compiling and providing the data which make this analysis possible.
[2] If there is a tie at the cut score, and more students have achieved the points threshold than can be awarded scholarships, ties are broken by a random drawing.

students whose scores were just below the necessary threshold. Figure 1 shows the impact on senior year GPA.

Figure 1: KC Scholars GPAs Aren't Appreciably Higher Than Close Applicants' GPAs
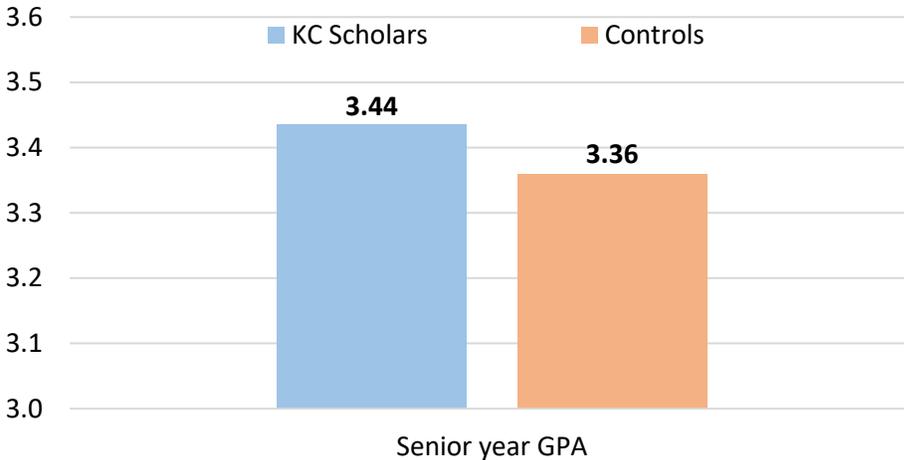
Although KC Scholars have a senior-year GPA slightly higher than those of the control students, the difference is not statistically significant.

Figure 2 shows the impact on cumulative high school course sequences. As with senior year GPA, there is little evidence of a significant positive impact of receiving the scholarship, as KC Scholars have similar rates of having taken an AP/IB course or four or more years of math. However, there is a statistically significant negative effect on foreign language, suggesting at least the possibility of some substitution away from these classes and toward others, perhaps science.

Figure 2: KC Scholars Cumulative HS Course Sequences Look Similar to Controls'
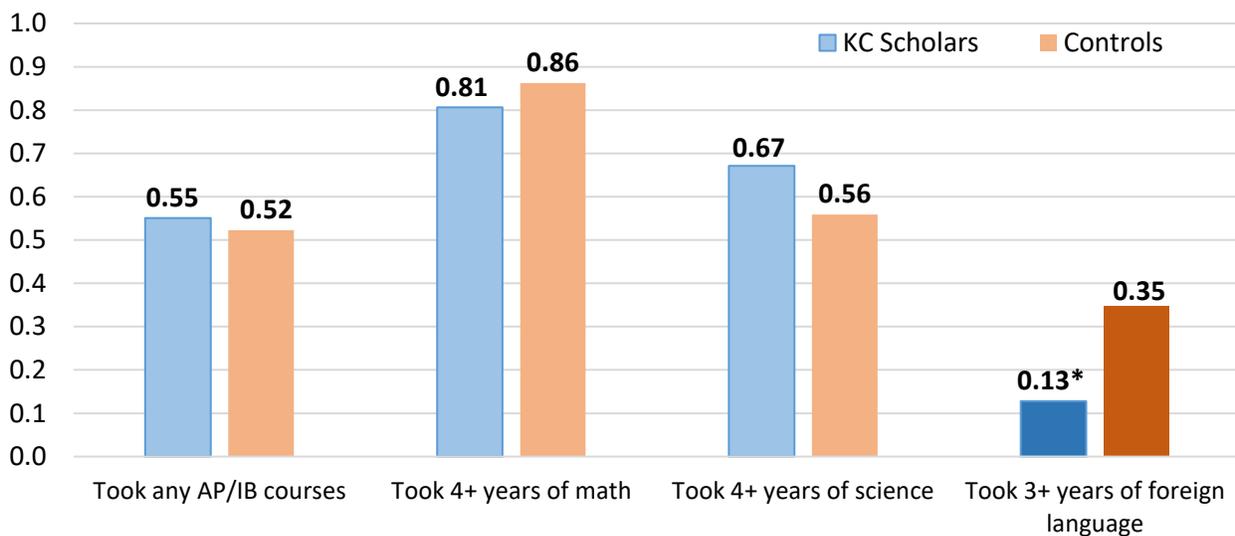
In Upjohn Institute focus groups with these students in Fall 2017, many indicated that senior year courses had generally been determined prior to the announcement of the scholarships, which may have limited the scope of this response margin. Additionally, with just one cohort of data, we have limited ability to detect small, but possible still meaningful, impacts of the scholarship, such as the 11-percentage-point estimated increase in taking four or more science classes (which is not statistically significant).

On the other hand, college preparation measures tracked by CAC, which are behavioral responses occurring during the senior year, are likely to be more sensitive to receiving the KCS scholarship. Figure 3 shows the impact on these measures.

Figure 3: KC Scholars See Large Boosts to College Preparation Measures
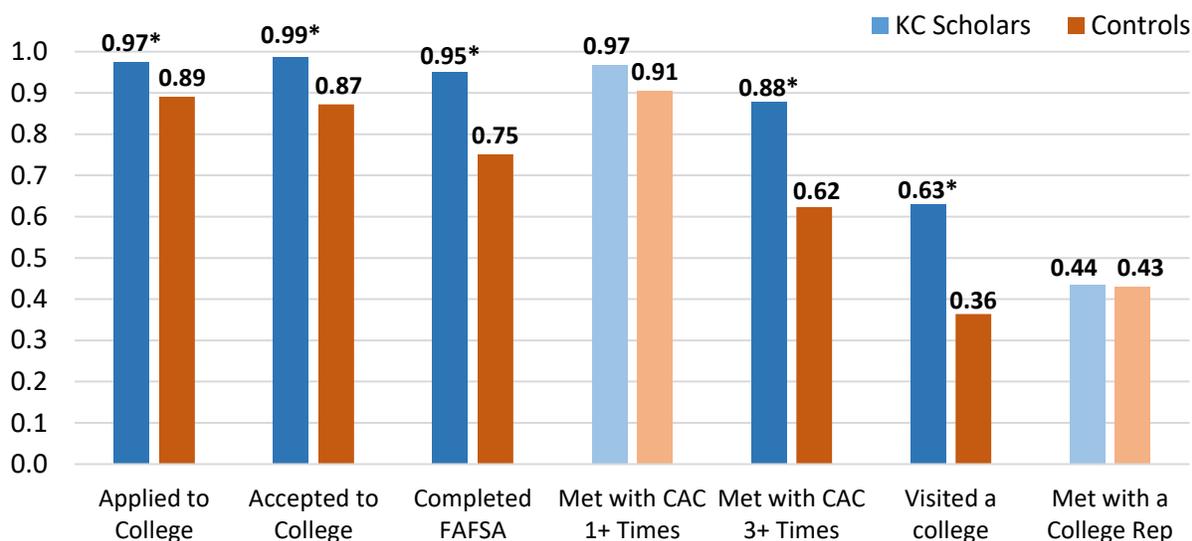
KC Scholars experience large gains, relative to the controls, in most of these indicators (darker bars indicate statistically significant differences). They are approximately 8 percentage points more likely to have applied to at least one college during senior year, and approximately 12 percentage points more likely to have been accepted to one.[3] Moreover, KC Scholars are 20 percentage points more likely to have completed the FAFSA, 26 percentage points more likely to have met with a CAC adviser at least three times, and 27 percentage points more likely to have visited a college. There are much smaller and statistically insignificant (but still positive) differences for having met with a CAC adviser at least once or having met with a college representative. Since senior-year GPA and cumulative course taking are high for both groups and indicate at least sufficient academic college preparation by conventional standards, it is worth noting that the CAC indicator impacts for KC Scholars are substantive and indicate high levels of *behavioral* college preparation. Put differently, these results would be consistent with positive college enrollment effects for the first cohort of traditional scholarships.

---

[3] The estimation procedure statistically adjusts for demographic differences in the students, so it is possible for the acceptance rates for KC Scholars to be slightly higher than the college application rate; this is a minor statistical quirk that does not affect the interpretation of the differences between the two groups.

Some Caveats and Postsecondary Outcomes

We note that the results in Figure 3 are based on the subsample of students for whom we had CAC data, about 60 percent of all traditional scholarship applicants from the first KCS cohort. We have checked the representativeness of this subsample, and students with CAC records were likely to come from lower socioeconomic backgrounds than were all applicants; we detail these differences in the methodology section below. It is also possible that KC Scholars were more forthcoming in reporting positive behaviors (such as college acceptance or FAFSA completion) to their CAC adviser than non-awardees. This phenomenon, known as the Hawthorne Effect, could happen for several reasons, from greater encouragement by KCS for awardees to report preparation steps to their CAC advisers to a resentment effect among non-awardees leading to less cooperation with advisers. To the extent this effect occurs, the estimates above may be too large.

Despite these limitations, we expect that impacts would be broadly similar (if perhaps slightly smaller) were we to have accurate college preparation measures for all KCS applicants. In any case, we expect to begin analyses of actual college-going behavior later this fall, using data from the National Student Clearinghouse, which should cover nearly all applicants.

Tabular Results

Table 1 presents the results in Figures 1 through 3 in tabular form, showing the estimated KCS impact, 95-percent confidence intervals for these impacts, and the baseline averages for students who do not receive the KCS scholarship. (The baseline averages correspond to the "Controls" in the figures; these averages plus the estimated effects correspond to the "KC Scholars".)

Table 1 Effects of KCS Scholarship on High School Outcomes

Outcome	Effect	95% CI	Mean for Non-Recipients
Senior year GPA	0.077	(−0.231, 0.308)	3.359
Took any AP/IB courses	0.028	(−0.196, 0.220)	0.523
Took 4+ years of math	−0.056	(−0.189, 0.061)	0.862
Took 4+ years of science	0.112	(−0.112, 0.352)	0.559
Took 3+ years of foreign language	−0.220	(−0.569, −0.076)	0.348
Applied to College	0.083	(0.014, 0.213)	0.891
Accepted to College	0.116	(0.048, 0.267)	0.872
Completed FAFSA	0.200	(0.065, 0.415)	0.751
Met with CAC 1+ Times	0.063	(−0.074, 0.129)	0.905
Met with CAC 3+ Times	0.256	(0.110, 0.499)	0.623
Visited a college	0.267	(0.098, 0.547)	0.364
Met with a College Rep	0.006	(−0.147, 0.306)	0.430

Methodology Notes

For the RDD analysis employed above to be valid, individuals on either side of the threshold must be similar, and, ideally, we would have data on all applicants.

However, for GPA and course-taking, we lacked high school outcomes data on 34 of 285 awardees from KCS; these were mostly students who turned down the scholarship. When we checked school and demographic characteristics from the applications for these 34 students, we found no substantive differences from the group of all 285 awardees as a whole. We also lacked high school outcomes data from 31 percent (238 of 765) of non-awardee applicants. While most high schools were very cooperative in sending us data, we were not successful in getting data for all applicants. Students for whom we did not receive data were more likely to be white and from the outlying counties in the Kansas City area. To make the sample of non-awardee responses with GPA and course-taking data representative of all non-awardee applicants, we weighted responses from those we did receive data. This step helped ensure that students falling right below the threshold are similar to those right above the threshold. That is, after the weighting procedure, we found no differences in demographic or school characteristics among those getting the scholarship and those just missing getting it.

We obtained CAC data for 603 students out of 1,050 total applicants. Missing data were entirely driven by students at schools with hybrid CAC programs, for which we received data for 120 out of 422 students. The remaining 125 students (1,050 − 603 − 322 = 125) did not participate in a CAC program. As a consequence, we lacked data on 20 awardees, generally those from schools in certain hybrid CAC programs or in schools without any CAC program. When we checked school and demographic characteristics from the applications for these 20 students, we found no substantive differences from the group of all 285 awardees as a whole. We also lacked CAC data from 56 percent (424 of 762) of non-awardee applicants, all of whom either were in a hybrid CAC program (for which data were incomplete) or did not participate in a CAC program at all. Students with missing CAC data were more likely to have at least one parent with a four-year college degree, less likely to be receiving free or reduced-price lunch, more likely to have higher expected family contribution (EFC), and less likely to have taken a college entrance examination (SAT or ACT) at time of application. To make the sample of non-awardee responses with CAC data representative of all non-awardee applicants, we weighted—separately from above— responses that did have CAC data. After this weighting procedure, we again found no differences in demographic or school characteristics among those getting the scholarship and those just missing getting it.

After receiving and cleaning both the GPA and course-taking data and the CAC data, we confirmed that everyone above the threshold received a scholarship, and that no one below the threshold received it; this is known as a "sharp" discontinuity. Most applicants' scores were quite close to the threshold; approximately 54 percent of scores were within ± 10 points of the threshold.

In a regression framework, the RDD can be represented by the following equation:

$$Y_i = \alpha + \beta X_i + \gamma SCORE_i + \delta(SCORE_i > 0) + \lambda SCORE_i*(SCORE_i > 0) + \varepsilon_i,$$

where Y_i is the high school outcome for student i, X_i are observed characteristics of student i that do not directly affect the application score (e.g., race/ethnicity and county of residence), $SCORE_i$ is the application score of student i, and ($SCORE_i > 0$) takes the value of 1 if the student's score is above 0 and takes the value 0 otherwise. The key coefficient is δ, which represents the "discontinuity" in the outcome at the threshold—that is, the effect of the KCS scholarship. Following current practice, we estimate the above equation on students sufficiently close to the threshold, using the approach of Calonico, Cattaneo, and Titiunik (2014, 2015).[4]

Appendix Figure 1: A "Sharp RDD"—No Applicants with Scores Below the Threshold Received a KCS Scholarship, While All Applicants with Scores Above the Threshold Did


Normalized application score - award cutoff at 0

---
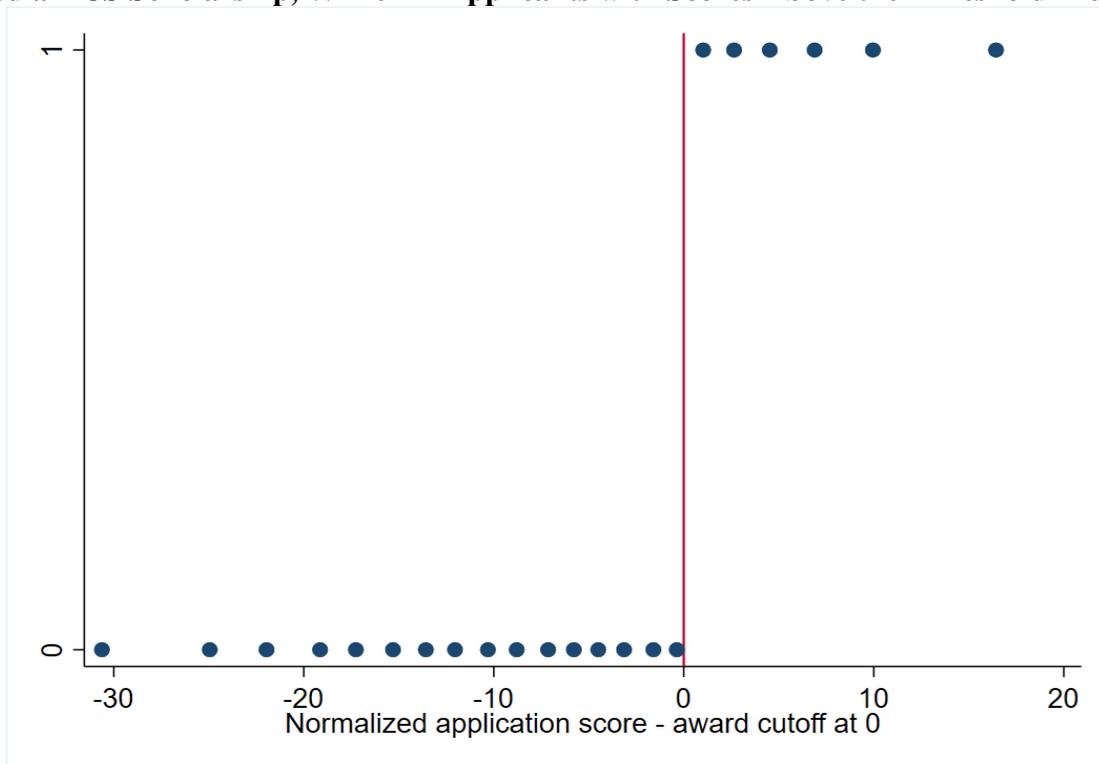
[4] Calonico, Sebastian, Mattias Cattaneo, and Rocio Titiunik. 2014. "Robust Nonparametric Confidence Intervals for Regression-Discontinuity Designs." *Econometrica* 82(6): 2295–2326; Calonico, Sebastian, Mattias Cattaneo, and Rocio Titiunik. 2015. "Optimal Data-Driven Regression Discontinuity Plots." *Journal of the American Statistical Association* 110(512): 1753–1769.
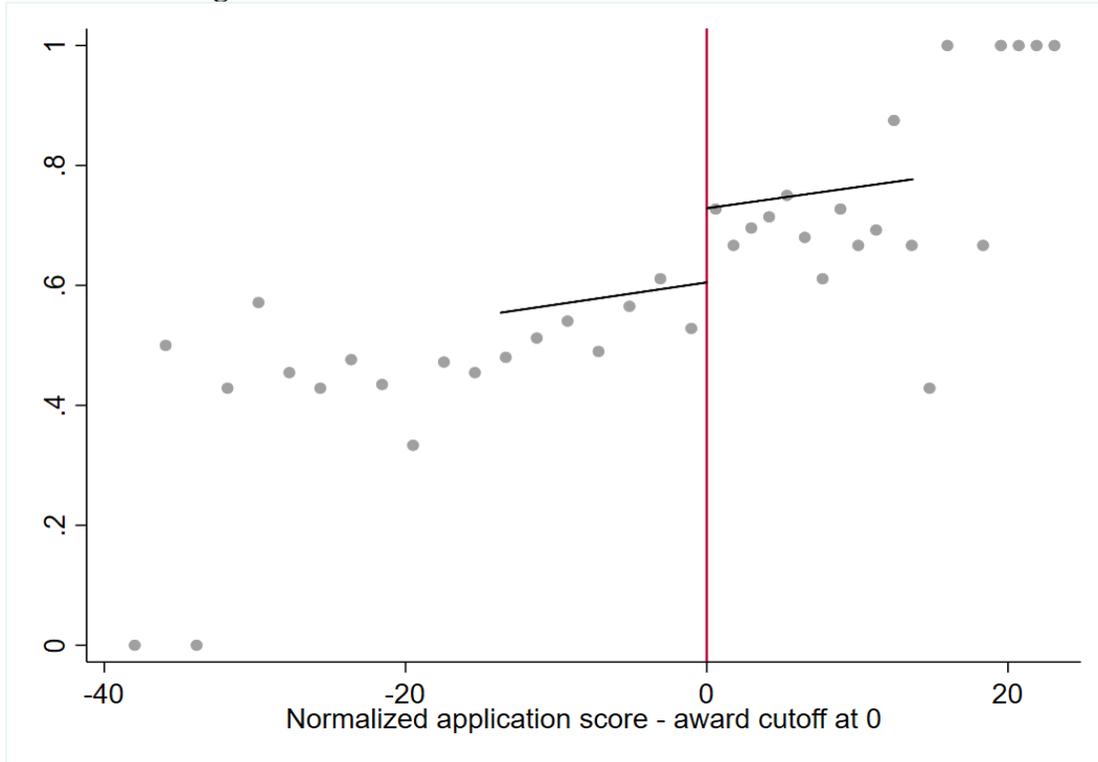
Appendix Figure 2: Receiving the KCS Scholarship Slightly Increases Senior Year GPAs
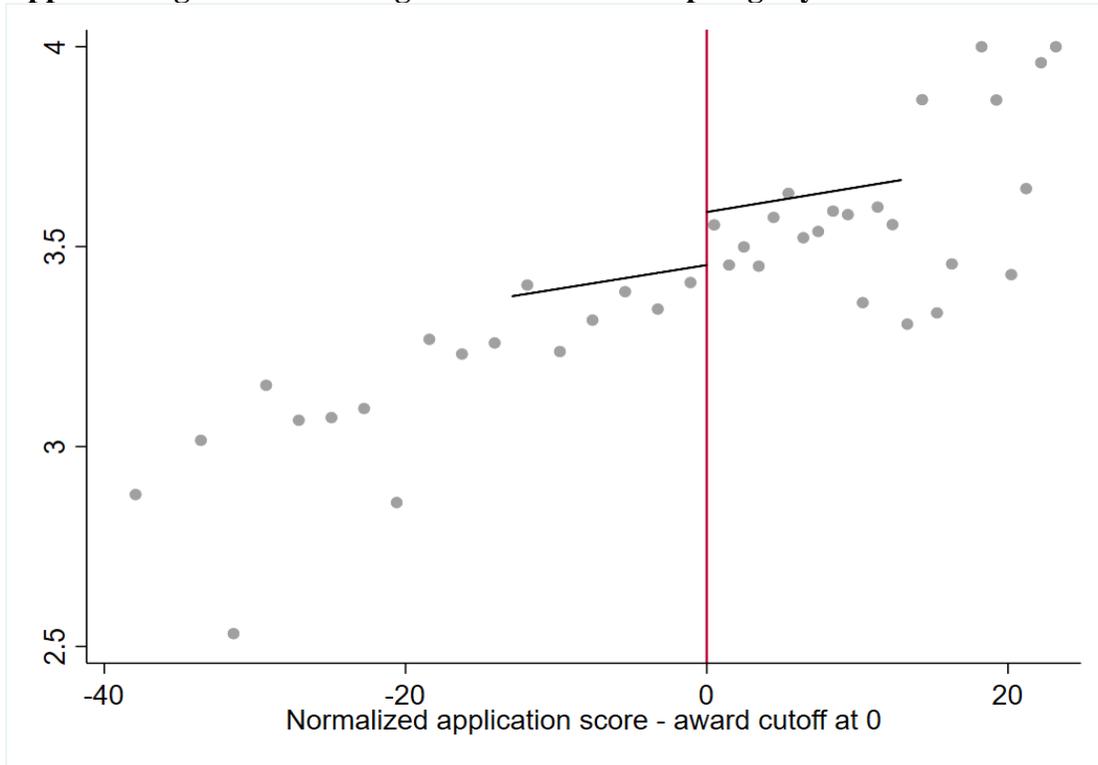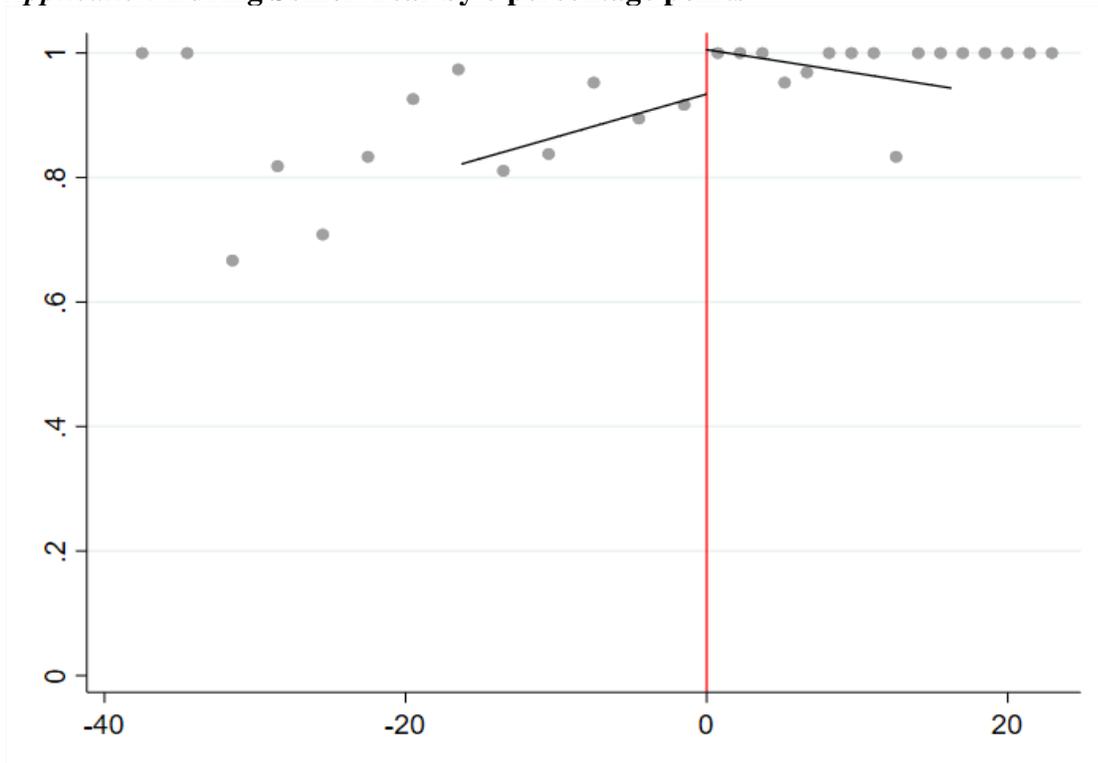

Appendix Figure 3: Receiving the KCS Scholarship Slightly Decreases the Likelihood of Students Taking 3+ Foreign Language Classes
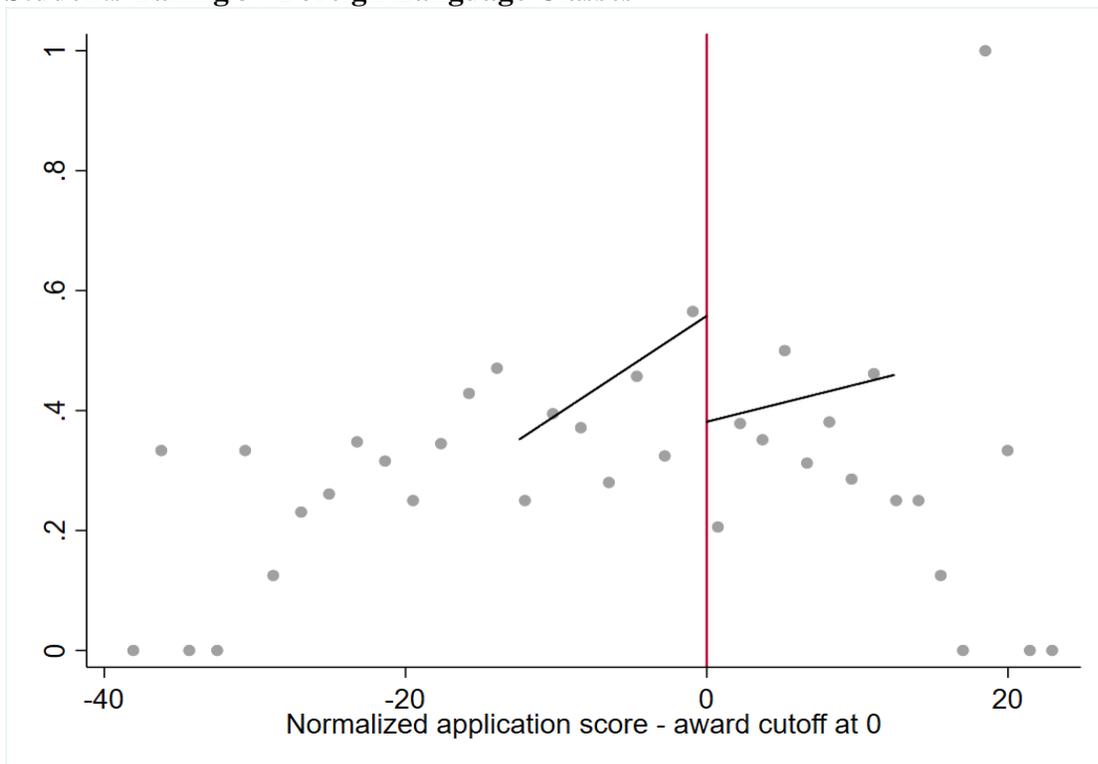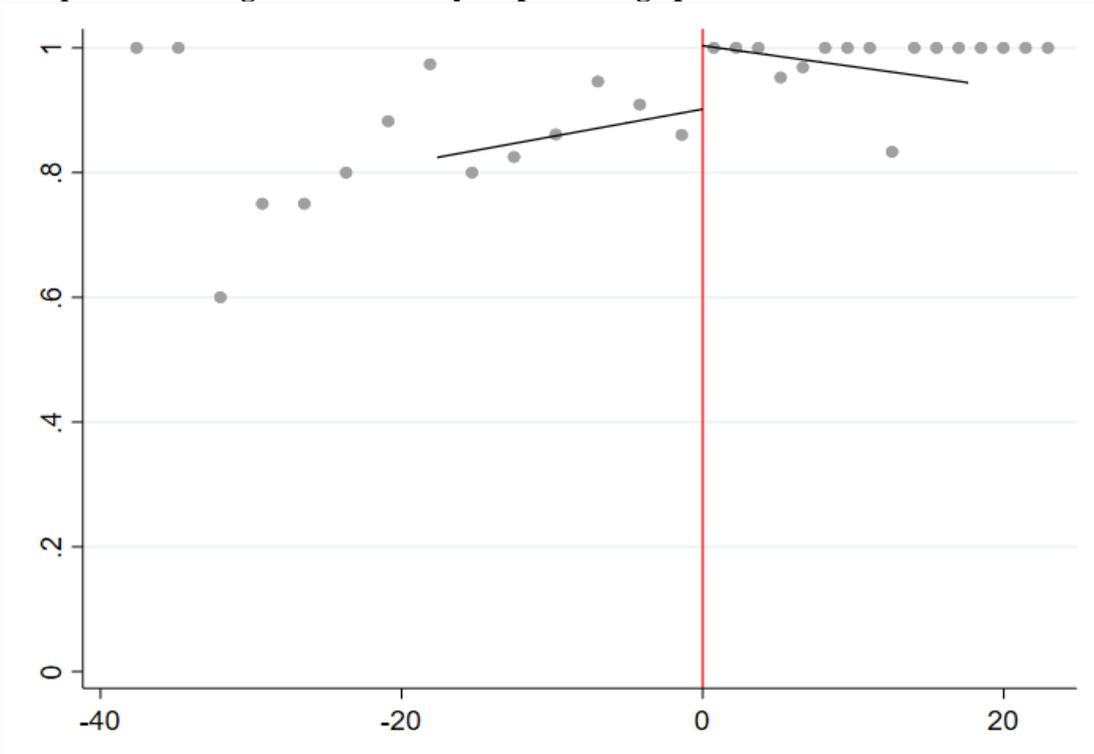
Appendix Figure 4: Receiving the KCS Scholarship Slightly Increases the Likelihood of Students Taking 4+ Science Classes


Normalized application score - award cutoff at 0

Appendix Figure 5: Receiving the KCS Scholarship Increases the Likelihood of College *Application* During Senior Year by 8 percentage points
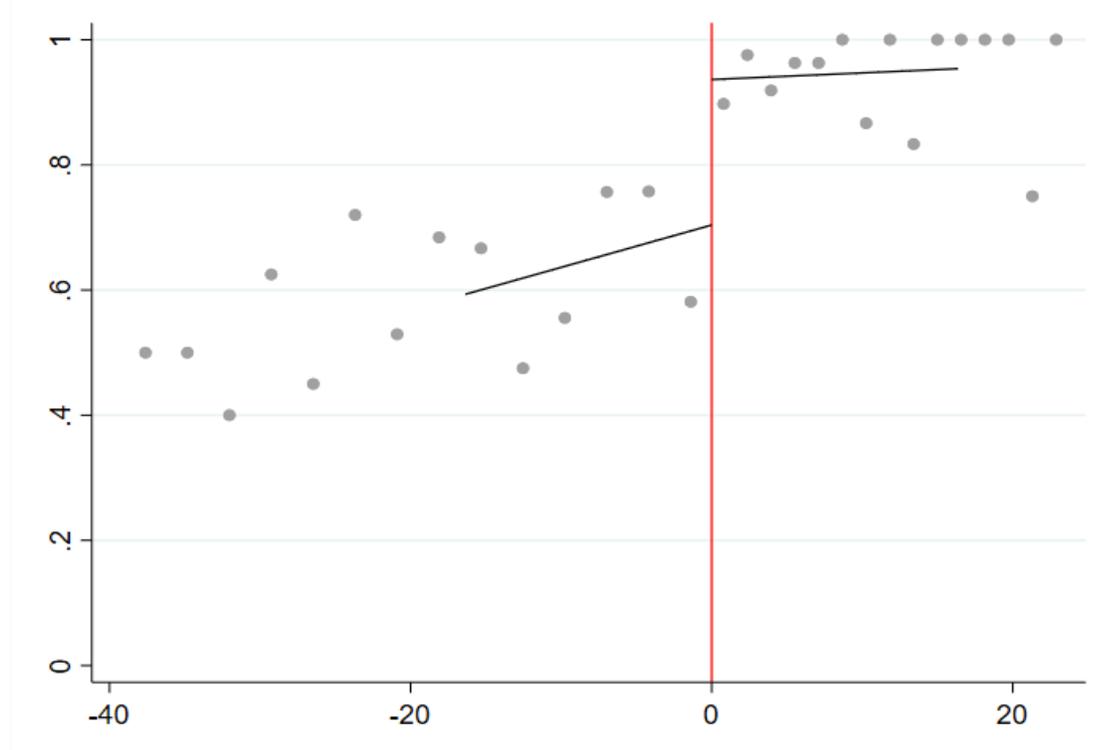
Appendix Figure 6: Receiving the KCS Scholarship Increases the Likelihood of College *Acceptance* During Senior Year by 12 percentage points

Appendix Figure 7: Receiving the KCS Scholarship Increases the Likelihood of FAFSA Completion During Senior Year by 20 percentage points
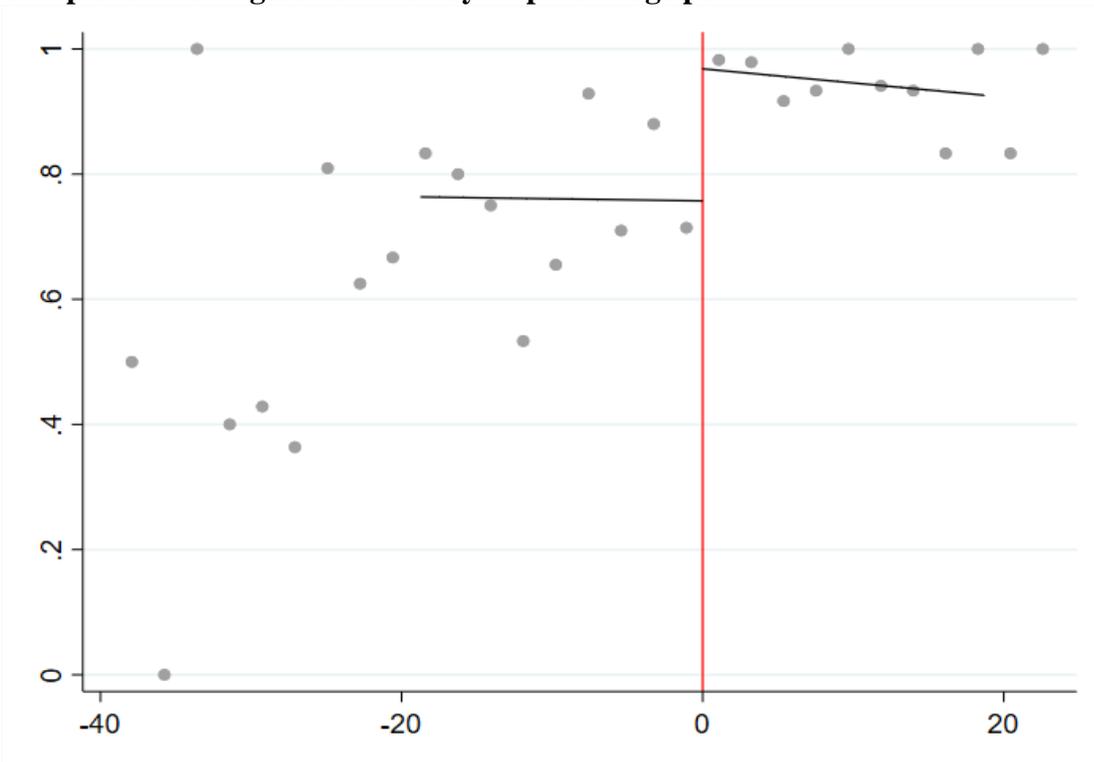
Appendix Figure 8: Receiving the KCS Scholarship Increases the Likelihood of Meeting with a CAC Adviser At Least 3 Times During Senior Year by 26 percentage points

Appendix Figure 9: Receiving the KCS Scholarship Increases the Likelihood of a College Visit During Senior Year by 27 percentage points