

Small Differences that Matter: Mistakes in Applying to College

Amanda Pallais*

Harvard University and NBER

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Abstract

This paper estimates the sensitivity of students' college application decisions to a small change in the cost of sending standardized test scores to colleges. Using confidential ACT micro data, I find that when the ACT increased from three to four the number of free score reports that ACT-takers could send, the fraction of test-takers sending four reports rose substantially while the fraction sending three fell by an offsetting amount. Students simultaneously sent their scores to a wider range of colleges. Using micro data from the American Freshman Survey, two identification strategies show that ACT-takers sent more college applications and low-income ACT-takers attended more selective colleges after the cost change. The first strategy compares ACT-takers before and after the cost change, controlling for time trends and covariates, and the second estimates difference-in-difference regressions using SAT-takers as a control group. Back-of-the-envelope calculations suggest that by inducing low-income students to attend more selective colleges, the policy change significantly increased their expected earnings. Because the cost of sending an additional (non-free) ACT score was merely \$6 throughout, this sizable behavioral change is surprising and suggests that students use simple heuristics in making their application decisions. In such a setting, small policy perturbations can have large effects on welfare.

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1 Introduction

Where a student applies to college greatly affects both whether she attends college and the type of college she attends. Yet, little is known about how students decide where to apply.

This paper estimates the sensitivity of students' college application decisions to a \$6 decrease in the cost of sending standardized test scores to colleges. Before the fall of 1997, students taking the ACT, a popular college entrance exam, could send their test scores to three colleges for free while each additional score report cost \$6. Afterwards, students could send four score reports for free with the same \$6 cost for each report beyond four. I find that, in response to this \$6 cost change, students sent substantially more score reports.

Figure 1 uses data from the ACT and SAT (a competing college entrance exam) to show the fraction of different high school classes that sent exactly three and exactly four score reports.¹ ACT-takers graduating high school before 1998 were eligible for three free score reports, ACT-takers graduating after 1998 were eligible for four free score reports, and ACT-takers in the class of 1998 received three free reports if they took the ACT in their junior year and four if they took the test in their senior year. SAT-takers received four free score reports throughout the period. The figure shows that between the classes of 1996 and 2000, the fraction of ACT-takers sending exactly four score reports jumped from 3% to 74%, while the fraction sending exactly three fell from 82% to 10%. In contrast, SAT-takers experienced relatively small changes in their score-sending patterns. Micro data from the ACT confirm that this large increase in score-sending was not driven by changes in the pool of test-takers.

Sending additional score reports benefitted students only if they also sent additional applications. I use the American Freshman Survey (AFS), a survey of college freshmen, and two identification strategies to directly evaluate the effect of the cost change on the number of applications students sent. First, I replicate the score-sending analysis with the

¹The ACT data used here come from a database compiled by Jesse Rothstein for other projects. The dataset covers about half the years from 1991 to 2004 (see Section 2 for more details) and the figure displays data from all the years to which I have access. The SAT data come from a similar dataset. Jesse Rothstein provided the tabulations for Figure 1b as I do not have access to the SAT micro data. Both graphs are limited to students sending at least one score report.

applications data, looking only at students who took the ACT. Then, I use a difference-in-difference methodology, comparing ACT-takers to SAT-takers. Both identification strategies show that ACT-takers sent more applications after the cost change.

When students gained access to four free score reports, they widened the range of colleges to which they sent scores. Some students sent scores to colleges that were more-selective than any they would have sent scores to otherwise. This gave students an additional opportunity to be admitted to and attend a more-selective college. Other students sent scores to less-selective colleges with higher admission rates. This gave students another chance to be admitted to any college. Using the AFS data (and both identification strategies), I find that, after the cost change, low-income students attended more-selective colleges, but the selectivity of the college the average ACT-taker attended was unchanged.

Throughout the paper, I estimate the effects of the cost change for low-income students as well as the entire population. I focus on low-income students because they may be the most likely to make suboptimal application decisions and, thus, to benefit from sending additional score reports. They are less likely to apply to and attend selective colleges than are their higher-income peers conditional on high school achievement (Bowen *et al.*, 2005; Pallais and Turner, 2006; and Spies, 2001). Additionally, over a quarter of low-income students who say they would like to attend a four-year college and apply to at least one do not matriculate at one (Avery and Kane, 2004). At the same time, they receive particularly high returns from attending selective colleges (Dale and Krueger, 2002 and Saavedra, 2008) and from attending any college (Card, 1995).

Sending additional score reports may have benefitted low-income students in several ways. A back-of-the-envelope calculation suggests that sending an additional score report increased the average low-income student's expected future earnings by over \$10,000 by increasing the probability that she attended a selective college. Sending an additional score report may have also increased college matriculation. I do not estimate the increase in college matriculation. However, a similar calculation shows that even if only one out of every 1,300 low-income

students who both sent an additional application and would not otherwise have attended college attended for only two years, the benefits of sending an additional score report for the average low-income student through this channel would exceed \$6.

I consider explanations for students' large reaction to such a small cost change. I provide evidence that students' response is inconsistent with optimizing behavior. However, it is not altogether surprising that students are not optimizing. Students have almost innumerable combinations of colleges to choose among and even determining the utility they would get from applying to one combination is difficult. This utility depends on the utility they will get from attending each college (which Avery and Kane, 2004, find students do not estimate well) and their probabilities of admission to each college. My preferred explanation is that, instead of finding the exact optimal combination, students use rules of thumb to determine which colleges to apply to. Thaler and Sunstein (2008) suggest that when faced with complex choices, individuals often rely on rules of thumb. In this context, students may interpret the ACT's providing three (or four) free score reports as an indication that sending three (or four) score reports is recommended. When the cost structure changed, so did their rules of thumb. In this way, this paper's findings are complementary to the findings in Madrian and Shea (2001), Choi *et al.* (2002), and Thaler and Sunstein (2008) that individuals are significantly affected by the default savings and health insurance plans.

The paper proceeds as follows: Section 2 discusses the policy change, the datasets used, and the relationship between score reports and applications. Section 3 reviews the literature on low-income students' college decisions while Section 4 examines students' score-sending and application patterns by family income before the cost change. Section 5 uses ACT micro data to determine the effect of the cost change on the number and selectivity of colleges to which students sent scores. Section 6 uses the AFS data to analyze the effect of the cost change on students' application behavior and the selectivity of the colleges they attended. Section 7 benchmarks the benefits low-income students might receive from sending an additional score report while Section 8 examines why students' behavior changes so much

in response to a small cost change. Section 9 concludes.

2 Background Information

2.1 Setting and Policy Change

The ACT is a nationwide college entrance exam that is particularly popular in the Midwest. At the time of the policy change, just under one million students took the ACT each year.² By 2007, all US colleges that required a standardized test score accepted ACT scores (Marklein, 2007) and recently several states have started requiring all public high school students to take the ACT (Ramirez, 2009). The test consists of English, math, reading, and science sections and students scores on these four sections are averaged to create an overall ACT score, an integer ranging from one to 36.³

Throughout the period analyzed in this paper, when students registered for the ACT, they answered a questionnaire with questions about their demographics, high school experience, and aspirations, and indicated up to six colleges they wanted their ACT scores sent to. Students could send additional score reports after they took the test, but this was relatively uncommon: only 8% of students did so in 2004 (the only year for which this information is available). Free score reports could be sent only at test registration.

Before the fall of 1997, the ACT allowed students to send three free score reports. Starting in the fall of 1997, the ACT provided four free reports. The marginal cost of an additional score report was constant at \$6 from the fall of 1995 to the fall of 2001. Before then (in the years analyzed in the paper) it ranged from \$4 to \$5.50, while afterwards, each additional score report cost \$7. While the monetary cost of sending four score reports decreased in the fall of 1997, the non-monetary cost did not. Because students chose the colleges they sent scores to when they registered for the test, they had to provide payment at that time

²According to the ACT Corporation's 1999 National Score Report, 959,301 students took the ACT in the academic year before the cost change and 995,039 students took the ACT in the year after.

³The ACT introduced an optional writing section in 2005, after the time period analyzed in this paper.

regardless of the cost of sending score reports.⁴ Both before and after the cost change, students were given six lines to record the colleges to which they wanted their scores sent.

Students may not have been aware that the ACT was changing its score-sending policy. It was not generally publicized nor even mentioned in the ACT's annual newsletter to guidance counselors. After the cost change, the ACT registration documents described the new cost structure, but did not mention that there had been a change. Some students in the class of 1998 took the ACT under both cost structures, so they were more likely to have been directly aware of the change. However, other students taking the ACT after the cost change might not have known that the ACT ever provided only three free score reports.

In comparison, the SAT provided students with four free score reports throughout the entire period analyzed in the paper. The marginal cost of sending an additional SAT score report was \$6 before the fall of 1994 and \$6.50 afterwards.

2.2 Data

This paper uses three datasets: a large database from the ACT Corporation, the American College Survey (ACS), and the AFS.

2.2.1 ACT Database

I use the ACT database, which contains administrative data from the ACT Corporation on test-takers, to analyze the change in ACT-takers' score-sending patterns after the cost change. The database includes information on one out of every four Caucasians, one out of every two minorities, and every test-taker who did not provide a race who planned to graduate from high school in 1991, 1992, 1994, 1996, 1998, 2000, or 2004.⁵ This provides a large sample: 2,486,159 observations with over 287,000 in each year. I observe each student's ACT score, high school GPA, race, gender, family income, high school, courses taken, and

⁴This is not necessarily true for low-income students who could waive the testing fee but not score-sending fees.

⁵I did not choose these years; they were chosen for another project and were the only years available to me.

extracurricular activities. I also observe up to six colleges to which each student sent her ACT scores at the time of registration.

In the analysis, I exclude students who sent no score reports at test registration. These students likely either took the ACT for reasons other than college admissions, sent score reports after viewing their scores, or sent SAT score reports instead. However, I show the effect of the cost change on score-sending using the entire sample in an appendix table. Excluding students who sent zero score reports still leaves a large sample: 2,143,734 observations with more than 257,000 in each year.

2.2.2 American College Survey

The ACS is a yearly survey of colleges and universities in which over 3,000 colleges provide data ranging from their courses of study and admissions statistics to their sports teams. I link the ACS to the ACT database to determine the selectivities of colleges students sent scores to.

My measure of college selectivity is based on the ACT scores of each college's entering freshman class. The ACS provides the 25th and 75th percentile ACT scores of the entering class.⁶ I discuss the results using only colleges' 25th percentile ACT scores because the results using the 25th and 75th percentiles are so similar. However, results for the 75th percentile are readily available upon request. I use test scores from freshmen matriculating in a base year, 1993, so that the analysis is not confounded by colleges becoming more competitive over time.

2.2.3 American Freshman Survey

The AFS is a yearly survey of first-time full-time (FTFT) freshmen at four-year colleges and universities, organized by the Higher Education Research Institute at UCLA. I use the

⁶Many colleges do not provide both SAT and ACT scores of matriculating freshmen. For schools that only provide their freshman classes' 25th and 75th percentile SAT scores, I impute the corresponding ACT scores using a concordance produced by the College Board. The ACS does not provide information on the freshmen classes' median ACT or SAT scores.

survey to analyze the effect of the cost change on (1) the number of applications students sent and (2) the selectivities of the colleges they attended.

Each year, all colleges that have entering first-year classes and respond to the U.S. Department of Education's Higher Education General Information Survey are invited to participate in the AFS. Colleges can choose to participate, but only those with sufficient fractions of freshmen taking the survey (75% of freshmen for research universities) are included in the data. Survey weights, which correct for differing response rates of students within participating schools and differing participation rates of schools of different types, are provided to make the sample representative of the national population of FTFT freshmen.

This paper uses data on the entering college cohorts of 1992 through 1999, the last cohort with publicly available data. The data include 1,886,245 total observations covering over 350 colleges and over 200,000 students in each year. Most importantly for this project, it provides information on whether students took the SAT or the ACT, the number of college applications they sent, and the selectivity of the colleges they enrolled in. The data also include background characteristics, which I use as controls.

The AFS asks students to provide their ACT and SAT scores. I define students as taking the ACT if they provided ACT scores and taking the SAT if they provided SAT scores. By this definition, 12% of students took both the SAT and ACT, 35% of students took just the ACT, 37% of students took just the SAT, and 15% of students took neither test. In the analysis, I limit the sample to students who took only one test. This eliminates students coded as taking neither test, many of whom may have taken the ACT, but did not want to provide their test scores. It also eliminates students who took both tests who could have sent either ACT or SAT scores.⁷

In the early years of the sample, the total number of applications students sent was censored at seven applications, so I censor it in all years. Approximately 3.5% of students who took only the ACT and 10.3% of the entire population is coded as sending seven applications.

⁷The results using the entire sample are qualitatively similar, but slightly attenuated (as expected). These results are readily available upon request.

In later years, when the survey distinguishes between students sending exactly seven and more than seven applications, 42% of students sending at least seven applications sent exactly seven.

The AFS directly provides the median SAT score of incoming freshmen at each student's college.⁸ I convert this SAT score to an ACT score using a concordance produced by the College Board. So that the analysis is not confounded by colleges changing their selectivities over time, I average each college's yearly ACT scores to create one constant selectivity measure for each college. (In practice, because ACT scores are relatively coarse, only one college has an median ACT score that changes over time.)

2.3 Relationship between Score-Sending and Applications

Using score-sending data as a proxy for application data has become quite common in the literature.⁹ By comparing applications to SAT score reports, Card and Krueger (2005) find that score-sending data are, in general, a good proxy for application data. However, because the policy of interest here represents a change in the score-sending institution itself, I do not consider score-sending as a proxy for applications. Instead, I consider sending a score report to be a first step in sending an application.

However, some students may have applied to colleges to which I do not observe them sending a score report. Some colleges do not require standardized test scores. Alternatively, a student I observe in the ACT database may have sent her SAT scores to colleges instead. (To eliminate this concern in the application analysis, I eliminate students who took both the SAT and ACT.) Finally, some students sent score reports after registration, which I cannot observe. Empirically, this is relatively uncommon: in 2004 (the only year for which this statistic is available) only 8% of students who sent score reports at registration sent additional score reports afterwards.

⁸While the data has a unique identifier for each college, this identifier purposely cannot be linked to other datasets.

⁹See, for example, Card and Krueger (2005), Abraham and Clark (2006), Pope and Pope (2008), Long (2004), and Pallais and Turner (2006).

On the other hand, students could have easily sent score reports to colleges but not ended up applying. This appears to have been commonplace after the cost change. In particular, I estimate that only about 20% of the additional score reports sent as a result of the cost change translated into additional applications.

3 College Choices of Low-Income Students

Low-income students are less likely to attend college than are their higher-income peers, conditional on high school achievement. Ellwood and Kane (2000) find that in the high school class of 1992, 66% of students with family incomes in the top quartile attended a four-year college, while only 28% of students from the bottom quartile did so. They estimate that 40% of this gap remains after controlling for 12th grade test scores. This is troubling, as Card (1995) finds that the return to a year of college is particularly large for disadvantaged students.

Low-income students are also underrepresented at selective colleges. Hill *et al.* (2005) find that, in the 2001-2002 school year, only 10% of students at 28 elite private colleges (COFHE colleges)¹⁰ were from the bottom 40% of the income distribution. Winston and Hill (2005) find that this was 35% fewer than the fraction of high-achieving high school students that were from the bottom 40% of the income distribution.

Many studies have found a large return to college quality for students of all income levels (*e.g.*, Hoxby, 1998; Black *et al.*, 2005; Zhang 2005; Brewer *et al.*, 1999; and Black and Smith, 2006). There is no consensus in this literature, however, because Dale and Krueger (2002) find there is no return to college selectivity for most students when they compare the earnings of students who were admitted to the same colleges, but chose to attend different ones. Yet, Dale and Krueger do find large returns to college selectivity for low-income students. Many other studies (*e.g.*, Saavedra, 2008; Monks, 2000; Behrman *et al.*, 1996; and

¹⁰The COFHE (Consortium on Financing Higher Education) colleges are 31 elite private schools that include the entire Ivy League. Hill *et al.* (2005) and Winston and Hill (2005) have data on only 28 of these colleges.

Loury and Garman, 1995) find that low-income students and minorities receive particularly high returns from attending selective colleges.

Low-income students' application choices may play a role in their underrepresentation both in college in general and at selective colleges. In their evaluation of the Boston COACH program, Avery and Kane (2004) argue that providing disadvantaged high school students with help choosing which colleges to apply to increased the fraction of these students who attended college. Even with substantial college counseling, however, 27% of the disadvantaged students in Avery and Kane's study who wanted to attend a four-year college and applied to at least one, did not matriculate at one, including a large number of students who had high GPAs. This suggests that there are a substantial number of low-income ACT-takers who could potentially be induced to attend college.

Similarly, Bowen *et al.* (2005), Spies (2001), and Pallais and Turner (2006) find that low-income students are less likely to apply to elite colleges than are their higher-income peers, conditional on high-school achievement. Yet, Bowen *et al.* (2005) finds that, conditional on applying, low-income students are no less likely to gain admission to or matriculate at elite colleges than are their higher-income peers.

4 Baseline Score-Sending and Application Data

Before analyzing the effect of the cost change, I describe in this section the existing score-sending and application patterns at the time of the cost change. Table 1 presents descriptive statistics from the class of 1996. Panel A uses data from the ACT database on the high school graduating class of 1996. The first column presents statistics for the sample of students who sent at least one score report while the second presents statistics on the entire sample. In general, the samples look very similar. In both cases, just over 70% of the sample is Caucasian, 56% is female, and the average high school GPA is approximately 3.1. In this database, I define low-income students as those with annual family incomes below \$36,000,

middle-income students as those with family incomes between \$36,000 and \$80,000, and high-income students as those with family incomes of \$80,000 or more. Under this definition, just over 40% of both samples is low-income, while 7% is high-income. Unsurprisingly, the big difference between the samples is the number of score reports sent. As Figure 1 suggests, conditional on sending any score reports, the average ACT-taker sent approximately three (2.95) reports. Unconditional on sending any score reports, she sent 2.63.

Panel B uses data from the AFS on the entering college class of 1996. The columns provide data on students who took only the ACT, students who took only the SAT, all ACT-takers, and all students who did not take the ACT, respectively. Unlike the ACT database, the AFS includes only students who matriculated at a four-year college. The average matriculated ACT-taker in the AFS database had a higher GPA and ACT score than the average ACT-taker in the ACT database. Matriculated ACT-takers also sent slightly more applications on average (3.04) than ACT-takers sent score reports, while students only taking the ACT sent fewer (2.67).

The AFS database contains different income categories than the ACT database. In the AFS, I define low-income students as those with annual family incomes below \$40,000, middle-income students as those with family incomes between \$40,000 and \$75,000, and high-income students as those with family incomes of \$75,000 or more. Under this definition, 34% of students who took only the ACT were low-income and 25% were high-income. Students who took only the SAT were higher-income and more racially diverse than students taking only the ACT. They also sent substantially more applications on average (3.93) than students who took only the ACT (2.67).

Before the policy change, low-income students sent fewer score reports and applications than did their higher-income peers. Table 2 displays the results of estimating the equation

$$y_i = \alpha + \beta_1 midinc_i + \beta_2 highinc_i + X_i \beta_3 + \varepsilon_i. \quad (1)$$

Panel A uses the ACT database and includes students in the high school class of 1996 who sent at least one score report. In this panel, y_i is the number of score reports student i sent. Panel B uses the AFS data and includes all students in the entering college class of 1996 who took only the ACT. In this panel, y_i indicates the number of applications student i sent. (In both panels, students who do not report their family incomes are excluded.) The variables $midinc_i$ and $highinc_i$ are dummies for having a middle and high family income, respectively. The vector X_i contains controls for student demographics and high school performance that are used throughout the analysis. The same demographic controls are used in both datasets.¹¹ The high school performance measures overlap, but differ.¹² The first column of each panel contains no controls, while the second column adds all of the demographic controls (listed in footnote 11), and the third column adds the high school performance controls (listed in footnote 12). The fourth column in Panel A adds high school fixed effects, which are not present in the AFS data.¹³ Throughout the paper, standard errors calculated from the ACT data are clustered at the state level. Standard errors calculated from the AFS data are robust Huber-White errors (state is not included in the AFS data).

Panel A shows that the average low-income student sent 2.90 score reports, while the average middle- and high-income student sent an additional 0.08 and 0.19 score reports,

¹¹These are race dummies, an indicator for being a U.S. citizen, an English language indicator, and gender. In the ACT data, the English language indicator is whether English is the primary language spoken in the home, while in the AFS data, the indicator is whether English is the student's native language.

¹²In both datasets, I control for high school GPA, whether the student had college credit, and dummies for each ACT score. (For students in the AFS data who took only the SAT, I convert their SAT scores to ACT scores using the concordance produced by the College Board.) In the ACT data, I also control for the number of years of English and math classes the student took as well as indicators for taking honors English and math, attending a private high school, and being on a college preparatory track. I add indicators for ever having been elected to a student office, working on the staff of a school paper or yearbook, earning a varsity letter for sports participation, and holding a regular part-time job. In the AFS data, I do not have these additional controls, but do include controls for whether the student drank beer, smoked cigarettes, performed volunteer work, spent at least one hour per week on student clubs or groups, and spent more than five hours a week on homework in the last year.

¹³It is not clear that I should control for high school fixed effects in this regression. If students' high schools are partially a function of their incomes, regressions that include high school fixed effects likely underestimate the effect of family income on application choices. However, if students' high schools are a function of characteristics correlated with income, omitting high school fixed effects would likely overestimate the effect of family income. Because I would rather conservatively underestimate the gap between the income groups, I prefer the specification with high school fixed effects. When high school fixed effects are added, the dummy for attending a private high school is dropped as it does not vary within high school.

respectively.¹⁴ Including the demographic controls slightly increases the differences between the income groups, but adding the high school performance controls decreases them. Once all the controls and high school fixed effects are included, the coefficients indicate that high-income students sent 0.11 more score reports than their observationally equivalent low-income peers, while middle-income students sent 0.03 more score reports.

Panel B shows that the number of applications sent varied by family income even more. The average (matriculated) low-income student sent 2.54 applications. The average middle-income student sent 0.09 more applications, which was close to the raw difference in score-sending between low- and middle-income students. But the average high-income student sent 0.37 more applications than the average low-income student, approximately double the difference in score-sending between these two income groups. Unlike the differences in score-sending, the differences in applications between income groups substantially increase when the demographic controls are added. This is driven by the race dummies. The average black student sent 1.02 more applications than the average Caucasian student, but only 0.06 more score reports. (Appendix Table 1 displays the coefficients on all the control variables included in the regressions in Table 2.) Once all the controls are added, the average middle- and high-income students sent 0.19 and 0.46 more applications, respectively, than their observationally equivalent low-income peers.

Consistent with the prior literature, the ACT and AFS data show that low-income students sent scores to and attended less-selective colleges than did their higher-income peers. Panels A and B of Table 3 show the results of estimating Equation (1) on the ACT data where the dependent variables are the selectivities of the most- and least-selective colleges students sent scores to, respectively. The table includes the same controls as Table 2. (The coefficients on these controls are in Appendix Table 2.)

The most-selective college that the average low-income student sent scores to was 0.89 and

¹⁴Students with higher family incomes were more likely to send zero score reports at test registration. This suggests that higher-income students were more likely to take the ACT for reasons other than college entry or to forgo their free score reports for the option of seeing their score before sending them to colleges.

1.37 ACT points less selective than the most-selective colleges the average middle-income and high-income students sent scores to, respectively. These are large differences relative to the interquartile range (3 ACT points) and standard deviation (3.1 ACT points) of the dependent variable. The demographic characteristics explain very little of the gap, though including the high school performance controls explain about 60% of the remaining difference between low- and middle-income students and about 40% of the remaining gap between low- and high-income students. Conditional on all the controls and high school fixed effects, the disparity between low- and high-income students was 0.35 ACT points. The differences between low- and high-income students' least-selective colleges were also substantial, but only approximately 60% to 70% of the size of the differences in their most-selective colleges.

Panel C shows the results of estimating a similar regression on the AFS data where the dependent variable is the selectivity of the college the student attended. The differences between income groups in college attendance are similar in magnitude to differences in score-sending. The demographic and high school performance controls explain about half of the raw difference between low- and high-income students. Even after these are included, the difference between the colleges these students attended was 0.53 ACT points, or approximately one sixth of a standard deviation.

5 Changes in Score-Sending

5.1 Number of Score Reports

When the ACT allowed students to send a fourth free score report, ACT-takers sent substantially more score reports. In particular, there was a dramatic increase in the fraction of ACT-takers sending exactly four score reports and corresponding decrease in the fraction sending exactly three. Figure 1 shows that in each class graduating before 1997 (in which all ACT-takers received only three free score reports) over 80% of ACT-takers sent exactly three score reports. Fewer than 5% sent exactly four. On the other hand, in the class of 2000

when test-takers received four free score reports, the fraction sending three score reports plummeted to 10% while the fraction sending four increased to just under 75%. The class of 1998, in which only some ACT-takers were eligible for four free score reports, represents an intermediate case where the fraction of ACT-takers sending three score reports had dropped to just under 40% and the fraction sending four had increased to just over 45%.¹⁵

While there were large changes in the fraction of ACT-takers sending exactly three and exactly four score reports, there were very small changes in the fraction of students sending other numbers of scores. Aside from the fraction of students sending one score report in 2004, over the 13 years spanned by this data, the fraction of students sending one, two, five, and six score reports each varied by fewer than one percentage point, remaining almost unchanged after 1997.¹⁶ The figure also shows that there was no similar increase in score-sending among SAT-takers. In fact, after the cost change, there was actually a small decrease in the fraction of SAT-takers sending four score reports and no change in the fraction of students sending three. This suggests that it was the change in the ACT's score-sending cost structure and not some general secular change that caused the dramatic increase in ACT score-sending.

Table 4 displays regression estimates of the effect of the cost change on the number of score reports ACT-takers sent. It presents estimates of the regression

$$y_i = \alpha + \beta_1 class1998_i + \beta_2 post1998_i + \beta_3 t + X_i \beta_4 + \varepsilon_i. \quad (2)$$

Here, the dependent variable, y_i , is the number of score reports student i sent. The variable $class1998_i$ is an indicator for being in the high school class of 1998 and $post1998_i$ is an indicator for graduating after 1998 (being in the class of 2000 or 2004). I include separate indicators for the class of 1998 and classes after 1998 because I expect the policy to have larger

¹⁵Appendix Figure 1 replicates Figure 1 including students who sent no score reports. The results are very similar although slightly attenuated due to the fact that over this period there is a 10 percentage point increase in the fraction of students who sent no score reports.

¹⁶There was a four percentage point decrease in the fraction of ACT-takers sending four score reports between 2000 and 2004. This came entirely from a four percentage point increase in the number of students sending exactly one score report.

effects in years when all test-takers received four free score reports. The vector X_i includes the same covariates included in Table 2 and adds income dummies to the demographic controls in Panel A.¹⁷ The variable t represents a linear time trend. The first column does not contain the time trend or any controls. The second column adds the time trend, the third adds the demographic controls, the fourth adds the high school performance controls, and the fifth adds high school fixed effects.

The regressions in Panel A include all income groups. Before the time trend is added, the estimates indicate that students sent an additional 0.44 score reports in the class of 1998 and an additional 0.62 score reports in later classes. Including the time trends increases these coefficients as, on average, students sent 0.02 fewer score reports each year between 1991 and 2004. However, the other covariates and high school fixed effects have very little effect on the estimates. (The coefficients on the time trend and the other controls are displayed in Appendix Table 3.) After these controls are included, the estimates show that on average, students in the classes of 2000 and 2004 sent 0.78 more score reports than those in classes in which students only received three free score reports.

Panel B estimates the same regression, limited to the sample of low-income students. The results are similar to the results for the entire population of ACT-takers. Students substantially increased their score-sending when the fourth score report became free. The estimated effects increase when the time trend is included, but are not affected by the other controls. When all the controls and the time trend are included, the estimates suggest that, on average, low-income students sent an additional 0.80 score reports when the fourth score report became free. Appendix Table 4 replicates this table, including students who did not send any score reports. Similar to Appendix Figure 1, it shows a large increase in score-

¹⁷In all subsequent regressions not limited to low-income students, income dummies are added into the demographic controls. (Panel B is limited to low-income students and so does not contain these controls.) In the ACT data, these are dummies for having a family income between \$36,000 and \$60,000, a family income at or above \$60,000, and a missing family income. I use \$60,000 as opposed to \$80,000 as the high-income cutoff here because the early years of the sample do not distinguish family incomes above \$60,000. In the AFS data, these are dummies for having a family income between \$40,000 and \$75,000, a family income at or above \$75,000, and a missing family income.

sending, but one that is attenuated due to the increase in the number of students sending zero score reports over this period.

5.2 Selectivity of Score Reports

When students sent more score reports, they sent scores to a wider range of colleges, that is, those that were both more- and less-selective than any they would have sent scores to otherwise. Figure 2 shows this graphically. For each high school class, the figure plots the average selectivity of students' most- and least-selective colleges. College selectivities of the average student are plotted in blue, while college selectivities of the average low-income student are plotted in red. The figure shows that the range of colleges students sent scores to was relatively constant before the cost change. But, it widened for the class of 1998 and continued to widen for the class of 2000.

Table 5 analyzes these changes through regressions. It presents results from estimating Equation (2) on the ACT database. In Panel A, the dependent variable is a student's range of colleges: the difference between the selectivities of the most- and least-selective colleges a student sent scores to. In Panels B and C, the dependent variables are the selectivities of these most- and least-selective colleges, respectively. The controls are the same as in Table 4. Table 6 replicates this table for low-income students and Appendix Tables 5 and 6 display the coefficients on the controls.

Table 5 also shows that there was a large increase in the range of colleges students sent scores to. This range increased by 0.89 ACT points for students graduating after 1998, relative to of a mean of 2.97 ACT points in 1996. Approximately 60% of this increase (0.53 ACT points) resulted from students applying to more-selective colleges than they otherwise would have. On average, the selectivity of students' most-selective colleges increased by a sixth of a standard deviation. Low-income students experienced a slightly larger increase in the range of colleges they sent scores to (0.93 ACT points). They also experienced a larger average increase in the selectivity of the most-selective colleges they sent scores to (0.57 ACT

points) off of a lower mean. Overall, after the cost change, students of all income groups sent their scores to more-selective colleges on average.

However, some students sent scores to less-selective schools as a result of the cost change. Low-income students experienced approximately the same change in the selectivity of their least-selective colleges as did the average student (0.36 ACT points). When students sent scores to less-selective colleges, they sent scores to colleges with higher admissions rates. The highest admissions rate of the colleges students sent scores to increased by 1.5 percentage points for all students and by 1.7 percentage points for low-income students.¹⁸

6 Changes in Applications and College Selectivity

6.1 Number of Applications

The AFS data show that the increase in score reports translated into a substantial increase in applications, but one that was much smaller than the increase in score-sending. To estimate the change in applications caused by the cost change, I use two identification strategies. First, I estimate regressions similar to the ones in the previous section using only ACT-takers. Second, I estimate difference-in-difference regressions, utilizing students who took only the SAT as a control group.

Table 7, which has the same structure as Table 4, presents the results of estimating Equation (2) on students who took only the ACT. The dependent variable is the number of applications sent. In the AFS data, $post1998_i$ indicates that the student was in the entering college class of 1999. Estimating the equation without controls shows that ACT-takers in the class of 1998 sent more applications than their predecessors and those in the class of 1999 sent even more. The estimates increase when time trends are added as ACT-takers are estimated to send 0.01 fewer applications every year, but are robust to the addition of

¹⁸So that my results are not confounded by colleges becoming more competitive over time, I use consistent measures of colleges' admissions standards for the different cohorts: admissions rates for the class of 1993.

controls. (The coefficient on the time trend and the other control variables are in Appendix Table 7.) When the time trend and all the controls are added, the estimates indicate that students in the class of 1999 sent an additional 0.15 applications and students in the class of 1998 sent an additional 0.10 applications than students in previous cohorts. In both cases, the results suggest that approximately 20% of the additional score reports translated into additional applications.

Panel B shows that low-income students also sent more applications when the fourth score report became free. As with the increase in score reports, their response was similar in magnitude to that of their higher-income peers. Conditional on all the controls, I estimate that low-income students increased their score-sending by 0.11 applications in the class of 1998 and by 0.14 in the class of 1999, close to 20% of the increase in score-sending.

Table 8 presents estimates from the second identification strategy. Specifically, it displays results from estimating the equation

$$\begin{aligned}
 y_i = & \alpha + \beta_1(class1998_i \times ACT_i) + \beta_2(post1998_i \times ACT_i) + \beta_3class1998_i \\
 & + \beta_5post1998_i + \beta_6ACT_i + \beta_7t + \beta_8(t \times ACT_i) + X_i\beta_9 + \varepsilon_i
 \end{aligned} \tag{3}$$

where the dependent variable, y_i , is the number of applications student i sent. The variable ACT_i is an indicator for taking the ACT. Column 1 doesn't include any controls or time trends, Column 2 adds both linear and ACT-specific time trends, while Columns 3 and 4 add the demographic and high school controls, respectively. As in previous tables, I estimate this equation for the whole sample in Panel A and on low-income students in Panel B. (The coefficients on the time trends and control variables are displayed in Appendix Table 8.)

This table also suggests that ACT-takers sent significantly more applications as a result of the cost change. However, these results are not as robust to adding controls as the regressions using only ACT-takers. This identification strategy relies on the assumption that, in the absence of the cost change, ACT-takers and SAT-takers would have experienced

the same changes in their application patterns. But estimates of the time trends suggest that ACT-takers and SAT-takers were on different trends. Each year SAT-takers sent 0.05 more applications than ACT-takers (and 0.08 more applications among low-income students).¹⁹ Thus, the results depend on including test-specific time trends. Once the time trends and all the controls are added, the increase in applications measured for the average student in the class of 1998 (0.10) is the same as in the other identification strategy. The effect for students graduating after 1998 (0.05) is about one third the size of the effect measured with the other identification strategy. The results suggest that low-income students increased the number of applications they sent by 0.08 in both the class of 1998 and later classes, approximately 70% and 55%, respectively, of the estimates using only ACT-takers.

6.2 Selectivity of Attended College

I use the same two identification strategies to examine the change in the selectivity of the colleges attended by ACT-takers after the cost change. Table 9 shows the results of estimating Equation (2) where the dependent variable is the selectivity of the college attended. (Appendix Table 9 displays the coefficients on the time trend and covariates.) Panel A shows that when all the controls are added, the average ACT-taker in the class of 1998 attended a college that was slightly (0.07 ACT points) more selective, but the average ACT-taker in the next class did not.

Low-income students, on the other hand, attended significantly more-selective colleges in both classes. The selectivity of the colleges they attended increased by 0.26 ACT points in the class of 1998 and 0.24 ACT points in the class of 1999. These changes are approximately half the difference in the selectivities of colleges attended by observationally equivalent low- and high-income students (from Table 3). The changes are also approximately 40% of the increase in the selectivity of the most-selective college the average low-income student sent scores to when she received four free score reports (from Table 6). This does not necessarily

¹⁹The finding that SAT-takers increased the number of applications they sent each year is consistent with the results of Bound, Hershbein, and Long (2009).

imply that score reports sent to more-selective colleges translated into applications at a higher-than-average rate, though this could be the case. Rather, even students who did not change the range of colleges they sent scores to as a result of the cost change could have been induced to attend more-selective colleges. This could occur for students who, before the cost change, would not have applied to, gained admission to, or chosen to attend the most-selective college they sent scores to.²⁰

Table 10 shows the estimates from the second identification strategy. It presents the results from estimating Equation (3) where the dependent variable is the selectivity of the college the student attended. (Appendix Table 10 displays the coefficients on the time trends and covariates.) This identification strategy also finds that low-income students attended more-selective colleges as a result of the cost change, but the average student did not. The estimated magnitudes of the effect for low-income students are similar to the estimates using the other identification strategy (0.14 and 0.31 ACT points for the classes of 1998 and 1999, respectively). However, as with the number of applications sent, these estimates do not appear to be as robust as the ones using the first identification strategy.

There are two potential threats to the validity of these results. The first is that the supply of college slots may not be perfectly elastic. (Bound and Turner, 2007) provide evidence on this.) In this case, low-income ACT-takers may have displaced SAT-takers from attending selective colleges and the results in Table 10 would overestimate the effect of the cost change. However, the estimates in Table 9 would not suffer from this bias. The second potential threat is that I observe only matriculated students in the AFS. I suggest that sending an additional application may have induced some ACT-takers to attend college. If these new matriculants were unobservably different than other matriculated ACT-takers, then the results in Tables 9 and 10 could be biased. However, this effect would have to

²⁰For example, consider a student who applied to colleges A, C and D before the cost change. (A college is more selective the closer to the beginning of the alphabet it is.) The student was rejected by A and attended C. After the cost change, the student would have also applied to and been admitted to B, so the range of colleges she sent scores to would not have changed. However, now she would attend B, so she would attend a more-selective college as a result of the cost change.

be implausibly large (and in a counterintuitive direction) to drive the results in Tables 9 and 10.²¹ Moreover, if the results were being driven by increased matriculation, this would suggest that some low-income students obtained large benefits from the cost change (see the next section).

7 Assessing Benefits to Students

Sending an additional application potentially has several different effects. It may benefit the student who sends it by increasing the probability that she is admitted to college. It can give her the opportunity to attend a more-selective college, or simply give her more college options, allowing her to attend a college that offers her a better financial aid package or that is a better fit.

However, sending an additional application also has costs. It costs the student time to complete the application and the admissions officer time to read it. Also, students often have to pay application fees.²² If college slots and financial aid dollars are not perfectly elastic, then students who attended college or more-selective colleges as a result of sending additional applications might have crowded out other students. However, Bound and Turner (2007) find that college slots are partially elastic, suggesting full crowd out was unlikely. Even if there was perfect crowd out, the resulting allocation of students to colleges might have been more efficient. In particular, given that low-income students are estimated to have particularly large returns from attending college and attending selective colleges, an increase in the number of low-income students at these colleges may have increased efficiency. Moreover, the fact that many selective colleges have recently attempted to attract more low-income

²¹For selection to drive the results in Tables 9 and 10, the new matriculants would have to have attended more-selective colleges than the students who did not need an additional free score report to induce them to attend college. The standard deviation of the dependent variable is 3 ACT points. Even if, conditional on observables, the new matriculants would have attended colleges that were one standard deviation more selective than the existing matriculants conditional on observables, the number of matriculants would have had to increase by approximately 9% to cause the 0.24 ACT point change in college selectivity found in Table 9. This seems implausibly large relative to the 14% of test-takers who sent an additional application.

²²Most colleges allow low-income students to waive their application fees.

students suggests that they value having economically diverse student bodies.

Sending an additional application may have had the largest benefits for low-income students, a group that obtains large benefits from attending college and selective colleges, but is underrepresented in both. In this section, I benchmark the benefits low-income ACT-takers received from sending another score report through (1) attending more-selective colleges and (2) increased college matriculation. I do not calculate the costs to potentially displaced higher-income students.²³ I do not estimate the additional benefits students received from sending an additional application through any other channels (*e.g.*, obtaining a better financial aid package), nor do I calculate the direct cost the student incurred from sending an additional application or the college incurred from reading it. However, the benefits to sending an additional score report appear so large that they are likely to have greatly outweighed the time and monetary costs of sending an additional application.

I start with the estimate from Table 9 that low-income students attended colleges with average ACT scores 0.236 points higher after the cost change. I use this estimate instead of the difference-in-difference estimate from Table 10 because it is more conservative and not potentially biased upward by the displacement of SAT-takers. To determine the benefit of attending a more-selective college, I use Dale and Krueger's (2002) estimate that low-income students receive a 4% wage premium for attending a college whose students score 100 points higher on the SAT.²⁴ Based on the concordance produced by the College Board, one ACT point is equivalent to 44 SAT points. Day and Newburger (2002) estimate that the average college graduate will earn \$2.1 million in 1999 dollars over her lifetime. Under these assumptions, the benefit a low-income student receives from attending a college with average ACT scores one point higher is $\$2,100,000 \times 4\% \times 0.44 = \$36,960$.

²³Dale and Krueger's (2002) findings suggest there would be no displacement costs for higher-income students who attended less-selective colleges as a result of the cost change.

²⁴As discussed in Section 3, there are many studies that estimate the return to college selectivity. I use estimates from Dale and Krueger's (2002) study because it examines low-income students separately and because Dale and Krueger's methodology generally finds smaller returns to college quality than do other approaches, allowing my statements about the benefit of sending an additional score report to be more conservative.

If the only low-income ACT-takers affected by the policy were those who sent an additional score report, then the expected benefit these students received from sending the additional report was

$$\frac{\$36,960 \times 0.236}{0.801} \approx \$10,900. \quad (4)$$

The denominator, 0.801, is the fraction of students who sent an additional score report estimated in Table 4. If, in fact, low-income ACT-takers who did not send additional score reports were displaced from selective colleges by those who did, this calculation understates the benefits obtained by students who sent score reports. In either case, the benefits low-income students received through this channel far outweigh the \$6 cost of sending additional score report.

I next consider the benefits low-income students could have obtained through increased college matriculation. Because I do not know the effect of the cost change on college matriculation, I estimate the fraction of students that would have to have been induced to attend college for the average benefit of sending an additional score report to exceed \$6. I first identify the fraction of students who could have potentially been induced to attend college. These are the students who would not otherwise have attended college and who sent an additional application because of the cost change. The results in Table 7 show that 14.1% of low-income students sent an additional application because of the cost change. I use this estimate instead of the difference-in-difference estimate in Table 8 because it is directly comparable to the measured increase in score-sending and is more robust. Avery and Kane (2004) find that 27% of students from disadvantaged high schools who stated that they wanted to attend a four-year college and applied to at least one nonetheless did not end up matriculating. They argue that this number would have been higher if they had not provided the students with extensive help in selecting which colleges to apply to. Under the assumption that 27% of low-income students who sent an additional application would not have otherwise attended college, only $\frac{27\% \times 14.1\%}{80.1\%} \approx 4.8\%$ of students who sent an additional

score report could have been induced to attend college because of doing so.²⁵

I calculate the fraction of these students that would have to have been induced to attend two years of college for the benefits of sending an additional score report to exceed \$6. Using two years of college is intended to account for some dropout, but is somewhat arbitrary. Only half as many students would need to attend four years of college for the benefits of an additional score report to exceed \$6 through this channel, while twice as many would need to attend one year of college.

To calculate the earnings gain from attending two years of college, I use Card's (1995) estimate that students' earnings increase by 10% for each additional year of college.²⁶ I use Day and Newburger's (2002) estimate that high school graduates from these cohorts will have lifetime earnings of \$1.2 million in 1999 dollars. Thus, the benefit of attending two years of college is $\$1.2 \text{ million} \times 20\% = \$240,000$. This benefit is offset by tuition costs and foregone earnings. The Digest of Education Statistics reports that the average tuition, room, and board at four-year colleges and universities was \$12,352 in 1999-2000. This likely overestimates low-income students' costs because they receive financial aid and may be more likely to attend public colleges with lower sticker prices. I use Day and Newburger's (2002) estimate that recent high school graduates earn \$20,975 per year in the labor market as my measure of foregone earnings. This estimate is for ages 25 to 29 and thus may overstate earnings at ages 18 and 19. I use it to be consistent with the lifetime earnings measures (Day and Newburger do not show average earnings for younger ages) and to be conservative. Under these assumptions, the benefit of attending two years of college is approximately \$173,350.

Among students who could be induced to attend college by this policy, the fraction who would have to have attended two years of college for the benefits the average low-income

²⁵The difference-in-difference estimate of the increase in applications sent by low-income students is 55% as large as the estimate using only ACT-takers. Thus, the fraction of these students who would have to be induced to attend college for the benefits to exceed \$6 would have to be $\frac{1}{0.55} \approx 1.8$ times larger.

²⁶Card (1995) estimates the gains to an additional year of education to be between 10% to 14%. I use his lower-bound estimate here to be conservative.

student received from sending an additional score report to exceed \$6 is

$$\frac{\$6}{4.7\% \times \$173,350} \approx 0.0007.$$

This is fewer than one out of every 1,300 of these students.

8 Interpretation of Behavior Change

The benefits low-income students received from sending an additional score report appear to substantially exceed \$6 and the benefits of sending an additional application would be over five times as large as the benefits of sending a score report. Thus, it seems unlikely that it could be optimal for 14% of low-income students to send an additional application as a result of a \$6 cost change.

It is not necessarily surprising that students may not be applying to the optimal set of colleges, given that it is almost impossible to determine what the optimal set is. Students must choose one of over $2^{2,400}$ combinations of colleges to apply to, while determining the value of applying to even one combination is not straightforward. The value of applying to any combination depends on the probability that a student would be admitted to each subset of colleges in the combination, the utility she would get from attending each college, and the cost of applying to the colleges.

Students face considerable uncertainty about these quantities. While a student may know a college's admissions rate and statistics on its entering students, she may not know the admissions rate of applicants with her grades and test scores or how the school's admissions officers will weight her extracurricular activities, recommendation letters, and essays. It is even less likely that the student would know the strength of the correlation between different colleges' admissions decisions.

Estimating the utility she would get from attending a given college may be even harder. This utility depends on her financial aid package (which is often not revealed until after

admissions decisions), her earnings after attending the college, her earnings if she does not attend a four-year college, and the utility derived from experiences she would have at the school. Avery and Kane (2004) show that students have a lot of difficulty estimating even part of this utility. The high school seniors Avery and Kane surveyed overestimated college graduates' average earnings by 50% and tuition at local colleges by 100% to 200% on average. Twenty-five percent of the students surveyed estimated that the net present value of college was negative. Finally, students may even face uncertainty about the cost of applying to a set of colleges because this depends on how long it takes to complete the applications.

It may not be the actual \$6 cost that discouraged students from sending an additional score report, but the framing of that cost. If it were the actual monetary value, then middle- and high-income students should respond similarly to a \$6 decrease in application fees and a \$6 decrease in score-sending costs.²⁷ Yet, they do not appear to do so. There is no relationship in the ACS data between changes in colleges' application fees and changes in the number of applications they received during the period from 1993 to 2002. This lack of relationship could result from the endogeneity of application fees. However, if colleges believed that reducing their application fees led to large increases in the size of their applicant pools, colleges that go to great lengths to encourage applications by sending representatives to high schools and purchasing radio and television advertisements would likely eliminate or greatly reduce their application fees to encourage more applications.

Several behavioral explanations can explain students' large response to the fourth free score report. Thaler and Sunstein (2008) argue that when faced with uncertainty, people often follow rules of thumb. In the current context, students may interpret the ACT providing three (or four) free score reports as a signal that sending three (or four) applications is recommended. They may then use that signal as a rule of thumb about how many colleges to apply to. Under this explanation, when the cost of score-sending changed, students responded to the change in their rule of thumb, not the actual cost change. This explanation

²⁷Low-income students may be more responsive to changes in score-sending costs than application fees as they can often waive application fees, but not score-sending costs.

is consistent with the Madrian and Shea (2001), Choi *et al.* (2002), and Thaler and Sunstein (2008) results that default 401(k) plans and Medicare Part D plans have large effects on plan choices. Deciding which financial investments and health care plan best suit an individual family is exceedingly complex. When individuals are unsure which option to choose, they may follow the rule of thumb of simply sticking with the default plan.

College application guides show that many students are looking for an authority to provide a rule of thumb on how many colleges they should apply to. “How many applications are enough?” is the first frequently asked question on the College Board’s website for college counselors²⁸ and is prominently featured in many other college guides. The College Board suggests sending five to eight applications, many more than students send on average.

An additional consideration is that the cost of the fourth score report did not just decrease by \$6, it decreased to \$0. Several studies have found that demand is discontinuous at a price of zero. For example, Kremer and Miguel (2007) find that the take-up of deworming drugs in Kenya decreased from 75% to 19% when students were charged \$0.30 per pill instead of receiving the drugs for free, even though deworming provides large benefits. Demand was not sensitive to changes in price once the price was above \$0. In the current context, even though the fourth score report cost \$0, sending an additional application was still costly for higher-income students because of application fees. Ariely (2008) documents, however, that people buy much more of a product when part of the item (such as shipping-and-handling) costs \$0 than they would from an equivalent reduction in the total price of the item where each part retained a positive price.

9 Conclusion

The colleges a student applies to greatly affect whether she attends college, the type of college she attends, and her future earnings. Yet, little is known about how students decide where to apply. This paper analyzes the effect of the ACT’s increasing the number of free score

²⁸See <http://professionals.collegeboard.com/guidance/applications/how-many> (accessed August 1, 2012).

reports it provided from three to four, a \$6 decrease in students' cost of sending a fourth score report. It finds that when the fourth score report became free, students sent many more score reports and applications. They sent their scores to a wider range of colleges, sending scores to colleges that were both more- and less-selective than any they would have otherwise sent scores to. Low-income students also attended more-selective colleges as a result.

I benchmark the expected benefit that a low-income ACT-taker received from sending an additional score report, finding that it likely far exceeded \$6. Thus, it appears that some students were not making optimal college application decisions before the cost change. Faced with great uncertainty about the optimal application strategy, students may have relied on rules of thumb: in this case interpreting the ACT's provision of three score reports as a recommendation about how many reports to send. Under this explanation, students responded to the change in their rule of thumb instead of the actual change in the monetary cost of sending a fourth score report. If this is the case, providing them with rules of thumb based on data as opposed to the pricing structure of the ACT could lead to large changes in application behavior, facilitating higher college attendance and better student-college matches.

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Figure 1. Number of Scores Sent by High School Graduation Year

Figure 1a: Students Who Took the ACT

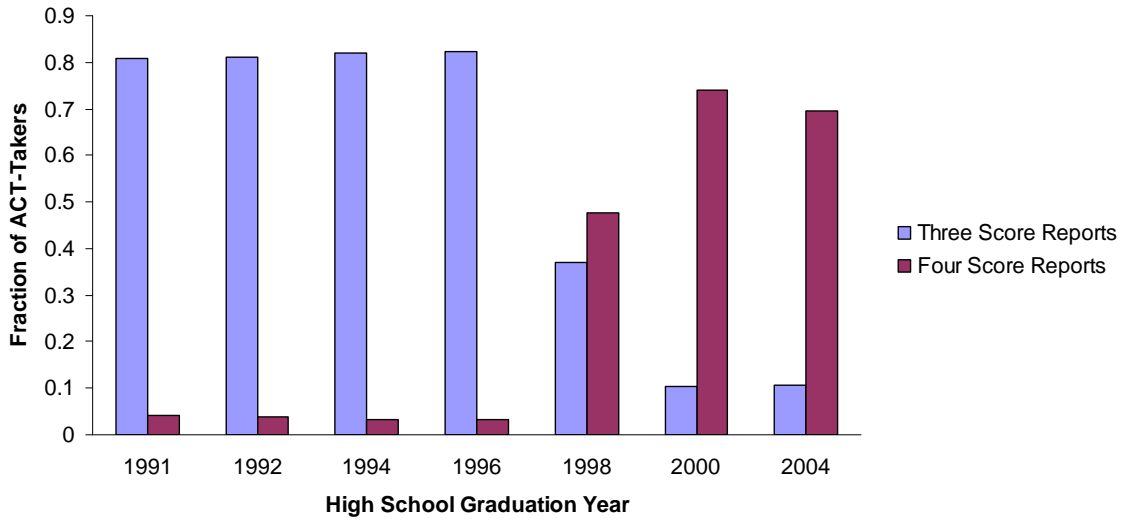
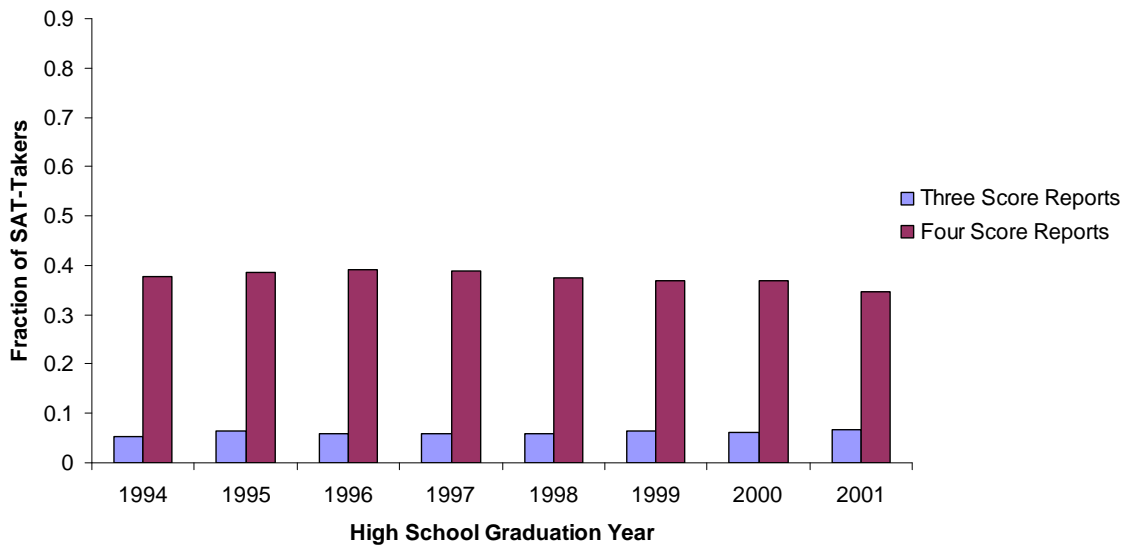
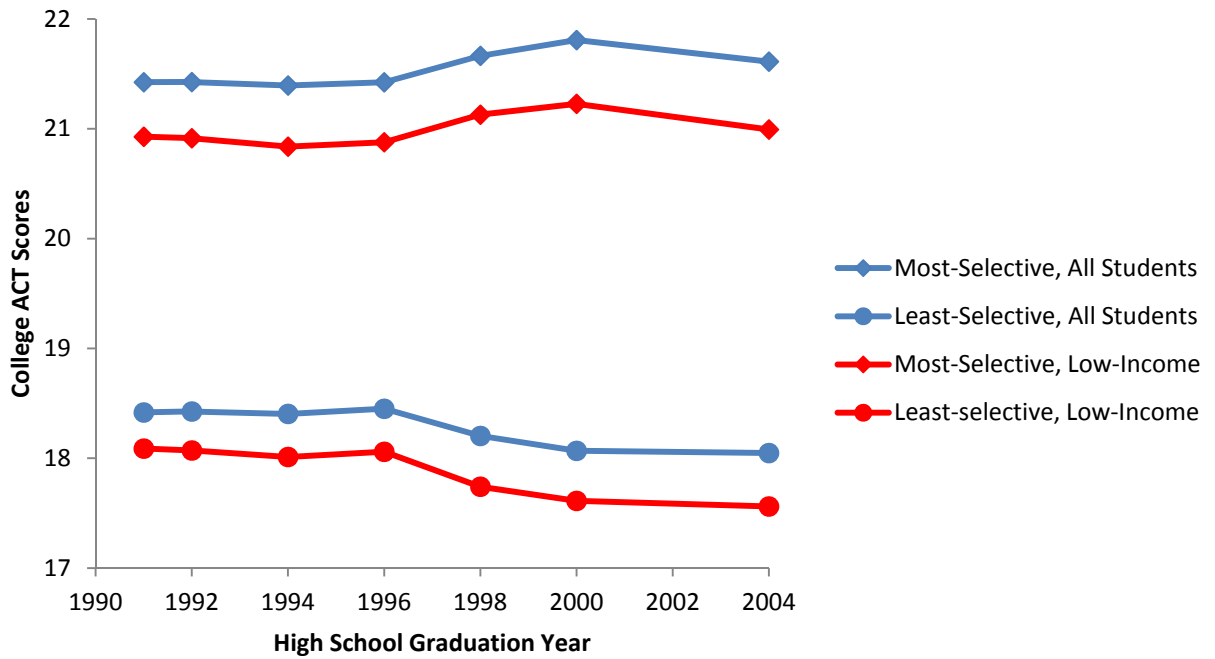


Figure 1b: Students Who Took the SAT



Notes: The bars indicate the fraction of each high school class that sent either exactly three or exactly four score reports. The analysis is limited to students who sent at least one score report. Data in Panel A come from the ACT database and data in Panel B come from a database of SAT-takers produced by the College Board.

Figure 2. Selectivity of Score Reports by High School Graduation Year



Notes: The y-axis measures the 25th percentile ACT scores of incoming freshmen at the most- and least-selective colleges students sent scores to. The data points marked with diamonds show the average selectivity of the most-selective college each student sent scores to. The data points marked with circles show the average selectivity of the least-selective college each student sent scores to. The blue data points include data from all students, while the red data points include data from only low-income students, defined as those with family incomes less than \$36,000 per year. The data come from the ACT database and the American College Survey.

Table 1. Descriptive Statistics from the High School and Entering College Classes of 1996
ACT and AFS Data

	A. ACT Data		B. AFS Data			
	Sent Score Reports	All Students	ACT Only	SAT Only	All ACT-Takers	Non-ACT-Takers
Score Reports/Applications	2.95	2.63	2.67	3.93	3.04	3.74
ACT Score Equivalent	20.9	20.9	22.5	24.4	23.3	24.4
Income < \$36,000	42%	41%				
Income ≥ \$80,000	7%	7%				
Income < \$40,000			34%	29%	31%	31%
Income ≥ \$75,000			25%	36%	29%	34%
H.S. GPA	3.08	3.07	3.27	3.32	3.33	3.26
U.S. Citizen	97%	97%	99%	94%	99%	94%
Female	56%	56%	57%	50%	56%	53%
Caucasian	72%	71%	80%	72%	79%	70%
Black	10%	9%	10%	9%	10%	10%
Asian	3%	3%	2%	8%	2%	7%
Hispanic	5%	5%	2%	4%	2%	5%
Other Race	3%	4%	5%	6%	6%	6%
No Race Given	7%	8%	1%	2%	1%	2%

Notes: Each cell presents the mean of the indicated characteristic for the indicated sample. Panel A uses data from the ACT database on students graduating high school in 1996 while Panel B uses data from the AFS on freshmen starting college in 1996. In the first row of data, Panel A presents the mean number of score reports sent while Panel B presents the mean number of applications sent. "ACT Score Equivalent" is the ACT score of students who took the ACT. For students who only took the SAT, I convert their SAT scores into an ACT score equivalent using a concordance produced by the College Board.

Table 2. Score-Sending and Application Patterns by Family Income in the Class of 1996
ACT and AFS Data

	<u>A. Score-Sending</u>			
Middle-Income	0.084** (0.004)	0.092** (0.004)	0.052** (0.003)	0.028** (0.004)
High-Income	0.194** (0.014)	0.201** (0.014)	0.153** (0.013)	0.112** (0.013)
Constant	2.904** (0.011)	2.864** (0.023)	2.108** (0.370)	2.245** (0.419)
Observations	252,120	252,120	252,120	252,120
R-squared	0.006	0.008	0.028	0.132
	<u>B. Applications</u>			
Middle-Income	0.094** (0.020)	0.219** (0.019)	0.192** (0.019)	
High-Income	0.372** (0.023)	0.504** (0.022)	0.464** (0.022)	
Constant	2.538** (0.015)	2.567** (0.084)	2.473** (0.354)	
Observations	58,968	58,968	58,968	
R-squared	0.008	0.045	0.065	
Demographics	No	Yes	Yes	Yes
High School Performance	No	No	Yes	Yes
High School Fixed Effects	No	No	No	Yes

Notes: Panels A and B display the results of estimating Equation (1) where the dependent variable is the number of score reports sent (Panel A) and the number of applications sent (Panel B).

Regressions in Panel A use data from the ACT and are limited to students in the class of 1996 who sent at least one score report and reported a family income. In this panel, middle-income indicates an annual family income between \$36,000 and \$80,000, high-income indicates a family income of at least \$80,000, and standard errors (in parentheses) are clustered at the state level. Regressions in Panel B use data from the AFS database and are limited to students who took only the ACT, entered college in 1996, and reported a family income. In this panel, middle-income indicates students with family incomes between \$40,000 and \$75,000, high-income indicates family incomes of at least \$75,000, and robust Huber-White standard errors are in parentheses. The first column of each panel adds no controls, the second column adds controls for demographics (listed in footnote 11), the third column adds controls for high school performance (listed in footnote 12), and the fourth column (Panel A only) adds high school fixed effects. When high school fixed effects are added, the control for attending a private high school is dropped. Coefficients on the included covariates are displayed in Appendix Table 1. Two asterisks indicate that the coefficient is significant at the 5% level.

Table 3. College Selectivity by Family Income in the Class of 1996
ACT and AFS Data

		<u>A. Most-Selective College</u>		
Middle-Income	0.888** (0.074)	0.809** (0.040)	0.341** 0.0250	0.076** (0.020)
High-Income	1.365** (0.098)	1.267** (0.069)	0.740** (0.053)	0.350** (0.033)
Constant	20.878** (0.204)	21.878** (0.250)	16.577** (0.939)	16.840** (1.168)
Observations	231,480	231,480	231,480	231,480
R-squared	0.024	0.051	0.232	0.392
		<u>B. Least-Selective College</u>		
Middle-Income	0.616** (0.086)	0.496** (0.054)	0.235** (0.042)	0.036** (0.014)
High-Income	0.910** (0.098)	0.775** (0.085)	0.485** (0.067)	0.206** (0.030)
Constant	18.059** (0.211)	18.774** (0.288)	17.733** (0.961)	17.371** (0.901)
Observations	231,480	231,480	231,480	231,480
R-squared	0.014	0.042	0.119	0.342
		<u>C. College Attended</u>		
Middle-Income	0.698** (0.038)	0.334** (0.027)	0.195** (0.026)	
High-Income	1.082** (0.041)	0.684** (0.030)	0.527** (0.029)	
Constant	18.394** (0.031)	19.402** (0.102)	19.467** (0.519)	
Observations	59,390	59,390	59,390	
R-squared	0.031	0.188	0.272	
Demographics	No	Yes	Yes	Yes
High School Performance	No	No	Yes	Yes
High School Fixed Effects	No	No	No	Yes

Notes: The table displays the results of estimating Equation (1) where the dependent variable is the 25th percentile ACT score of incoming freshmen at the most-selective college a student sent scores to (Panel A), the 25th percentile score of incoming freshmen at the least-selective college a student sent scores to (Panel B), and the median ACT score of incoming freshmen at the college the student attended (Panel C). Regressions in Panels A and B use data from the ACT database and American College Survey and are limited to students in the class of 1996 who sent at least one score report and reported a family income. In this panel, middle-income indicates an annual family income between

\$36,000 and \$80,000, high-income indicates a family income of at least \$80,000, and standard errors (in parentheses) are clustered at the state level. Regressions in Panel C use data from the AFS and are limited to students who took only the ACT, entered college in 1996, and reported a family income. In this panel, middle-income indicates students with family incomes between \$40,000 and \$75,000, high-income indicates family incomes of at least \$75,000, and robust Huber-White standard errors are in parentheses. The first column of each panel adds no controls, the second column adds controls for demographics (listed in footnote 11), the third column adds controls for high school performance (listed in footnote 12), and the fourth column (Panels A and B only) adds high school fixed effects. When high school fixed effects are added, the control for attending a private high school is dropped. Coefficients on the included covariates are displayed in Appendix Table 2. Two asterisks indicate the coefficient is significant at the 5% level.

Table 4. Change in the Number of Scores Sent by Family Income
ACT Data

<u>A. All Students</u>					
Class of 1998	0.440** (0.026)	0.539** (0.029)	0.533** (0.027)	0.502** (0.021)	0.500** (0.021)
Post-1998	0.619** (0.035)	0.804** (0.029)	0.799** (0.026)	0.784** (0.013)	0.783** (0.013)
Constant	2.972** (0.014)	3.021** (0.027)	2.917** (0.032)	2.397** (0.091)	2.420** (0.091)
Observations	2,143,599	2,143,599	2,143,599	2,143,599	2,143,599
R-squared	0.101	0.103	0.112	0.137	0.167
<u>B. Low-Income Students</u>					
Class of 1998	0.508** (0.023)	0.593** (0.027)	0.593** (0.026)	0.561** (0.018)	0.561** (0.019)
Post-1998	0.656** (0.037)	0.810** (0.019)	0.809** (0.019)	0.803** (0.012)	0.801** (0.012)
Constant	2.924** (0.011)	2.962** (0.021)	2.899** (0.032)	2.519** (0.149)	2.542** (0.145)
Observations	819,576	819,576	819,576	819,576	819,576
R-squared	0.130	0.131	0.135	0.163	0.210
Time Trend	No	Yes	Yes	Yes	Yes
Demographics	No	No	Yes	Yes	Yes
High School Performance	No	No	No	Yes	Yes
High School Fixed Effects	No	No	No	No	Yes

Notes: Each panel displays the results of estimating Equation (2) where the dependent variable is the number of score reports a student sent. Data come from the ACT database. Panel A includes all students who sent at least one score report while Panel B includes only low-income students (students with family incomes below \$36,000 per year) who sent at least one score report. Standard errors (in parentheses) are clustered at the state level. The first column of each panel adds no controls, the second column adds a linear time trend, and the third column adds controls for demographics. The demographic controls used in both panels are listed in footnote 11 while Panel A adds the demographic controls for family income listed in footnote 17. The fourth column adds controls for high school performance (listed in footnote 12), and the fifth column adds high school fixed effects. When high school fixed effects are added, the control for attending a private high school is dropped. Coefficients on the included covariates are displayed in Appendix Table 3. Two asterisks indicate the coefficient is significant at the 5% level.

Table 5. Changes in the Selectivity of Score Reports Sent
 ACT Data: Students of All Family Incomes

	<u>A. Range</u>				
Class of 1998	0.469** (0.028)	0.568** (0.033)	0.560** (0.033)	0.549** (0.032)	0.560** (0.034)
Post-1998	0.661** (0.031)	0.845** (0.036)	0.841** (0.035)	0.870** (0.032)	0.893** (0.031)
Constant	2.992** (0.097)	3.042** (0.098)	3.214** (0.145)	1.507** (0.300)	1.310** (0.280)
Observations	1,960,462	1,960,462	1,960,462	1,960,462	1,960,462
R-squared	0.011	0.011	0.019	0.062	0.141
	<u>B. Most-Selective College</u>				
Class of 1998	0.248** (0.021)	0.342** (0.021)	0.322** (0.021)	0.320** (0.025)	0.320** (0.023)
Post-1998	0.294** (0.030)	0.468** (0.026)	0.462** (0.027)	0.520** (0.025)	0.529** (0.026)
Constant	21.417** (0.174)	21.464** (0.173)	22.010** (0.222)	19.222** (0.393)	18.900** (0.222)
Observations	1,960,462	1,960,462	1,960,462	1,960,462	1,960,462
R-squared	0.002	0.002	0.054	0.231	0.331
	<u>C. Least-Selective College</u>				
Class of 1998	-0.221** (0.026)	-0.226** (0.018)	-0.237** (0.0177)	-0.229** (0.019)	-0.240** (0.015)
Post-1998	-0.367** (0.043)	-0.376** (0.024)	-0.379** (0.025)	-0.350** (0.025)	-0.364** (0.023)
Constant	18.425** (0.187)	18.422** (0.189)	18.797** (0.258)	17.716** (0.466)	17.590** (0.298)
Observations	1,960,462	1,960,462	1,960,462	1,960,462	1,960,462
R-squared	0.003	0.003	0.050	0.120	0.291
Time Trend	No	Yes	Yes	Yes	Yes
Demographics	No	No	Yes	Yes	Yes
High School Performance	No	Yes	No	Yes	Yes
High School Fixed Effects	No	Yes	No	No	Yes

Notes: Each panel displays the results of estimating Equation (2). The dependent variable is the difference between the 25th percentile ACT scores of incoming freshmen at the most- and least-selective colleges a student sent scores to (Panel A), the 25th percentile ACT score of incoming freshmen at the most-selective college she sent scores to (Panel B) and the 25th percentile ACT score of incoming freshmen at the least-selective college she sent scores to. Data come from the ACT database and American College Survey.

The regressions include all students who sent a score report to a college for which the ACS has selectivity information. Standard errors (in parentheses) are clustered at the state level. The first column of each panel adds no controls, the second column adds a linear time trend, the third column adds controls for demographics (listed in footnotes 11 and 17), the fourth column adds controls for high school performance (listed in footnote 12), and the fifth column adds high school fixed effects. When high school fixed effects are added, the control for attending a private high school is dropped. Coefficients on the included covariates are displayed in Appendix Table 5. Two asterisks indicate the coefficient is significant at the 5% level.

Table 6. Changes in the Selectivity of Score Reports Sent
ACT Data: Low-Income Students Only

	<u>A. Range</u>				
Class of 1998	0.555** (0.036)	0.639** (0.040)	0.640** (0.040)	0.635** (0.039)	0.652** (0.040)
Post-1998	0.695** (0.041)	0.847** (0.045)	0.844** (0.044)	0.890** (0.040)	0.925** (0.041)
Constant	2.833** (0.107)	2.870** (0.109)	3.216** (0.153)	1.875** (0.550)	1.699** (0.579)
Observations	737,135	737,135	737,135	737,135	737,135
R-squared	0.011	0.012	0.017	0.057	0.161
	<u>B. Most-Selective College</u>				
Class of 1998	0.238** (0.031)	0.370** (0.026)	0.380** (0.027)	0.386** (0.034)	0.383** (0.030)
Post-1998	0.225** (0.042)	0.462** (0.036)	0.484** (0.039)	0.561** (0.034)	0.570** (0.034)
Constant	20.890** (0.192)	20.948** (0.187)	21.911** (0.239)	19.318** (0.518)	18.784** (0.468)
Observations	737,135	737,135	737,135	737,135	737,135
R-squared	0.001	0.002	0.036	0.173	0.302
	<u>C. Least-Selective College</u>				
Class of 1998	-0.317** (0.042)	-0.270** (0.022)	-0.259** (0.021)	-0.249** (0.023)	-0.269** (0.020)
Post-1998	-0.470** (0.063)	-0.385** (0.033)	-0.360** (0.031)	-0.329** (0.030)	-0.355** (0.030)
Constant	18.058** (0.211)	18.078** (0.212)	18.695** (0.295)	17.442** (0.703)	17.085** (0.612)
Observations	737,135	737,135	737,135	737,135	737,135
R-squared	0.005	0.005	0.053	0.100	0.306
Time Trend	No	Yes	Yes	Yes	Yes
Demographics	No	No	Yes	Yes	Yes
High School Performance	No	Yes	No	Yes	Yes
High School Fixed Effects	No	Yes	No	No	Yes

Notes: Each panel displays the results of estimating Equation (2). The dependent variable is the difference between the 25th percentile ACT scores of incoming freshmen at the most- and least-selective colleges a student sent scores to (Panel A), the 25th percentile ACT score of incoming freshmen at the most-selective college she sent scores to (Panel B) and the 25th percentile ACT score of incoming freshmen at the least-selective college she sent scores to. Data come from the ACT database and American College Survey. The regressions include students with family incomes below \$36,000 per year who sent a

score report to a college for which the ACS has selectivity information. Standard errors (in parentheses) are clustered at the state level. The first column of each panel adds no controls, the second column adds a linear time trend, the third column adds controls for demographics (listed in footnote 11), the fourth column adds controls for high school performance (listed in footnote 12), and the fifth column adds high school fixed effects. When high school fixed effects are added, the control for attending a private high school is dropped. Coefficients on the included covariates are displayed in Appendix Table 6. Two asterisks indicate the coefficient is significant at the 5% level.

Table 7. Change in the Number of Applications Sent by Family Income
AFS Data: ACT-Takers Only

<u>A. All Students</u>				
Class of 1998	0.067** (0.009)	0.092** (0.011)	0.107** (0.011)	0.096** (0.011)
Post-1998	0.105** (0.008)	0.137** (0.012)	0.159** (0.012)	0.150** (0.012)
Constant	2.704** (0.003)	2.730** (0.008)	2.756** (0.030)	2.626** (0.188)
Observations	526,554	526,554	526,554	526,554
R-squared	0.001	0.001	0.037	0.056
<u>B. Low-Income Students</u>				
Class of 1998	0.105** (0.017)	0.109** (0.021)	0.120** (0.020)	0.108** (0.020)
Post-1998	0.112** (0.016)	0.116** (0.024)	0.154** (0.022)	0.141** (0.022)
Constant	2.571** (0.006)	2.575** (0.013)	2.747** (0.044)	2.721** (0.370)
Observations	156,477	156,477	156,477	156,477
R-squared	0.001	0.001	0.057	0.075
Time Trends	No	Yes	Yes	Yes
Demographics	No	No	Yes	Yes
High School Performance	No	No	No	Yes
High School Fixed Effects	No	No	No	No

Notes: Each panel displays the results of estimating Equation (2) where the dependent variable is the number of applications a student sent. Data come from the AFS and Panel A includes all students who took only the ACT while Panel B is limited to low-income students (students with family incomes below \$40,000) who took only the ACT. Huber-White standard errors are in parentheses. The first column of each panel adds no controls, the second column adds a linear time trend, and the third column adds controls for demographics. The demographic controls used in both panels are listed in footnote 11 while Panel A adds the demographic controls for family income listed in footnote 17. The fourth column adds controls for high school performance (listed in footnote 12). Coefficients on the included covariates are displayed in Appendix Table 7. Two asterisks indicate the coefficient is significant at the 5% level.

Table 8. Change in the Number of Applications Sent
AFS Data: ACT-Takers and SAT-Takers

		<u>A. All Students</u>		
Class of 1998 × ACT	0.077** (0.012)	0.173** (0.016)	0.144** (0.015)	0.103** (0.015)
Post-1998 × ACT	-0.019 (0.012)	0.105** (0.017)	0.100** (0.017)	0.050** (0.017)
ACT	-1.184** (0.005)	-1.088** (0.011)	-0.990** (0.011)	-1.004** (0.011)
Class of 1998	-0.009 (0.008)	-0.081** (0.011)	-0.042** (0.011)	-0.012 (0.010)
Post-1998	0.124** (0.009)	0.032** (0.012)	0.054** (0.012)	0.099** (0.012)
Constant	3.888** (0.003)	3.817** (0.008)	3.853** (0.016)	3.716** (0.045)
Observations	1,334,605	1,334,605	1,334,605	1,334,605
R-squared	0.092	0.093	0.126	0.153
		<u>B. Low-Income Students</u>		
Class of 1998 × ACT	0.011 (0.025)	0.164** (0.032)	0.108** (0.031)	0.076** (0.030)
Post-1998 × ACT	-0.078** (0.025)	0.116** (0.036)	0.118** (0.035)	0.077** (0.034)
ACT	-0.977** (0.009)	-0.836** (0.019)	-0.811** (0.019)	-0.832** (0.019)
Class of 1998	0.094** (0.018)	-0.055** (0.024)	0.005** (0.023)	0.022** (0.023)
Post-1998	0.190** (0.019)	0.000 (0.027)	0.033 (0.026)	0.060** (0.026)
Constant	3.549** (0.007)	3.411** (0.015)	3.763** (0.026)	3.449** (0.081)
Observations	337,705	337,705	337,705	337,705
R-squared	0.074	0.074	0.117	0.141
Time Trends	No	Yes	Yes	Yes
Demographics	No	No	Yes	Yes
High School Performance	No	No	No	Yes
High School Fixed Effects	No	No	No	No

Notes: Each panel displays the results of estimating Equation (3) where the

dependent variable is the number of applications a student sent. Data come from the AFS and Panel A includes students of all income levels while Panel B is limited to low-income students (students with family incomes below \$40,000). Both panels include students who took either the ACT or SAT, but not both. Huber-White standard errors are in parentheses. The first column of each panel adds no controls, the second column adds a linear time trend and an ACT-specific time trend, and the third column adds controls for demographics. The demographic controls used in both panels are listed in footnote 11 while Panel A adds the demographic controls for family income listed in footnote 17. The fourth column adds controls for high school performance (listed in footnote 12). Coefficients on the included covariates are displayed in Appendix Table 8. Two asterisks indicate the coefficient is significant at the 5% level.

Table 9. Change in the Selectivity of College Attended
AFS Data: ACT-Takers Only

		<u>A. All Students</u>		
Class of 1998	0.200** (0.013)	0.185** (0.018)	0.117** (0.016)	0.071** (0.015)
Post-1998	0.139** (0.011)	0.118** (0.020)	0.041** (0.017)	0.006 (0.016)
Constant	19.076** (0.006)	19.060** (0.012)	19.884** (0.044)	19.074** (0.234)
Observations	522,174	522,174	522,174	522,174
R-squared	0.001	0.001	0.140	0.237
		<u>B. Low-Income Students</u>		
Class of 1998	0.269** (0.025)	0.391** (0.036)	0.318** (0.031)	0.255** (0.030)
Post-1998	0.251** (0.023)	0.406** (0.040)	0.300** (0.034)	0.236** (0.032)
Constant	18.542** (0.010)	18.656** (0.021)	20.136** (0.068)	19.391** (0.464)
Observations	154,603	154,603	154,603	154,603
R-squared	0.002	0.002	0.171	0.250
Time Trends	No	Yes	Yes	Yes
Demographics	No	No	Yes	Yes
High School Performance	No	No	No	Yes
High School Fixed Effects	No	No	No	No

Notes: Each panel displays the results of estimating Equation (2) where the dependent variable is the median ACT score of incoming freshmen at the college a student attended. Data come from the AFS and Panel A includes all students who took only the ACT while Panel B is limited to low-income students (students with family incomes below \$40,000) who took only the ACT. Huber-White standard errors are in parentheses. The first column of each panel adds no controls, the second column adds a linear time trend, the third column adds controls for demographics. The demographic controls used in both panels are listed in footnote 11 while Panel A adds the demographic controls for family income listed in footnote 17. The fourth column adds controls for high school performance (listed in footnote 12). Coefficients on the included covariates are displayed in Appendix Table 9. Two asterisks indicate the coefficient is significant at the 5% level.

Table 10. Change in the Selectivity of College Attended
AFS Data: ACT-Takers and SAT-Takers

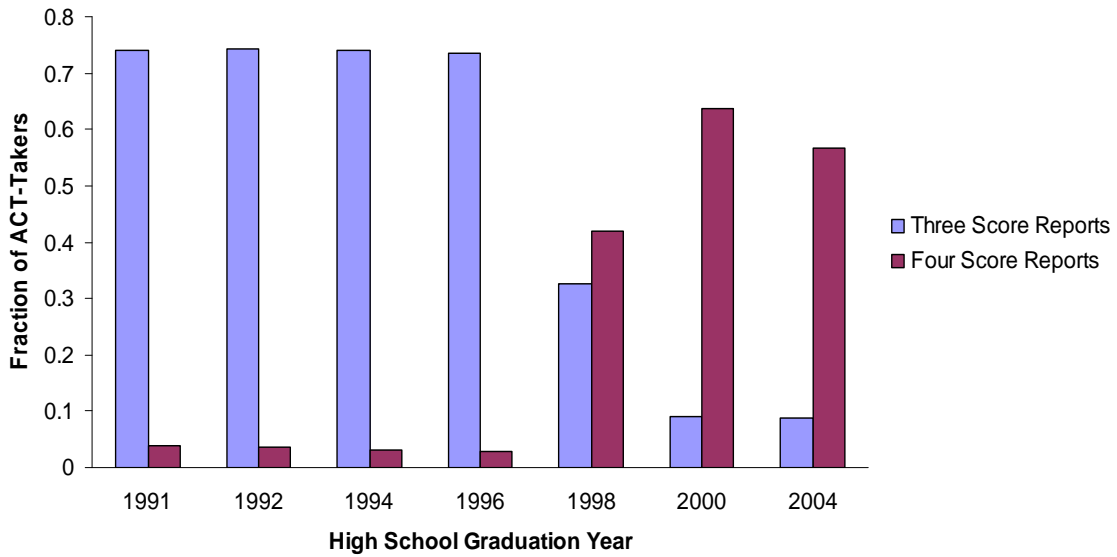
	<u>A. All Students</u>			
Class of 1998 x ACT	0.211** (0.020)	0.317** (0.028)	0.228** (0.024)	-0.028 (0.022)
Post-1998 x ACT	0.340** (0.019)	0.476** (0.030)	0.391** (0.026)	0.025 (0.024)
ACT	-1.821** (0.008)	-1.717** (0.018)	-1.401** (0.017)	-1.699** (0.015)
Class of 1998	-0.011 (0.016)	-0.133** (0.020)	-0.112** (0.018)	0.068** (0.015)
Post-1998	-0.201** (0.015)	-0.358** (0.023)	-0.355** (0.020)	-0.046** (0.017)
Constant	20.897** (0.006)	20.777** (0.013)	21.090** (0.027)	19.230** (0.067)
Observations	1,322,492	1,322,492	1,322,492	1,322,492
R-squared	0.080	0.080	0.196	0.392
	<u>B. Low-Income Students</u>			
Class of 1998 x ACT	0.411** (0.043)	0.506** (0.058)	0.326** (0.049)	0.136** (0.046)
Post-1998 x ACT	0.661** (0.040)	0.783** (0.063)	0.608** (0.054)	0.311** (0.051)
ACT	-1.391** (0.016)	-1.301** (0.032)	-1.171** (0.029)	-1.571** (0.028)
Class of 1998	-0.142** (0.035)	-0.115** (0.045)	-0.013 (0.038)	0.091** (0.034)
Post-1998	-0.410** (0.033)	-0.377** (0.049)	-0.311** (0.043)	-0.104** (0.038)
Constant	19.933** (0.013)	19.957** (0.024)	21.249** (0.043)	19.465** (0.121)
Observations	332,940	332,940	332,940	332,940
R-squared	0.047	0.047	0.182	0.326
Time Trends	No	Yes	Yes	Yes
Demographics	No	No	Yes	Yes
High School Performance	No	No	No	Yes
High School Fixed Effects	No	No	No	No

Notes: Each panel displays the results of estimating Equation (3) where the

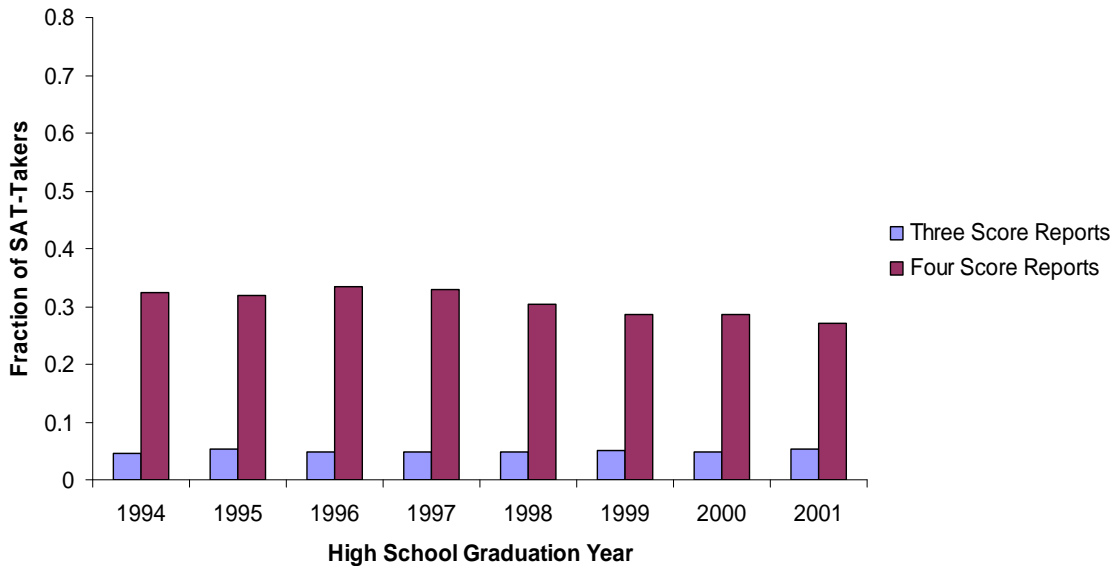
dependent variable is the median ACT score of incoming freshmen at the college a student attended. Data come from the AFS and Panel A includes students of all income levels while Panel B is limited to low-income students (students with family incomes below \$40,000). Both panels include students who took either the ACT or SAT, but not both. Huber-White standard errors are in parentheses. The first column of each panel adds no controls, the second column adds a linear time trend and an ACT-specific time trend, and the third column adds controls for demographics. The demographic controls used in both panels are listed in footnote 11 while Panel A adds the demographic controls for family income listed in footnote 17. The fourth column adds controls for high school performance (listed in footnote 12). Coefficients on the included covariates are displayed in Appendix Table 10. Two asterisks indicate the coefficient is significant at the 5% level.

Appendix Figure 1. Number of Scores Sent by High School Graduation Year
Including Students Who Sent Zero Score Reports

1a: Students Who Took the ACT



1b: Students Who Took the SAT



Notes: The bars indicate the fraction of each high school class that sent either exactly three or exactly four score reports. The analysis is not limited to students who sent at least one score report. Data in Panel A come from the ACT database and data in Panel B come from a database of SAT-takers produced by the College Board.

Appendix Table 1. Coefficients on the Control Variables in Table 2
ACT and AFS Data

	A. Score-Sending			B. Applications	
	(2)	(3)	(4)	(2)	(3)
Race -- Black	0.056** (0.009)	0.127** (0.008)	0.090* (0.008)	1.024** (0.045)	1.117** (0.046)
Race -- Asian	0.128** (0.024)	0.110** (0.022)	0.053** (0.015)	0.507** (0.066)	0.460** (0.065)
Race -- Hispanic	0.042** (0.012)	0.074** (0.011)	0.034** (0.007)	0.512** (0.062)	0.529** (0.062)
Race -- Other	0.014 (0.013)	0.046** (0.011)	0.029** (0.011)	0.097** (0.038)	0.108** (0.037)
No Race Given	0.037** (0.008)	0.043** (0.007)	0.023** (0.006)	0.133 (0.099)	0.140 (0.102)
U.S. Citizen	0.040 (0.024)	0.026 (0.025)	0.028* (0.014)	0.085 (0.087)	0.056 (0.085)
U.S. Citizen -- Missing	0.020 (0.044)	0.050 (0.047)	0.058 (0.044)	0.214* (0.119)	0.189 (0.118)
English	-0.001 (0.013)	-0.026* (0.014)	0.004 (0.009)	-0.272** (0.064)	-0.302** (0.062)
English -- Missing	-0.034** (0.014)	0.001 (0.014)	-0.008 (0.014)	0.368** (0.183)	0.344* (0.178)
Female	-0.028** (0.003)	-0.026** (0.003)	-0.032** (0.003)	-0.103** (0.017)	-0.159** (0.017)
High School GPA		0.008** (0.003)	0.013** (0.002)		-0.039** (0.020)
High School GPA -- Missing		-0.055** (0.020)	-0.031 (0.022)		-0.052 (0.114)
College Credit		-0.025** (0.012)	-0.019** (0.010)		0.149** (0.029)
College Credit -- Missing		-0.019 (0.012)	-0.023* (0.012)		
ACT Score 6		0.591 (0.377)	0.525 (0.426)		2.295** (0.338)
ACT Score 7		0.644* (0.388)	0.390 (0.452)		
ACT Score 8		0.459 (0.422)	0.408 (0.490)		
ACT Score 9		0.195 (0.383)	0.083 (0.448)		
ACT Score 10		0.530 (0.382)	0.399 (0.431)		-1.515** (0.496)
ACT Score 11		0.431 (0.379)	0.306 (0.424)		-1.702** (0.562)
ACT Score 12		0.435 (0.378)	0.318 (0.427)		-0.249 (0.508)
ACT Score 13		0.429 (0.376)	0.309 (0.425)		-0.257 (0.399)
ACT Score 14		0.451 (0.379)	0.333 (0.429)		-0.111 (0.366)
ACT Score 15		0.465 (0.376)	0.342 (0.423)		-0.261 (0.353)
ACT Score 16		0.487 (0.379)	0.361 (0.428)		-0.152 (0.347)

ACT Score 17	0.504 (0.379)	0.377 (0.428)	-0.224 (0.341)
ACT Score 18	0.520 (0.378)	0.384 (0.427)	-0.207 (0.339)
ACT Score 19	0.535 (0.380)	0.398 (0.431)	-0.182 (0.339)
ACT Score 20	0.545 (0.380)	0.405 (0.431)	-0.162 (0.339)
ACT Score 21	0.573 (0.378)	0.430 (0.427)	-0.146 (0.338)
ACT Score 22	0.574 (0.378)	0.426 (0.428)	-0.143 (0.338)
ACT Score 23	0.583 (0.379)	0.432 (0.431)	-0.121 (0.338)
ACT Score 24	0.595 (0.377)	0.441 (0.429)	-0.098 (0.338)
ACT Score 25	0.593 (0.375)	0.439 (0.427)	-0.037 (0.338)
ACT Score 26	0.616 (0.380)	0.461 (0.431)	-0.041 (0.339)
ACT Score 27	0.626* (0.378)	0.465 (0.431)	-0.001 (0.339)
ACT Score 28	0.651* (0.378)	0.487 (0.430)	0.025 (0.339)
ACT Score 29	0.650* (0.374)	0.482 (0.426)	0.153 (0.340)
ACT Score 30	0.668* (0.371)	0.497 (0.422)	0.246 (0.341)
ACT Score 31	0.711* (0.377)	0.542 (0.429)	0.193 (0.343)
ACT Score 32	0.740* (0.378)	0.566 (0.431)	0.214 (0.349)
ACT Score 33	0.702* (0.386)	0.517 (0.438)	0.129 (0.361)
ACT Score 34	0.836** (0.398)	0.654 (0.453)	0.362 (0.409)
ACT Score 35	0.773** (0.387)	0.593 (0.444)	-0.424 (0.494)
ACT Score 36	0.731* (0.412)	0.532 (0.462)	-1.092** (0.464)
Years of English	-0.001 (0.002)	-0.001 (0.002)	
Years of English -- Missing	0.017 (0.043)	0.040 (0.049)	
Honors English	0.026** (0.005)	0.027** (0.005)	
Honors English -- Missing	-0.052 (0.042)	-0.060 (0.044)	
Years of Math	0.019** (0.002)	0.015** (0.002)	
Years of Math -- Missing	0.061 (0.043)	0.031 (0.049)	
Honors Math	0.003 (0.004)	0.004 (0.004)	
Honors Math -- Missing	0.017	0.042	

	(0.041)	(0.039)	
Private School	0.028**		
	(0.009)		
Private School -- Missing	0.110**		
	(0.038)		
College Preparatory Track	0.054**	0.057**	
	(0.007)	(0.005)	
College Preparatory Track -- Missing	0.028	0.044**	
	(0.019)	(0.021)	
Elected to Student Office	0.002	0.023**	
	(0.005)	(0.004)	
Elected to Student Office -- Missing	-0.019	-0.006	
	(0.026)	(0.028)	
Worked on Paper	0.016**	0.022**	
	(0.005)	(0.004)	
Worked on Paper -- Missing	-0.002	-0.015	
	(0.030)	(0.027)	
Varsity Sport	0.049**	0.051**	
	(0.004)	(0.004)	
Varsity Sport -- Missing	0.026	0.036	
	(0.025)	(0.028)	
Part-time Job	0.009**	0.003	
	(0.004)	(0.004)	
Part-time Job -- Missing	-0.049**	-0.039	
	(0.027)	(0.027)	
Drank Beer			0.171**
			(0.019)
Drank Beer -- Missing			0.128
			(0.176)
Smoked Cigarettes			-0.063**
			(0.019)
Smoked Cigarettes -- Missing			-0.201
			(0.195)
Volunteer Work			0.220**
			(0.020)
Volunteer Work -- Missing			0.183
			(0.165)
1+ Hours/Week + on Clubs			0.179**
			(0.018)
1+ Hours/Week on Clubs -- Missing			0.149**
			(0.090)
5+ Hours/Week on Homework			0.231**
			(0.018)
5+ Hours/Week on Homework - Missing			0.084
			(0.096)

Notes: This table displays the coefficients on the covariates in the regressions displayed in Table 2. The column numbers indicate the columns of the associated regressions in each panel of Table 2. (The regression in the first column of each panel in Table 2 is not included because it does not contain any controls.) The omitted race category is Caucasian while the omitted ACT category is students scoring below 6 on the ACT. If a coefficient on

a listed covariate is not displayed, that covariate is not included in the regression. Some ACT score dummies are dropped due to perfect collinearity (few, if any, students earning those scores). Whether a student has college credit is never missing in the AFS database. The dummy for attending a private high school (and the dummy for its being missing) are dropped when high school fixed effects are added. Data come from the ACT and AFS databases. Two asterisks indicate that the coefficient is significant at the 5% level while one asterisk indicates that the coefficient is significant at the 10% level.

Appendix Table 2. Coefficients on the Control Variables in Table 3
ACT and AFS Data

	A. Most-Selective College			B. Least-Selective College			C. College Attended	
	(2)	(3)	(4)	(2)	(3)	(4)	(2)	(3)
Race -- Black	-1.059** (0.246)	-0.131 (0.218)	-0.244** (0.114)	-1.333** (0.286)	-0.756** (0.266)	-0.748** (0.184)	-3.289** (0.075)	-2.412** (0.078)
Race -- Asian	1.452** (0.123)	1.104** (0.107)	0.72** (0.054)	0.841** (0.147)	0.659** (0.138)	0.428** (0.065)	0.536** (0.084)	0.432** (0.079)
Race -- Hispanic	0.401** (0.160)	0.787** (0.146)	0.367** (0.060)	0.447 (0.276)	0.692** (0.263)	0.204** (0.074)	0.161** (0.063)	0.464** (0.063)
Race -- Other	0.110 (0.098)	0.482** (0.075)	0.372** (0.039)	0.057** (0.119)	0.268** (0.107)	0.128** (0.050)	-0.643** (0.053)	-0.516** (0.051)
No Race Given	0.350** (0.050)	0.308** (0.036)	0.145** (0.028)	0.076 (0.063)	0.041 (0.055)	-0.043 (0.040)	-0.130 (0.199)	0.025 (0.177)
U.S. Citizen	-0.412** (0.134)	-0.480** (0.100)	-0.210** (0.059)	-0.290* (0.154)	-0.338** (0.132)	-0.107 (0.068)	-0.323** (0.115)	-0.306** (0.109)
U.S. Citizen -- Missing	-0.123 (0.192)	-0.021 (0.184)	0.016 (0.180)	-0.104 (0.147)	-0.070 (0.141)	-0.114 (0.130)	-0.276* (0.153)	-0.223 (0.145)
English	-0.361** (0.125)	-0.540** (0.139)	-0.234** (0.052)	-0.210** (0.096)	-0.316** (0.095)	-0.140** (0.024)	-0.103 (0.082)	-0.379** (0.077)
English -- Missing	-0.062 (0.086)	0.129 (0.091)	0.074 (0.067)	0.052 (0.081)	0.140* (0.082)	0.135** (0.064)	-0.552** (0.236)	-0.585** (0.219)
Female	-0.328** (0.024)	-0.338** (0.024)	-0.438** (0.027)	-0.150** (0.035)	-0.120** (0.036)	-0.188** (0.033)	-0.002 (0.023)	-0.019 (0.023)
High School GPA		0.238** (0.034)	0.319** (0.022)		0.120** (0.038)	0.170** (0.022)		0.245** (0.025)
High School GPA - - Missing		-0.284** (0.075)	-0.193** (0.083)		-0.028 (0.088)	-0.009 (0.095)		0.681** (0.143)
College Credit		0.165* (0.093)	0.126** (0.047)		0.231** (0.089)	0.125** (0.034)		-0.009** (0.037)
College Credit -- Missing		0.076 (0.055)	0.050 (0.058)		0.066 (0.049)	0.083* (0.043)		
ACT Score 6		6.201** (0.817)	5.799** (1.005)		6.140** (0.821)	6.282** (0.796)		2.047** (0.503)
ACT Score 7		3.423 (4.895)	1.447 (4.818)		-0.594 (2.058)	-1.779 (2.120)		
ACT Score 8		2.506** (1.020)	2.449** (1.099)		-0.171 (1.481)	0.538 (1.356)		
ACT Score 9		1.894 (1.091)	0.899 (1.243)		-0.524 (1.074)	-0.395 (0.961)		
ACT Score 10		1.918** (0.919)	1.547 (1.069)		-0.454 (0.969)	-0.176 (0.777)		-1.360 (1.799)
ACT Score 11		1.697* (0.933)	1.270 (1.043)		-0.719 (0.865)	-0.271 (0.680)		1.630* (0.859)
ACT Score 12		1.834** (0.867)	1.460 (0.967)		-0.525 (0.799)	-0.038 (0.672)		-1.427* (0.824)
ACT Score 13		1.873** (0.889)	1.472 (0.970)		-0.571 (0.835)	-0.110 (0.668)		-2.625** (0.572)
ACT Score 14		1.919** (0.911)	1.458 (1.005)		-0.542 (0.842)	-0.158 (0.666)		-2.428** (0.535)
ACT Score 15		2.057** (0.909)	1.557 (0.995)		-0.460 (0.844)	-0.132 (0.669)		-2.459** (0.518)
ACT Score 16		2.244** (0.913)	1.683* (0.999)		-0.365 (0.857)	-0.086 (0.687)		-2.008** (0.513)
ACT Score 17		2.373** (0.904)	1.766* (0.991)		-0.312 (0.852)	-0.080 (0.681)		-1.800** (0.506)
ACT Score 18		2.515** (0.900)	1.843* (0.987)		-0.196 (0.846)	-0.046 (0.681)		-1.596** (0.504)

ACT Score 19	2.668** (0.891)	1.937** (0.980)	-0.068 (0.841)	0.018 (0.682)	-1.302** (0.503)
ACT Score 20	2.817** (0.906)	2.042** (1.002)	0.024 (0.849)	0.062 (0.703)	-1.203** (0.503)
ACT Score 21	3.052** (0.904)	2.214** (0.998)	0.169 (0.843)	0.144 (0.702)	-0.974* (0.502)
ACT Score 22	3.216** (0.903)	2.337** (0.999)	0.284 (0.834)	0.202 (0.697)	-0.905* (0.503)
ACT Score 23	3.344** (0.898)	2.418** (0.996)	0.410 (0.841)	0.272 (0.712)	-0.742 (0.502)
ACT Score 24	3.567** (0.897)	2.609** (0.994)	0.498 (0.844)	0.345 (0.701)	-0.626 (0.503)
ACT Score 25	3.778** (0.906)	2.780** (1.007)	0.668 (0.850)	0.474 (0.722)	-0.458 (0.503)
ACT Score 26	4.047** (0.895)	3.002** (0.991)	0.849 (0.841)	0.622 (0.708)	-0.340 (0.503)
ACT Score 27	4.407** (0.902)	3.318** (1.004)	1.078 (0.854)	0.788 (0.717)	-0.149 (0.504)
ACT Score 28	4.643** (0.919)	3.549** (1.021)	1.197 (0.853)	0.902 (0.725)	-0.063 (0.504)
ACT Score 29	5.029** (0.890)	3.876** (0.982)	1.496* (0.856)	1.147 (0.725)	0.371 (0.506)
ACT Score 30	5.337** (0.886)	4.128** (0.983)	1.796** (0.841)	1.399* (0.725)	0.487 (0.508)
ACT Score 31	5.862** (0.899)	4.612** (0.998)	2.143** (0.852)	1.696** (0.714)	0.545 (0.511)
ACT Score 32	6.289** (0.872)	5.006** (0.953)	2.394** (0.833)	1.906** (0.689)	0.906 (0.527)
ACT Score 33	6.78** (0.862)	5.445** (0.930)	2.902** (0.838)	2.355** (0.720)	1.153** (0.556)
ACT Score 34	7.436** (0.876)	5.948** (0.944)	3.540** (0.808)	2.909** (0.671)	0.947 (0.616)
ACT Score 35	7.527** (0.859)	6.119** (0.919)	3.899** (0.872)	3.320** (0.753)	-0.341 (0.790)
ACT Score 36	7.809** (1.111)	6.456** (1.134)	3.095* (1.714)	2.376* (1.339)	-0.678 (1.433)
Years of English	-0.069** (0.018)	-0.042** (0.014)	-0.040 (0.026)	-0.022* (0.013)	
Years of English -- Missing	-0.542** (0.191)	-0.202 (0.168)	-0.553** (0.201)	-0.225 (0.155)	
Honors English	0.309** (0.066)	0.306** (0.020)	0.092 (0.074)	0.142** (0.019)	
Honors English -- Missing	0.022 (0.145)	0.083 (0.150)	-0.131 (0.164)	-0.135 (0.146)	
Years of Math	0.163** (0.018)	0.115** (0.010)	0.065** (0.019)	0.034** (0.007)	
Years of Math -- Missing	1.130** (0.204)	0.709** (0.159)	0.528** (0.214)	0.232 (0.183)	
Honors Math	0.260** (0.051)	0.284** (0.027)	0.147** (0.053)	0.182** (0.023)	
Honors Math -- Missing	0.035 (0.159)	0.053 (0.162)	0.146 (0.139)	0.195 (0.128)	
Private School	0.334** (0.070)		0.260** (0.065)		
Private School -- Missing	0.234* (0.141)		0.063 (0.120)		

College Preparatory Track	0.236** (0.047)	0.248** (0.024)	-0.108* (0.058)	-0.012 (0.026)	
College Preparatory Track - Missing	0.155* (0.089)	0.190** (0.071)	-0.099 (0.082)	-0.0218 (0.075)	
Elected to Student Office	-0.086* (0.044)	0.201** (0.022)	-0.0697 (0.049)	0.120** (0.018)	
Elected to Student Office -- Missing	0.075 (0.111)	0.092 (0.110)	-0.022 (0.094)	-0.042 (0.095)	
Worked on Paper	-0.030 (0.035)	0.114** (0.023)	-0.053 (0.036)	0.042* (0.023)	
Worked on Paper - Missing	-0.184* (0.098)	-0.184** (0.081)	-0.0246 (0.111)	-0.013 (0.107)	
Varsity Sport	0.195** (0.047)	0.151** (0.023)	0.125** (0.047)	0.033* (0.019)	
Varsity Sport -- Missing	0.221* (0.123)	0.164 (0.122)	0.229** (0.097)	0.166 (0.101)	
Part-time Job	-0.007 (0.048)	-0.147** (0.018)	0.047 (0.066)	-0.116** (0.018)	
Part-time Job -- Missing	-0.064 (0.115)	-0.105 (0.109)	0.078 (0.125)	0.008 (0.116)	
Drank Beer					0.158** (0.026)
Drank Beer -- Missing					0.527** (0.230)
Smoked Cigarettes					-0.089** (0.026)
Smoked Cigarettes -- Missing					-0.025 (0.221)
Volunteer Work					0.155** (0.025)
Volunteer Work -- Missing					-0.060 (0.200)
1+ Hours/Week + on Clubs					-0.080** (0.023)
1+ Hours/Week on Clubs -- Missing					0.092 (0.127)
5+ Hours/Week on Homework					0.274** (0.025)
5+ Hours/Week on Homework -- Missing					0.190 (0.147)

Notes: This table displays the coefficients on the covariates in the regressions displayed in Table 3. The column numbers

indicate the columns of the associated regressions in each panel of Table 3. (The regression in the first column of each panel in Table 3 is not included because it does not contain any controls.) The omitted race category is Caucasian while the omitted ACT category is students scoring below 6 on the ACT. If a coefficient on a listed covariate is not displayed, that covariate is not included in the regression. Some ACT score dummies are dropped due to perfect collinearity (few, if any, students earning those scores). Whether a student has college credit is never missing in the AFS database. The dummy for attending a private high school (and the dummy for its being missing) are dropped when high school fixed effects are added. Data come from the ACT, ACS, and AFS databases. Two asterisks indicate that the coefficient is significant at the 5% level while one asterisk indicates that the coefficient is significant at the 10% level.

Appendix Table 3. Coefficients on the Control Variables in Table 4
ACT Data

	A. All Students				B. Low-Income Students			
	(2)	(3)	(4)	(5)	(2)	(3)	(4)	(5)
Year	-0.021** (0.007)	-0.023** (0.007)	-0.016** (0.002)	-0.015** (0.002)	-0.017** (0.006)	-0.019** (0.006)	-0.012** (0.001)	-0.012** (0.001)
Race -- Black		0.145** (0.009)	0.225** (0.012)	0.171** (0.008)		0.130** (0.009)	0.199** (0.010)	0.146** (0.006)
Race -- Asian		0.167** (0.029)	0.144** (0.027)	0.094** (0.013)		0.153** (0.026)	0.137** (0.022)	0.085** (0.010)
Race -- Hispanic		0.063** (0.021)	0.107 (0.016)	0.063 (0.007)		0.052** (0.018)	0.094** (0.013)	0.053** (0.007)
Race -- Other		0.033** (0.015)	0.073 (0.011)	0.051 (0.007)		0.024** (0.011)	0.065** (0.009)	0.044** (0.006)
No Race Given		0.010 (0.020)	0.026* (0.015)	0.006 (0.014)		0.020** (0.009)	0.052** (0.008)	0.029** (0.006)
U.S. Citizen		0.043** (0.021)	0.027 (0.022)	0.017** (0.008)		0.025* (0.013)	0.010 (0.013)	0.005 (0.005)
U.S. Citizen -- Missing		-0.058 (0.038)	-0.015 (0.032)	-0.006 (0.021)		-0.011 (0.025)	0.027 (0.024)	0.020 (0.020)
English		0.011 (0.021)	-0.023 (0.017)	0.010 (0.008)		0.019 (0.022)	-0.010 (0.019)	0.022** (0.009)
English -- Missing		-0.0354 (0.023)	0.102** (0.027)	0.115** (0.032)		-0.049** (0.020)	0.025** (0.010)	0.009 (0.008)
Female		-0.010 (0.006)	-0.015** (0.004)	-0.017** (0.004)		-0.011** (0.004)	-0.014** (0.003)	-0.015** (0.003)
Middle-Income ¹		0.068** (0.004)	0.030** (0.002)	0.021** (0.002)				
High-Income ¹		0.161** (0.012)	0.094** (0.006)	0.062** (0.005)				
Income -- Missing		-0.031** (0.007)	-0.029** (0.004)	-0.044** (0.003)				
High School GPA			0.013** (0.002)	0.016** (0.002)			0.014** (0.002)	0.016** (0.001)
High School GPA -- Missing			-0.030** (0.011)	0.018 (0.018)			-0.047** (0.010)	-0.010 (0.012)
College Credit			0.001 (0.013)	0.001 (0.007)			0.008 (0.011)	0.001 (0.007)
College Credit -- Missing			0.017** (0.007)	0.022** (0.008)			0.004 (0.007)	0.001 (0.007)
ACT Score 6			-0.014 (0.250)	0.020 (0.240)			0.297** (0.127)	0.298** (0.121)
ACT Score 7			0.012 (0.156)	-0.026 (0.161)			0.005 (0.250)	-0.003 (0.281)
ACT Score 8			-0.085 (0.139)	-0.131 (0.137)			-0.230 (0.206)	-0.264 (0.204)
ACT Score 9			-0.061 (0.095)	-0.087 (0.097)			-0.125 (0.146)	-0.169 (0.144)
ACT Score 10			-0.066 (0.099)	-0.080 (0.099)			-0.148 (0.150)	-0.170 (0.152)
ACT Score 11			-0.023 (0.098)	-0.029 (0.101)			-0.102 (0.146)	-0.119 (0.149)
ACT Score 12			-0.007 (0.094)	-0.017 (0.097)			-0.105 (0.147)	-0.128 (0.150)
ACT Score 13			0.038 (0.088)	0.032 (0.091)			-0.064 (0.146)	-0.083 (0.148)
ACT Score 14			0.057 (0.087)	0.051 (0.090)			-0.053 (0.147)	-0.072 (0.149)

ACT Score 15	0.085 (0.086)	0.080 (0.088)	-0.036 (0.146)	-0.053 (0.148)
ACT Score 16	0.105 (0.085)	0.100 (0.088)	-0.020 (0.145)	-0.037 (0.148)
ACT Score 17	0.128 (0.085)	0.121 (0.087)	-0.005 (0.146)	-0.022 (0.149)
ACT Score 18	0.149* (0.084)	0.142 (0.087)	0.017 (0.145)	-0.002 (0.148)
ACT Score 19	0.165** (0.084)	0.157* (0.086)	0.031 (0.145)	0.012 (0.149)
ACT Score 20	0.183** (0.083)	0.175** (0.086)	0.046 (0.145)	0.025 (0.148)
ACT Score 21	0.195** (0.083)	0.186** (0.086)	0.049 (0.145)	0.029 (0.148)
ACT Score 22	0.201** (0.084)	0.191** (0.087)	0.056 (0.145)	0.035 (0.148)
ACT Score 23	0.216** (0.083)	0.204** (0.086)	0.067 (0.145)	0.046 (0.149)
ACT Score 24	0.218** (0.085)	0.205** (0.088)	0.062 (0.145)	0.042 (0.148)
ACT Score 25	0.234** (0.085)	0.221** (0.088)	0.085 (0.145)	0.064 (0.149)
ACT Score 26	0.246** (0.085)	0.231** (0.088)	0.088 (0.145)	0.067 (0.148)
ACT Score 27	0.244** (0.086)	0.228** (0.089)	0.089 (0.144)	0.066 (0.147)
ACT Score 28	0.262** (0.086)	0.246** (0.089)	0.099 (0.143)	0.077 (0.146)
ACT Score 29	0.271** (0.086)	0.252** (0.090)	0.110 (0.143)	0.086 (0.146)
ACT Score 30	0.270** (0.086)	0.256** (0.089)	0.120 (0.140)	0.100 (0.144)
ACT Score 31	0.285** (0.086)	0.268** (0.089)	0.123 (0.144)	0.105 (0.148)
ACT Score 32	0.306** (0.089)	0.289** (0.092)	0.144 (0.141)	0.126 (0.145)
ACT Score 33	0.325** (0.087)	0.303** (0.090)	0.187 (0.144)	0.167 (0.148)
ACT Score 34	0.330** (0.088)	0.306** (0.091)	0.130 (0.152)	0.113 (0.155)
ACT Score 35	0.319** (0.092)	0.288** (0.095)	0.159 (0.171)	0.135 (0.177)
ACT Score 36	0.329** (0.107)	0.279** (0.112)	0.576** (0.256)	0.497** (0.224)
Years of English	0.009** (0.003)	0.007** (0.003)	0.010** (0.003)	0.008** (0.002)
Years of English -- Missing	0.181** (0.041)	0.207** (0.048)	0.200** (0.028)	0.214** (0.027)
Honors English	0.031** (0.004)	0.027** (0.003)	0.031** (0.003)	0.026** (0.003)
Honors English -- Missing	0.060** (0.019)	0.065** (0.023)	0.075** (0.028)	0.088** (0.030)
Years of Math	0.018** (0.002)	0.015** (0.001)	0.015** (0.001)	0.014** (0.001)
Years of Math -- Missing	0.070** (0.019)	0.071** (0.023)	0.024 (0.026)	0.031 (0.029)
Honors Math	0.013** (0.003)	0.012** (0.003)	0.017** (0.003)	0.015** (0.002)

Honors Math -- Missing	0.057** (0.019)	0.067** (0.020)	0.045* (0.025)	0.053** (0.025)
Private School	0.028** (0.010)		-0.001 (0.012)	
Private School -- Missing	0.209** (0.044)		0.150** (0.030)	
College Preparatory Track	0.069** (0.007)	0.066** (0.005)	0.065** (0.005)	0.064** (0.004)
College Preparatory Track -- Missing	0.025** (0.009)	0.055** (0.014)	0.023** (0.010)	0.040** (0.010)
Elected to Student Office	0.012** (0.005)	0.026** (0.004)	0.016** (0.005)	0.026** (0.004)
Elected to Student Office -- Missing	-0.408 (0.113)	-0.376** (0.122)	-0.375** (0.085)	-0.355** (0.096)
Worked on Paper	0.022** (0.003)	0.028** (0.003)	0.024** (0.003)	0.030** (0.003)
Worked on Paper -- Missing	0.064** (0.025)	0.047* (0.025)	0.012 (0.022)	0.004 (0.023)
Varsity Sport	0.063** (0.003)	0.069** (0.003)	0.056** (0.004)	0.062** (0.004)
Varsity Sport -- Missing	-0.036** (0.013)	-0.027** (0.013)	-0.056** (0.023)	-0.056** (0.024)
Part-time Job	0.025** (0.004)	0.022** (0.002)	0.029** (0.004)	0.025** (0.002)
Part-time Job -- Missing	-0.120** (0.038)	-0.116** (0.040)	-0.134** (0.034)	-0.138** (0.038)

Notes: This table displays the coefficients on the covariates in the regressions displayed in Table 4. The column numbers indicate the columns of the associated regressions in each panel of Table 4. (The regression in the first column of each panel in Table 4 is not included because it does not contain any controls.) The omitted race category is Caucasian while the omitted ACT category is students scoring below 6 on the ACT. If a coefficient on a listed covariate is not displayed, that covariate is not included in the regression. The dummy for attending a private high school (and the dummy for its being missing) are dropped when high school fixed effects are added. Data come from the ACT database. Two asterisks indicate that the coefficient is significant at the 5% level while one asterisk indicates that the coefficient is significant at the 10% level.

¹ Here, middle-income indicates a family income between \$36,000 and \$60,000, while high-income indicates a family income of at least \$60,000.

Appendix Table 4. Change in the Number of Scores Sent by Family Income
Including Students Who Sent No Score Reports

	(1)	(2)	(3)	(4)	(5)
<u>A. All Students</u>					
Class of 1998	0.310** (0.026)	0.514** (0.021)	0.502** (0.018)	0.455** (0.021)	0.468** (0.021)
Post-1998	0.318** (0.035)	0.702** (0.020)	0.693** (0.017)	0.669** (0.014)	0.674** (0.014)
Constant	2.691** (0.025)	2.795** (0.029)	2.682** (0.048)	1.846** (0.128)	1.875** (0.126)
Observations	2,485,965	2,485,965	2,485,965	2,485,965	2,485,965
R-squared	0.014	0.017	0.046	0.062	0.118
<u>B. Low-Income Students</u>					
Class of 1998	0.411** (0.024)	0.551** (0.021)	0.553** (0.021)	0.516** (0.017)	0.527** (0.018)
Post-1998	0.475** (0.036)	0.732** (0.015)	0.733** (0.015)	0.724** (0.011)	0.724** (0.011)
Constant	2.736** (0.017)	2.799** (0.022)	2.648** (0.042)	1.910** (0.209)	1.967** (0.198)
Observations	891,731	891,731	891,731	891,731	891,731
R-squared	0.037	0.039	0.042	0.063	0.123
Time Trends	No	Yes	Yes	Yes	Yes
Demographics	No	No	Yes	Yes	Yes
High School Performance	No	No	No	Yes	Yes
High School Fixed Effects	No	No	No	No	Yes

Notes: Each panel displays the results of estimating Equation (2) where the dependent variable is the number of score reports a student sent. Data come from the ACT database. Panel A includes all students while Panel B includes only low-income students (students with family incomes below \$36,000 per year). Students who did not send score reports are included. Standard errors (in parentheses) are clustered at the state level. The first column of each panel adds no controls, the second column adds a linear time trend, and the third column adds controls for demographics. The demographic controls used in both panels are listed in footnote 11 while Panel A adds the demographic controls for family income listed in footnote 17. The fourth column adds controls for high school performance (listed in footnote 12), and the fifth column adds high school fixed effects. When high school fixed effects are added, the control for attending a private high school is dropped. Two asterisks indicate the coefficient is significant at the 5% level.

Appendix Table 5. Coefficients on the Control Variables in Table 5
ACT Data: Students of All Family Incomes

	A. Range				B. Most-Selective College				C. Least-Selective College			
	(2)	(3)	(4)	(5)	(2)	(3)	(4)	(5)	(2)	(3)	(4)	(5)
Year	-0.021** (0.004)	-0.029** (0.004)	-0.034** (0.004)	-0.034** (0.003)	-0.020** (0.004)	-0.039** (0.003)	-0.058** (0.004)	-0.046** (0.003)	0.001 (0.004)	-0.010** (0.003)	-0.025** (0.003)	-0.012** (0.002)
Race -- Black		0.438** (0.142)	0.818** (0.153)	0.641** (0.113)		-0.916** (0.223)	0.019** (0.195)	-0.123 (0.095)		-1.354** (0.284)	-0.800** (0.264)	-0.764** (0.177)
Race -- Asian		0.637** (0.107)	0.472** (0.100)	0.329** (0.066)		1.358** (0.118)	1.028** (0.106)	0.698** (0.046)		0.721** (0.156)	0.556** (0.144)	0.369** (0.064)
Race -- Hispanic		-0.080 (0.236)	0.081 (0.237)	0.161** (0.069)		0.401** (0.151)	0.807** (0.139)	0.367** (0.053)		0.481 (0.301)	0.726** (0.294)	0.206** (0.085)
Race -- Other		0.082 (0.118)	0.245** (0.117)	0.279** (0.032)		0.146* (0.078)	0.512** (0.062)	0.383** (0.022)		0.064 (0.108)	0.268** (0.105)	0.104** (0.032)
No Race Given		0.238** (0.050)	0.226** (0.048)	0.153** (0.026)		0.330** (0.045)	0.265** (0.031)	0.136** (0.016)		0.093 (0.068)	0.039 (0.060)	-0.017 (0.035)
U.S. Citizen		-0.099** (0.046)	-0.139** (0.053)	-0.104** (0.025)		-0.374** (0.082)	-0.486** (0.071)	-0.264** (0.039)		-0.275** (0.102)	-0.347** (0.093)	-0.161** (0.038)
U.S. Citizen -- Missing		-0.344** (0.063)	-0.277** (0.064)	-0.175** (0.033)		-0.783** (0.097)	-0.702** (0.101)	-0.344** (0.048)		-0.439** (0.129)	-0.425** (0.126)	-0.169** (0.051)
English		-0.197** (0.082)	-0.262** (0.082)	-0.100** (0.039)		-0.405** (0.104)	-0.547** (0.116)	-0.245** (0.035)		-0.208** (0.111)	-0.284** (0.109)	-0.145** (0.021)
English -- Missing		-0.043 (0.040)	0.099** (0.038)	0.102** (0.024)		0.036 (0.048)	0.129** (0.041)	0.133** (0.017)		0.079** (0.037)	0.030 (0.028)	0.031* (0.017)
Female		-0.173** (0.025)	-0.204** (0.024)	-0.225** (0.022)		-0.335** (0.021)	-0.316** (0.023)	-0.397** (0.021)		-0.162** (0.035)	-0.113** (0.033)	-0.172** (0.029)
Middle-Income ¹		0.216** (0.026)	0.055** (0.022)	0.020** (0.009)		0.519** (0.034)	0.180** (0.023)	0.014 (0.009)		0.303** (0.042)	0.125** (0.033)	-0.006 (0.009)
High-Income ¹		0.499** (0.043)	0.181** (0.038)	0.081** (0.013)		1.314** (0.053)	0.618** (0.038)	0.236** (0.016)		0.815** (0.073)	0.437** (0.056)	0.154** (0.012)
Income -- Missing		0.106** (0.032)	-0.008 (0.026)	-0.048** (0.013)		0.581** (0.033)	0.274** (0.030)	0.067** (0.013)		0.475** (0.046)	0.281** (0.037)	0.114** (0.009)
High School GPA			0.121** (0.019)	0.151** (0.011)			0.231** (0.030)	0.298** (0.019)			0.110** (0.034)	0.147** (0.019)
High School GPA -- Missing			-0.186** (0.033)	-0.114** (0.029)			-0.300** (0.023)	-0.193** (0.027)			-0.114** (0.033)	-0.079** (0.024)
College Credit			-0.011 (0.056)	0.039* (0.021)			0.215** (0.081)	0.141** (0.027)			0.226** (0.086)	0.102** (0.022)
College Credit -- Missing			0.025* (0.015)	0.038** (0.014)			0.040* (0.022)	0.055** (0.014)			0.015 (0.021)	0.017 (0.013)
ACT Score 6			0.058 (0.509)	0.151 (0.554)			0.858 (0.772)	0.142 (0.730)			0.800 (0.677)	-0.009 (0.688)
ACT Score 7			-0.512 (0.621)	-0.558 (0.675)			-0.560 (0.628)	-0.192 (0.631)			-0.049 (0.550)	0.366 (0.597)
ACT Score 8			-0.282 (0.350)	-0.505 (0.350)			-0.332 (0.456)	-0.630* (0.329)			-0.051 (0.307)	-0.125 (0.270)
ACT Score 9			-0.052 (0.283)	-0.177 (0.264)			-0.609** (0.293)	-0.646** (0.227)			-0.557* (0.286)	-0.469* (0.240)
ACT Score 10			-0.131 (0.271)	-0.248 (0.268)			-0.579** (0.258)	-0.493** (0.216)			-0.448** (0.203)	-0.246 (0.225)
ACT Score 11			-0.130 (0.290)	-0.244 (0.283)			-0.499* (0.273)	-0.364* (0.217)			-0.369* (0.197)	-0.120 (0.191)
ACT Score 12			-0.028 (0.267)	-0.145 (0.264)			-0.419* (0.252)	-0.245 (0.194)			-0.391** (0.196)	-0.100 (0.190)
ACT Score 13			0.052 (0.277)	-0.057 (0.274)			-0.332 (0.255)	-0.167 (0.194)			-0.383* (0.201)	-0.109 (0.194)
ACT Score 14			0.080 (0.276)	-0.018 (0.273)			-0.231 (0.252)	-0.088 (0.190)			-0.311 (0.202)	-0.070 (0.193)
ACT Score 15			0.157 (0.275)	0.064 (0.272)			-0.081 (0.248)	0.024 (0.185)			-0.238 (0.204)	-0.040 (0.199)
ACT Score 16			0.217 (0.270)	0.134 (0.269)			0.055 (0.249)	0.120 (0.183)			-0.162 (0.205)	-0.014 (0.197)
ACT Score 17			0.290 (0.267)	0.215 (0.268)			0.211 (0.247)	0.231 (0.178)			-0.078 (0.206)	0.016 (0.200)
ACT Score 18			0.352 (0.268)	0.293 (0.269)			0.368 (0.249)	0.351** (0.175)			0.016 (0.208)	0.059 (0.200)
ACT Score 19			0.399 (0.268)	0.347 (0.269)			0.524** (0.248)	0.457** (0.172)			0.125 (0.209)	0.110 (0.204)
ACT Score 20			0.489* (0.269)	0.446* (0.269)			0.707** (0.249)	0.604** (0.171)			0.218 (0.212)	0.158 (0.203)
ACT Score 21			0.554**	0.518*			0.885**	0.734**			0.331	0.216

	(0.273)	(0.274)	(0.256)	(0.173)	(0.214)	(0.205)
ACT Score 22	0.610**	0.584**	1.074**	0.885**	0.464**	0.301
	(0.272)	(0.274)	(0.261)	(0.170)	(0.217)	(0.205)
ACT Score 23	0.672**	0.644**	1.271**	1.046**	0.599**	0.401*
	(0.275)	(0.276)	(0.267)	(0.172)	(0.218)	(0.206)
ACT Score 24	0.781**	0.753**	1.494**	1.243**	0.714**	0.490**
	(0.277)	(0.278)	(0.272)	(0.173)	(0.217)	(0.203)
ACT Score 25	0.845**	0.818**	1.731**	1.444**	0.887**	0.626**
	(0.285)	(0.286)	(0.279)	(0.175)	(0.225)	(0.208)
ACT Score 26	0.943**	0.914**	2.003**	1.678**	1.060**	0.765**
	(0.285)	(0.287)	(0.290)	(0.177)	(0.230)	(0.205)
ACT Score 27	1.046**	1.025**	2.288**	1.934**	1.242**	0.908**
	(0.291)	(0.293)	(0.297)	(0.183)	(0.235)	(0.209)
ACT Score 28	1.116**	1.095**	2.583**	2.201**	1.467**	1.106**
	(0.291)	(0.291)	(0.301)	(0.182)	(0.241)	(0.208)
ACT Score 29	1.223**	1.199**	2.942**	2.529**	1.719**	1.329**
	(0.291)	(0.293)	(0.310)	(0.183)	(0.248)	(0.208)
ACT Score 30	1.327**	1.295**	3.310**	2.860**	1.984**	1.565**
	(0.293)	(0.292)	(0.316)	(0.193)	(0.251)	(0.207)
ACT Score 31	1.431**	1.398**	3.733**	3.245**	2.302**	1.847**
	(0.295)	(0.296)	(0.326)	(0.198)	(0.264)	(0.211)
ACT Score 32	1.559**	1.530**	4.160**	3.634**	2.601**	2.103**
	(0.294)	(0.296)	(0.323)	(0.190)	(0.265)	(0.200)
ACT Score 33	1.701**	1.679**	4.667**	4.098**	2.966**	2.419**
	(0.309)	(0.308)	(0.318)	(0.193)	(0.274)	(0.221)
ACT Score 34	1.643**	1.611**	5.067**	4.459**	3.424**	2.848**
	(0.320)	(0.320)	(0.333)	(0.200)	(0.297)	(0.235)
ACT Score 35	1.600**	1.571**	5.308**	4.662**	3.708**	3.091**
	(0.318)	(0.319)	(0.362)	(0.208)	(0.334)	(0.225)
ACT Score 36	1.615**	1.627**	5.813**	5.011**	4.198**	3.384**
	(0.453)	(0.467)	(0.399)	(0.290)	(0.395)	(0.346)
Years of English	-0.038**	-0.032**	-0.078**	-0.066**	-0.040**	-0.034**
	(0.016)	(0.006)	(0.014)	(0.007)	(0.019)	(0.007)
Years of English -- Missing	-0.266**	-0.184**	-0.611**	-0.379**	-0.345**	-0.195**
	(0.114)	(0.069)	(0.107)	(0.068)	(0.109)	(0.053)
Honors English	0.224**	0.141**	0.300**	0.259**	0.076	0.118**
	(0.043)	(0.012)	(0.060)	(0.015)	(0.074)	(0.012)
Honors English -- Missing	0.053	0.068	0.001	0.046	-0.052	-0.022
	(0.049)	(0.042)	(0.051)	(0.040)	(0.052)	(0.041)
Years of Math	0.079**	0.069**	0.138**	0.106**	0.059**	0.037**
	(0.009)	(0.007)	(0.015)	(0.007)	(0.018)	(0.006)
Years of Math -- Missing	0.456**	0.45**	0.792**	0.682**	0.337**	0.232**
	(0.086)	(0.068)	(0.144)	(0.072)	(0.149)	(0.064)
Honors Math	0.122**	0.110**	0.252**	0.274**	0.130**	0.163**
	(0.025)	(0.009)	(0.047)	(0.020)	(0.051)	(0.019)
Honors Math -- Missing	-0.009	0.008	-0.087	0.012	-0.078	0.004
	(0.048)	(0.036)	(0.055)	(0.034)	(0.070)	(0.042)
Private School	0.042		0.283**		0.241**	
	(0.058)		(0.068)		(0.066)	
Private School -- Missing	0.245**		0.195**		-0.051	
	(0.045)		(0.040)		(0.044)	
College Preparatory Track	0.324**	0.242**	0.183**	0.220**	-0.141**	-0.023
	(0.039)	(0.015)	(0.043)	(0.021)	(0.057)	(0.025)
College Preparatory Track -- Missing	0.097**	0.116**	0.073**	0.122**	-0.024	0.006
	(0.030)	(0.020)	(0.029)	(0.018)	(0.041)	(0.025)
Elected to Student Office	0.007	0.101**	-0.039	0.216**	-0.046	0.115**
	(0.032)	(0.010)	(0.040)	(0.015)	(0.047)	(0.014)
Elected to Student Office -- Missing	0.084	0.0323	0.474**	0.164**	0.390**	0.132**
	(0.070)	(0.026)	(0.167)	(0.041)	(0.181)	(0.046)
Worked on Paper	0.039**	0.076**	-0.003	0.106**	-0.042	0.030**
	(0.012)	(0.007)	(0.026)	(0.012)	(0.029)	(0.009)
Worked on Paper -- Missing	-0.0533	-0.082**	-0.042	-0.101**	0.012	-0.019
	(0.037)	(0.026)	(0.051)	(0.029)	(0.061)	(0.021)
Varsity Sport	0.087**	0.142**	0.195**	0.155**	0.108**	0.013

	(0.032)	(0.013)		(0.041)	(0.016)		(0.050)	(0.014)
Varsity Sport -- Missing	0.005**	0.022		0.086**	0.017		0.081**	-0.005
	(0.026)	(0.022)		(0.038)	(0.027)		(0.030)	(0.019)
Part-time Job	-0.056	-0.032**		0.044	-0.113**		0.101	-0.081**
	(0.043)	(0.009)		(0.045)	(0.009)		(0.066)	(0.011)
Part-time Job -- Missing	-0.004	-0.017		0.227**	-0.012		0.230**	0.005
	(0.042)	(0.025)		(0.057)	(0.024)		(0.063)	(0.023)

Notes: This table displays the coefficients on the covariates in the regressions displayed in Table 5. The column numbers indicate the columns of the associated regressions in each panel of Table 5. (The regression in the first column of each panel in Table 5 is not included because it does not contain any controls.) The omitted race category is Caucasian while the omitted ACT category is students scoring below 6 on the ACT. The dummy for attending a private high school (and the dummy for its being missing) are dropped when high school fixed effects are added. Data come from the ACT and ACS databases. Two asterisks indicate that the coefficient is significant at the 5% level while one asterisk indicates that the coefficient is significant at the 10% level.

¹ Here, middle-income indicates a family income between \$36,000 and \$60,000, while high-income indicates a family income of at least \$60,000.

Appendix Table 6. Coefficients on the Control Variables in Table 6
ACT Data: Low-Income Students Only

	A. Range				B. Most-Selective College				C. Least-Selective College			
	(2)	(3)	(4)	(5)	(2)	(3)	(4)	(5)	(2)	(3)	(4)	(5)
Year	-0.017** (0.005)	-0.020** (0.005)	-0.026** (0.005)	-0.029** (0.004)	-0.027** (0.007)	-0.024** (0.005)	-0.042** (0.005)	-0.031** (0.004)	-0.010 (0.007)	-0.004 (0.005)	-0.017 (0.005)	-0.003 (0.002)
Race -- Black		0.382** (0.159)	0.749** (0.172)	0.573** (0.122)		-1.012** (0.260)	-0.120 (0.227)	-0.249** (0.108)		-1.394** (0.321)	-0.869** (0.300)	-0.822** (0.202)
Race -- Asian		0.554** (0.128)	0.432** (0.124)	0.294** (0.066)		1.182** (0.114)	1.008** (0.103)	0.602** (0.050)		0.628** (0.161)	0.576** (0.152)	0.308** (0.069)
Race -- Hispanic		-0.181 (0.268)	-0.019 (0.271)	0.114 (0.071)		0.397** (0.153)	0.805** (0.146)	0.303** (0.052)		0.578* (0.338)	0.824** (0.332)	0.189** (0.086)
Race -- Other		0.014 (0.131)	0.198 (0.133)	0.260** (0.039)		0.105 (0.091)	0.513** (0.070)	0.346** (0.025)		0.091 (0.129)	0.315** (0.124)	0.086** (0.038)
No Race Given		0.196** (0.070)	0.281** (0.077)	0.197** (0.047)		0.120 (0.078)	0.295** (0.057)	0.110** (0.031)		-0.076 (0.117)	0.014 (0.102)	-0.087 (0.070)
U.S. Citizen		-0.134** (0.048)	-0.161** (0.057)	-0.093** (0.029)		-0.410** (0.100)	-0.487** (0.084)	-0.238** (0.044)		-0.276** (0.117)	-0.326** (0.111)	-0.145** (0.036)
U.S. Citizen -- Missing		-0.268** (0.077)	-0.082 (0.078)	-0.066 (0.074)		-0.647** (0.078)	-0.327** (0.071)	-0.181** (0.046)		-0.379** (0.104)	-0.245** (0.096)	-0.116 (0.078)
English		-0.181** (0.103)	-0.247** (0.097)	-0.052 (0.041)		-0.295** (0.114)	-0.446** (0.127)	-0.162** (0.031)		-0.114 (0.140)	-0.199 (0.137)	-0.110** (0.027)
English -- Missing		0.006 (0.066)	0.118* (0.066)	0.037 (0.030)		0.074 (0.077)	0.231** (0.077)	0.107** (0.037)		0.067 (0.082)	0.113 (0.074)	0.070** (0.026)
Female		-0.196** (0.024)	-0.217** (0.024)	-0.244** (0.019)		-0.379** (0.023)	-0.339** (0.027)	-0.425** (0.024)		-0.183** (0.032)	-0.123** (0.036)	-0.180** (0.027)
High School GPA			0.110** (0.018)	0.145** (0.011)			0.211** (0.030)	0.270** (0.018)			0.101** (0.033)	0.126** (0.016)
High School GPA -- Missing			-0.212** (0.049)	-0.126** (0.045)			-0.328** (0.044)	-0.204** (0.040)			-0.116** (0.045)	-0.078** (0.032)
College Credit			-0.007 (0.068)	0.026 (0.022)			0.252** (0.089)	0.150** (0.032)			0.258** (0.096)	0.124** (0.023)
College Credit -- Missing			0.023 (0.030)	0.011 (0.026)			0.072** (0.033)	0.049** (0.019)			0.049 (0.037)	0.038 (0.024)
ACT Score 6			0.586 (0.800)	0.587 (0.821)			1.658 (1.154)	1.094 (1.006)			1.073 (1.579)	0.506 (1.501)
ACT Score 7			-0.273 (1.144)	-0.215 (1.244)			-0.326 (0.929)	0.096 (1.134)			-0.053 (0.870)	0.311 (1.054)
ACT Score 8			-0.974 (0.622)	-1.255 (0.592)			-0.368 (0.698)	-0.534 (0.636)			0.606 (0.647)	0.721 (0.757)
ACT Score 9			-0.465 (0.521)	-0.651 (0.533)			-0.743 (0.477)	-0.686 (0.475)			-0.278 (0.493)	-0.035 (0.497)
ACT Score 10			-0.519 (0.552)	-0.724 (0.592)			-0.707 (0.444)	-0.484 (0.523)			-0.187 (0.558)	0.240 (0.597)
ACT Score 11			-0.563 (0.535)	-0.760 (0.571)			-0.675 (0.435)	-0.429 (0.496)			-0.111 (0.530)	0.331 (0.550)
ACT Score 12			-0.428 (0.529)	-0.650 (0.565)			-0.553 (0.433)	-0.271 (0.485)			-0.125 (0.540)	0.379 (0.555)
ACT Score 13			-0.347 (0.540)	-0.552 (0.578)			-0.488 (0.436)	-0.219 (0.490)			-0.141 (0.555)	0.333 (0.563)
ACT Score 14			-0.314 (0.544)	-0.509 (0.578)			-0.384 (0.443)	-0.129 (0.490)			-0.070 (0.560)	0.380 (0.560)
ACT Score 15			-0.240 (0.540)	-0.431 (0.575)			-0.237 (0.444)	-0.023 (0.483)			0.003 (0.566)	0.407 (0.564)
ACT Score 16			-0.196 (0.538)	-0.374 (0.576)			-0.115 (0.446)	0.061 (0.481)			0.081 (0.570)	0.435 (0.566)
ACT Score 17			-0.115 (0.535)	-0.290 (0.573)			0.052 (0.444)	0.174 (0.474)			0.167 (0.571)	0.463 (0.564)
ACT Score 18			-0.048 (0.540)	-0.214 (0.576)			0.214 (0.444)	0.297 (0.468)			0.262 (0.576)	0.510 (0.565)
ACT Score 19			0.003 (0.539)	-0.151 (0.576)			0.383 (0.441)	0.411 (0.464)			0.380 (0.575)	0.562 (0.564)
ACT Score 20			0.075 (0.542)	-0.068 (0.578)			0.532 (0.445)	0.528 (0.463)			0.457 (0.581)	0.596 (0.565)
ACT Score 21			0.111 (0.545)	-0.022 (0.582)			0.688 (0.446)	0.636 (0.459)			0.577 (0.583)	0.658 (0.565)
ACT Score 22			0.182 (0.542)	0.057 (0.580)			0.878** (0.445)	0.789* (0.456)			0.696 (0.577)	0.732 (0.560)
ACT Score 23			0.231 (0.545)	0.108 (0.585)			1.049** (0.449)	0.930** (0.461)			0.818 (0.574)	0.823 (0.559)
ACT Score 24			0.306	0.190			1.263**	1.124**			0.957*	0.934*

	(0.551)	(0.588)	(0.446)	(0.453)	(0.577)	(0.558)
ACT Score 25	0.378	0.263	1.472**	1.30**	1.093*	1.036*
	(0.550)	(0.591)	(0.446)	(0.455)	(0.575)	(0.556)
ACT Score 26	0.466	0.359	1.712**	1.514**	1.246**	1.154**
	(0.561)	(0.601)	(0.447)	(0.452)	(0.581)	(0.560)
ACT Score 27	0.601	0.504	2.004**	1.758**	1.403**	1.254**
	(0.563)	(0.600)	(0.458)	(0.461)	(0.579)	(0.557)
ACT Score 28	0.644	0.523	2.249**	1.964**	1.605**	1.442**
	(0.557)	(0.598)	(0.457)	(0.459)	(0.577)	(0.557)
ACT Score 29	0.843	0.740	2.637**	2.339**	1.794**	1.599**
	(0.566)	(0.600)	(0.475)	(0.467)	(0.590)	(0.557)
ACT Score 30	0.987*	0.854	2.978**	2.646**	1.991**	1.792**
	(0.563)	(0.598)	(0.469)	(0.462)	(0.585)	(0.560)
ACT Score 31	1.062*	0.949	3.386**	3.034**	2.325**	2.085**
	(0.562)	(0.595)	(0.485)	(0.488)	(0.576)	(0.555)
ACT Score 32	1.380*	1.243*	3.943**	3.529**	2.564**	2.286**
	(0.559)	(0.599)	(0.494)	(0.487)	(0.578)	(0.543)
ACT Score 33	1.344*	1.202**	4.402**	3.902**	3.058**	2.699**
	(0.596)	(0.613)	(0.509)	(0.503)	(0.612)	(0.555)
ACT Score 34	1.216**	1.113*	4.724**	4.224**	3.508**	3.11**
	(0.591)	(0.627)	(0.480)	(0.480)	(0.673)	(0.636)
ACT Score 35	1.088*	0.949	5.223**	4.704**	4.135**	3.755**
	(0.630)	(0.693)	(0.657)	(0.616)	(0.684)	(0.643)
ACT Score 36	2.209**	2.020*	6.515**	5.978**	4.306**	3.958**
	(1.043)	(1.134)	(0.788)	(0.664)	(1.007)	(0.987)
Years of English	-0.032**	-0.028**	-0.069**	-0.061**	-0.038**	-0.033**
	(0.014)	(0.007)	(0.015)	(0.007)	(0.017)	(0.005)
Years of English -- Missing	-0.194	-0.126	-0.648**	-0.421**	-0.455**	-0.295**
	(0.129)	(0.091)	(0.101)	(0.082)	(0.132)	(0.075)
Honors English	0.236**	0.141**	0.308**	0.234**	0.073	0.093**
	(0.043)	(0.014)	(0.065)	(0.018)	(0.080)	(0.013)
Honors English -- Missing	0.123	0.0781	-0.044	-0.004	-0.166**	-0.082
	(0.088)	(0.083)	(0.079)	(0.073)	(0.077)	(0.066)
Years of Math	0.081**	0.070**	0.127**	0.103**	0.046**	0.033**
	(0.011)	(0.007)	(0.018)	(0.008)	(0.021)	(0.007)
Years of Math -- Missing	0.422**	0.421**	0.674**	0.644**	0.253	0.223**
	(0.086)	(0.070)	(0.162)	(0.089)	(0.168)	(0.063)
Honors Math	0.145**	0.130**	0.260**	0.280**	0.115*	0.150**
	(0.029)	(0.011)	(0.058)	(0.026)	(0.062)	(0.024)
Honors Math -- Missing	-0.051	0.023	-0.041	0.098	0.010	0.075
	(0.091)	(0.089)	(0.073)	(0.071)	(0.098)	(0.072)
Private School	0.066		0.305**		0.240**	
	(0.074)		(0.085)		(0.074)	
Private School -- Missing	0.273**		0.205**		-0.068	
	(0.085)		(0.073)		(0.069)	
College Preparatory Track	0.338**	0.267**	0.186**	0.252	-0.152**	-0.015
	(0.045)	(0.016)	(0.051)	(0.024)	(0.063)	(0.023)
College Preparatory Track -- Missing	0.035	0.050	0.025**	0.072**	-0.010	0.023
	(0.045)	(0.033)	(0.043)	(0.026)	(0.050)	(0.033)
Elected to Student Office	-0.006	0.110**	-0.097**	0.172**	-0.091*	0.062**
	(0.035)	(0.013)	(0.045)	(0.019)	(0.052)	(0.016)
Elected to Student Office -- Missing	0.049	-0.021	0.472**	0.106**	0.423**	0.128**
	(0.084)	(0.041)	(0.171)	(0.043)	(0.207)	(0.054)
Worked on Paper	0.037**	0.090**	-0.018	0.106**	-0.055**	0.017
	(0.013)	(0.009)	(0.031)	(0.014)	(0.031)	(0.013)
Worked on Paper -- Missing	-0.060	-0.062	-0.013	-0.076	0.047	-0.014
	(0.062)	(0.064)	(0.052)	(0.058)	(0.051)	(0.042)
Varsity Sport	0.071*	0.158**	0.188**	0.138**	0.117*	-0.020
	(0.038)	(0.015)	(0.051)	(0.019)	(0.061)	(0.017)
Varsity Sport -- Missing	0.049	0.040	0.164**	0.045	0.115*	0.005
	(0.065)	(0.061)	(0.058)	(0.048)	(0.063)	(0.052)
Part-time Job	-0.031	-0.023**	0.141**	-0.082**	0.172**	-0.059**
	(0.050)	(0.010)	(0.053)	(0.012)	(0.077)	(0.012)

Part-time Job --						
Missing	-0.017	-0.040	0.310**	-0.003	0.327**	0.036
	(0.068)	(0.045)	(0.082)	(0.047)	(0.099)	(0.045)

Notes: This table displays the coefficients on the covariates in the regressions displayed in Table 6. The column numbers indicate the columns of the associated regressions in each panel of Table 6. (The regression in the first column of each panel in Table 6 is not included because it does not contain any controls.) The omitted race category is Caucasian while the omitted ACT category is students scoring below 6 on the ACT. The dummy for attending a private high school (and the dummy for its being missing) are dropped when high school fixed effects are added. Data come from the ACT and ACS databases. Two asterisks indicate that the coefficient is significant at the 5% level while one asterisk indicates that the coefficient is significant at the 10% level.

Appendix Table 7. Coefficients on the Control Variables in Table 7
AFS Data: ACT-Takers Only

	A. All Students			B. Low-Income Students		
	(2)	(3)	(4)	(2)	(3)	(4)
Year	-0.007** (0.002)	-0.014** (0.002)	-0.015** (0.002)	-0.001 (0.004)	-0.002 (0.003)	-0.004 (0.003)
Race -- Black		0.947** (0.013)	1.057** (0.013)		1.017** (0.017)	1.100** (0.018)
Race -- Asian		0.415** (0.021)	0.386** (0.020)		0.301** (0.035)	0.291** (0.035)
Race -- Hispanic		0.357** (0.021)	0.399** (0.021)		0.380** (0.030)	0.426** (0.030)
Race -- Other		0.142** (0.015)	0.161** (0.014)		0.179** (0.023)	0.206** (0.022)
No Race Given		0.204** (0.032)	0.234** (0.033)		0.348** (0.075)	0.383** (0.075)
U.S. Citizen		-0.076** (0.030)	-0.078** (0.030)		-0.010** (0.045)	-0.094** (0.045)
U.S. Citizen -- Missing		0.039 (0.042)	0.035 (0.042)		-0.075 (0.068)	-0.074 (0.067)
English		-0.203** (0.021)	-0.236** (0.021)		-0.233** (0.033)	-0.248** (0.033)
English -- Missing		-0.061 (0.044)	-0.078* (0.044)		-0.013 (0.077)	-0.003 (0.077)
Female		-0.083** (0.006)	-0.144** (0.006)		-0.095** (0.010)	-0.158** (0.011)
Middle-Income ¹		0.207** (0.007)	0.179** (0.007)			
High-Income ¹		0.503** (0.008)	0.458** (0.008)			
Income -- Missing		0.229** (0.012)	0.225** (0.011)			
High School GPA			-0.029** (0.007)			0.015 (0.011)
High School GPA -- Missing			-0.109** (0.040)			-0.042 (0.068)
College Credit			0.135** (0.010)			0.239** (0.018)
ACT Score 6			-0.915** (0.426)			-1.287** (0.493)
ACT Score 7			1.791** (0.767)			
ACT Score 8			0.0459 (0.545)			
ACT Score 9			-0.684 (0.541)			-0.947 (0.736)
ACT Score 10			-0.086 (0.440)			-0.253 (0.836)
ACT Score 11			-0.486 (0.298)			-0.881** (0.421)
ACT Score 12			-0.459** (0.225)			-0.696* (0.400)
ACT Score 13			-0.295 (0.198)			-0.353 (0.375)

ACT Score 14	-0.357*	(0.189)	-0.533	(0.368)
ACT Score 15	-0.316*	(0.187)	-0.459	(0.367)
ACT Score 16	-0.281	(0.186)	-0.459	(0.366)
ACT Score 17	-0.272	(0.185)	-0.431	(0.365)
ACT Score 18	-0.209	(0.185)	-0.391	(0.365)
ACT Score 19	-0.187	(0.184)	-0.352	(0.365)
ACT Score 20	-0.195	(0.184)	-0.400	(0.365)
ACT Score 21	-0.169	(0.184)	-0.370	(0.365)
ACT Score 22	-0.187	(0.184)	-0.421	(0.365)
ACT Score 23	-0.180	(0.184)	-0.403	(0.365)
ACT Score 24	-0.140	(0.184)	-0.370	(0.365)
ACT Score 25	-0.109	(0.184)	-0.355	(0.365)
ACT Score 26	-0.096	(0.184)	-0.350	(0.365)
ACT Score 27	-0.071	(0.184)	-0.310	(0.365)
ACT Score 28	-0.027	(0.185)	-0.309	(0.365)
ACT Score 29	0.038	(0.185)	-0.234	(0.366)
ACT Score 30	0.053	(0.185)	-0.187	(0.366)
ACT Score 31	0.101	(0.185)	-0.125	(0.367)
ACT Score 32	0.109	(0.186)	-0.175	(0.369)
ACT Score 33	0.208	(0.190)	-0.055	(0.376)
ACT Score 34	0.244	(0.199)	-0.158	(0.404)
ACT Score 35	-0.172	(0.263)	-0.850*	(0.479)
ACT Score 36	-0.575**	(0.272)	-0.571	(0.471)
Drank Beer	0.186**	(0.006)	0.111**	(0.011)
Drank Beer -- Missing	0.107**	(0.052)	0.003	(0.104)
Smoked Cigarettes	-0.045**	(0.007)	-0.033**	(0.013)
Smoked Cigarettes -- Missing	0.074	(0.057)	0.068	(0.101)

Volunteer Work	0.238** (0.007)	0.244** (0.012)
Volunteer Work -- Missing	0.039 (0.044)	0.036 (0.082)
1+ Hours/Week + on Clubs	0.190** (0.006)	0.183** (0.011)
1+ Hours/Week on Clubs -- Missing	0.053* (0.028)	0.018 (0.051)
5+ Hours/Week on Homework	0.223** (0.006)	0.166** (0.011)
5+ Hours/Week on Homework -- Missing	0.104** (0.031)	0.071 (0.056)

Notes: This table displays the coefficients on the covariates in the regressions displayed in Table 7. The column numbers indicate the columns of the associated regressions in each panel of Table 7. (The regression in the first column of each panel in Table 7 is not included because it does not contain any controls.) The omitted race category is Caucasian while the omitted ACT category is students scoring below 6 on the ACT. If a coefficient on a listed covariate is not displayed, that covariate is not included in the regression. Some ACT score dummies are dropped due to perfect collinearity (few, if any, students earning those scores). Data come from the AFS database. Two asterisks indicate that the coefficient is significant at the 5% level while one asterisk indicates that the coefficient is significant at the 10% level.

¹ Here, middle-income indicates a family income between \$40,000 and \$75,000, while high-income indicates a family income of at least \$75,000.

Appendix Table 8. Coefficients on the Control Variables in Table 8
AFS Data: ACT-Takers and SAT-Takers

	A. All Students			B. Low-Income Students		
	(2)	(3)	(4)	(2)	(3)	(4)
Year x ACT	-0.027** (0.003)	-0.020** (0.003)	0.005* (0.003)	-0.042** (0.005)	-0.017** (0.005)	-0.003 (0.005)
Year	0.020** (0.002)	0.000 (0.002)	-0.021** (0.002)	0.041** (0.004)	0.014** (0.004)	0.000 (0.004)
Race -- Black		0.683** (0.009)	0.855** (0.009)		0.824** (0.013)	0.963** (0.014)
Race -- Asian		0.728** (0.011)	0.642** (0.011)		0.694** (0.021)	0.644** (0.021)
Race -- Hispanic		0.296** (0.013)	0.362** (0.013)		0.403** (0.020)	0.471** (0.020)
Race -- Other		0.222** (0.010)	0.223** (0.010)		0.295** (0.017)	0.312** (0.017)
No Race Given		0.212** (0.020)	0.220** (0.021)		0.327** (0.054)	0.354** (0.054)
U.S. Citizen		-0.163** (0.015)	-0.175** (0.015)		-0.223** (0.023)	-0.221** (0.023)
U.S. Citizen -- Missing		-0.139** (0.024)	-0.134** (0.024)		-0.205** (0.044)	-0.199** (0.043)
English		-0.272** (0.012)	-0.323** (0.012)		-0.315** (0.020)	-0.348** (0.020)
English -- Missing		-0.116** (0.029)	-0.152** (0.029)		-0.104* (0.055)	-0.118** (0.055)
Female		-0.043** (0.004)	-0.067** (0.004)		-0.071** (0.008)	-0.102** (0.008)
Middle-Income ¹		0.225** (0.005)	0.174** (0.005)			
High-Income ¹		0.719** (0.006)	0.580** (0.006)			
Income -- Missing		0.394** (0.008)	0.346** (0.008)			
High School GPA			-0.138** (0.005)			-0.069** (0.009)
High School GPA -- Missing			-0.463** (0.027)			-0.265** (0.050)
College Credit			0.108** (0.008)			0.203** (0.015)
ACT Score 6			-0.705* (0.364)			-0.919** (0.269)
ACT Score 7			1.846** (0.628)			
ACT Score 8			0.498 (0.507)			
ACT Score 9			-0.441 (0.534)			-0.617 (0.609)
ACT Score 10			-0.185 (0.126)			-0.208 (0.169)
ACT Score 11			-0.099 (0.184)			-0.237 (0.216)
ACT Score 12			-0.176** (0.081)			-0.210* (0.114)

ACT Score 13	-0.113** (0.055)	-0.048 (0.087)
ACT Score 14	-0.129** (0.048)	-0.078 (0.080)
ACT Score 15	-0.106** (0.044)	-0.037 (0.077)
ACT Score 16	-0.054 (0.042)	-0.046 (0.076)
ACT Score 17	-0.036 (0.041)	-0.026 (0.074)
ACT Score 18	0.014 (0.041)	0.021 (0.074)
ACT Score 19	0.022 (0.040)	0.037 (0.074)
ACT Score 20	0.022 (0.040)	0.025 (0.074)
ACT Score 21	0.071* (0.040)	0.061 (0.073)
ACT Score 22	0.087** (0.040)	0.045 (0.074)
ACT Score 23	0.111** (0.040)	0.079 (0.074)
ACT Score 24	0.138** (0.040)	0.104 (0.074)
ACT Score 25	0.204** (0.040)	0.146** (0.074)
ACT Score 26	0.243** (0.040)	0.200** (0.074)
ACT Score 27	0.287** (0.040)	0.248** (0.075)
ACT Score 28	0.369** (0.040)	0.296** (0.075)
ACT Score 29	0.448** (0.041)	0.379** (0.075)
ACT Score 30	0.558** (0.041)	0.487** (0.077)
ACT Score 31	0.661** (0.041)	0.617** (0.077)
ACT Score 32	0.776** (0.042)	0.730** (0.080)
ACT Score 33	0.876** (0.043)	0.887** (0.087)
ACT Score 34	0.923** (0.048)	1.001** (0.112)
ACT Score 35	0.886** (0.060)	0.976** (0.165)
ACT Score 36	0.588** (0.100)	0.392 (0.253)
Drank Beer	0.322** (0.005)	0.225** (0.009)
Drank Beer -- Missing	0.178** (0.034)	0.069 (0.071)
Smoked Cigarettes	-0.079** (0.005)	-0.058** (0.010)

Smoked Cigarettes -- Missing	0.060 (0.037)	0.071 (0.075)
Volunteer Work	0.252** (0.005)	0.258** (0.009)
Volunteer Work -- Missing	0.053* (0.030)	0.086 (0.062)
1+ Hours/Week + on Clubs	0.206** (0.004)	0.204** (0.008)
1+ Hours/Week on Clubs -- Missing	0.141** (0.020)	0.109** (0.039)
5+ Hours/Week on Homework	0.301** (0.004)	0.238** (0.008)
5+ Hours/Week on Homework -- Missing	0.0985** (0.022)	0.084* (0.044)

Notes: This table displays the coefficients on the covariates in the regressions displayed in Table 8. The column numbers indicate the columns of the associated regressions in each panel of Table 8. (The regression in the first column of each panel in Table 8 is not included because it does not contain any controls.) The omitted race category is Caucasian while the omitted ACT category is students scoring below 6 on the ACT. If a coefficient on a listed covariate is not displayed, that covariate is not included in the regression. Some ACT score dummies are dropped due to perfect collinearity (few, if any, students earning those scores). Data come from the AFS database. Two asterisks indicate that the coefficient is significant at the 5% level while one asterisk indicates that the coefficient is significant at the 10% level.

¹ Here, middle-income indicates a family income between \$40,000 and \$75,000, while high-income indicates a family income of at least \$75,000.

Appendix Table 9. Coefficients on the Control Variables in Table 9
AFS Data: ACT-Takers Only

	A. All Students			B. Low-Income Students		
	(2)	(3)	(4)	(2)	(3)	(4)
Year	0.005 (0.004)	-0.015** (0.003)	-0.034** (0.003)	-0.034** (0.006)	-0.029** (0.005)	-0.041** (0.005)
Race -- Black		-2.819** (0.021)	-1.869** (0.022)		-2.791** (0.027)	-1.869** (0.029)
Race -- Asian		0.787** (0.030)	0.691** (0.028)		0.569** (0.055)	0.602** (0.053)
Race -- Hispanic		-0.711** (0.037)	-0.273** (0.034)		-0.931** (0.053)	-0.410** (0.049)
Race -- Other		-0.863** (0.022)	-0.683** (0.021)		-1.076** (0.033)	-0.812** (0.031)
No Race Given		-0.323** (0.050)	-0.154** (0.046)		-0.513** (0.120)	-0.260** (0.111)
U.S. Citizen		-0.464** (0.045)	-0.448** (0.042)		-0.585** (0.069)	-0.605** (0.066)
U.S. Citizen -- Missing		-0.407** (0.061)	-0.321** (0.057)		-0.522** (0.103)	-0.485** (0.097)
English		-0.230** (0.032)	-0.508** (0.030)		-0.334** (0.054)	-0.569** (0.051)
English -- Missing		-0.399** (0.064)	-0.514** (0.061)		-0.368** (0.115)	-0.460** (0.110)
Female		-0.068** (0.008)	-0.082** (0.008)		-0.059** (0.015)	-0.048** (0.015)
Middle-Income ¹		0.325** (0.010)	0.181** (0.009)			
High-Income ¹		0.752** (0.011)	0.565** (0.011)			
Income -- Missing		0.359** (0.017)	0.366** (0.016)			
High School GPA			0.269** (0.009)			0.116** (0.016)
High School GPA -- Missing			0.861** (0.054)			0.412** (0.104)
College Credit			-0.100** (0.014)			0.062** (0.027)
ACT Score 6			-0.241 (0.633)			-0.219 (0.798)
ACT Score 7			2.996** (0.560)			
ACT Score 8			-1.361 (2.127)			
ACT Score 9			-2.347** (0.931)			-1.351* (0.816)
ACT Score 10			-1.589** (0.527)			-1.109 (1.173)
ACT Score 11			-1.749** (0.383)			-1.147* (0.649)
ACT Score 12			-1.580** (0.296)			-1.184** (0.500)
ACT Score 13			-1.877** (0.246)			-1.519** (0.470)

ACT Score 14	-1.838** (0.236)	-1.445** (0.463)
ACT Score 15	-1.773** (0.233)	-1.402** (0.460)
ACT Score 16	-1.503** (0.231)	-1.105** (0.459)
ACT Score 17	-1.111** (0.230)	-0.760* (0.458)
ACT Score 18	-0.858** (0.229)	-0.468 (0.457)
ACT Score 19	-0.617** (0.229)	-0.192 (0.457)
ACT Score 20	-0.462** (0.229)	-0.033 (0.457)
ACT Score 21	-0.265 (0.229)	0.176 (0.457)
ACT Score 22	-0.115 (0.229)	0.326 (0.457)
ACT Score 23	0.011 (0.229)	0.434 (0.457)
ACT Score 24	0.155 (0.229)	0.526 (0.457)
ACT Score 25	0.356 (0.229)	0.732 (0.457)
ACT Score 26	0.514** (0.229)	0.879* (0.457)
ACT Score 27	0.744** (0.229)	1.070** (0.458)
ACT Score 28	0.914** (0.229)	1.262** (0.458)
ACT Score 29	1.189** (0.230)	1.477** (0.459)
ACT Score 30	1.147** (0.230)	1.393** (0.460)
ACT Score 31	1.403** (0.231)	1.663** (0.462)
ACT Score 32	1.639** (0.234)	1.908** (0.469)
ACT Score 33	1.843** (0.242)	2.044** (0.485)
ACT Score 34	2.013** (0.268)	1.733** (0.563)
ACT Score 35	1.395** (0.406)	0.853 (0.653)
ACT Score 36	0.359 (0.422)	0.595 (0.718)
Drank Beer	0.257** (0.009)	0.169** (0.016)
Drank Beer -- Missing	0.190** (0.061)	0.0863 (0.115)
Smoked Cigarettes	-0.061** (0.009)	-0.055** (0.018)
Smoked Cigarettes -- Missing	-0.010 (0.068)	0.028 (0.128)

Volunteer Work	0.199** (0.009)	0.242** (0.016)
Volunteer Work -- Missing	0.053 (0.059)	0.191 (0.117)
1+ Hours/Week + on Clubs	-0.085** (0.008)	-0.112** (0.015)
1+ Hours/Week on Clubs -- Missing	0.005 (0.039)	-0.105 (0.072)
5+ Hours/Week on Homework	0.348** (0.009)	0.317** (0.016)
5+ Hours/Week on Homework -- Missing	0.024 (0.044)	0.137* (0.079)

Notes: This table displays the coefficients on the covariates in the regressions displayed in Table 9. The column numbers indicate the columns of the associated regressions in each panel of Table 9. (The regression in the first column of each panel in Table 9 is not included because it does not contain any controls.) The omitted race category is Caucasian while the omitted ACT category is students scoring below 6 on the ACT. If a coefficient on a listed covariate is not displayed, that covariate is not included in the regression. Some ACT score dummies are dropped due to perfect collinearity (few, if any, students earning those scores). Data come from the AFS database. Two asterisks indicate that the coefficient is significant at the 5% level while one asterisk indicates that the coefficient is significant at the 10% level.

¹ Here, middle-income indicates a family income between \$40,000 and \$75,000, while high-income indicates a family income of at least \$75,000.

Appendix Table 10. Coefficients on the Control Variables in Table 10
AFS Data: ACT-Takers and SAT-Takers

	A. All Students			B. Low-Income Students		
	(2)	(3)	(4)	(2)	(3)	(4)
Year x ACT	-0.030** (0.005)	-0.040** (0.004)	0.105** (0.004)	-0.026** (0.010)	-0.013 (0.008)	0.101** (0.008)
Year	0.035** (0.004)	0.013** (0.003)	-0.156** (0.003)	-0.007 (0.007)	-0.016** (0.006)	-0.147** (0.006)
Race -- Black		-2.850** (0.016)	-1.539** (0.016)		-2.761** (0.021)	-1.549** (0.022)
Race -- Asian		1.063** (0.019)	0.507** (0.016)		0.760** (0.034)	0.534** (0.030)
Race -- Hispanic		-0.366** (0.023)	0.209** (0.020)		-0.541** (0.034)	0.130** (0.031)
Race -- Other		-0.366** (0.016)	-0.276** (0.014)		-0.601** (0.028)	-0.372** (0.025)
No Race Given		-0.044 (0.035)	0.013 (0.030)		-0.386** (0.093)	-0.105 (0.081)
U.S. Citizen		-0.467** (0.026)	-0.452** (0.023)		-0.539** (0.039)	-0.470** (0.036)
U.S. Citizen -- Missing		-0.699** (0.038)	-0.474** (0.034)		-0.661** (0.068)	-0.451** (0.062)
English		-0.183** (0.020)	-0.504** (0.018)		-0.354** (0.034)	-0.597** (0.030)
English -- Missing		-0.314** (0.044)	-0.437** (0.040)		-0.345** (0.083)	-0.411** (0.078)
Female		-0.093** (0.006)	-0.067** (0.006)		-0.101** (0.012)	-0.050** (0.012)
Middle-Income ¹		0.418** (0.008)	0.154** (0.007)			
High-Income ¹		1.362** (0.009)	0.779** (0.008)			
Income -- Missing		0.569** (0.013)	0.441** (0.011)			
High School GPA			0.526** (0.007)			0.359** (0.013)
High School GPA -- Missing			1.749** (0.039)			1.207** (0.079)
College Credit			-0.085** (0.011)			0.073** (0.022)
ACT Score 6			0.486 (0.549)			0.426 (0.600)
ACT Score 7			3.460** (0.502)			
ACT Score 8			-0.943 (2.138)			
ACT Score 9			-1.700* (0.877)			-0.907 (0.756)
ACT Score 10			-1.994** (0.153)			-1.648** (0.209)
ACT Score 11			-1.766** (0.249)			-1.460** (0.358)
ACT Score 12			-1.885**			-1.499**

	(0.108)	(0.154)
ACT Score 13	-1.895**	-1.478**
	(0.074)	(0.122)
ACT Score 14	-1.792**	-1.369**
	(0.067)	(0.115)
ACT Score 15	-1.647**	-1.207**
	(0.064)	(0.113)
ACT Score 16	-1.382**	-0.950**
	(0.062)	(0.111)
ACT Score 17	-0.988**	-0.592**
	(0.060)	(0.110)
ACT Score 18	-0.675**	-0.261**
	(0.060)	(0.109)
ACT Score 19	-0.450**	0.007
	(0.060)	(0.109)
ACT Score 20	-0.274**	0.188*
	(0.060)	(0.109)
ACT Score 21	-0.004	0.455**
	(0.059)	(0.108)
ACT Score 22	0.228**	0.667**
	(0.059)	(0.109)
ACT Score 23	0.423**	0.852**
	(0.059)	(0.109)
ACT Score 24	0.607**	0.992**
	(0.059)	(0.109)
ACT Score 25	0.893**	1.245**
	(0.059)	(0.109)
ACT Score 26	1.189**	1.516**
	(0.059)	(0.110)
ACT Score 27	1.455**	1.703**
	(0.060)	(0.111)
ACT Score 28	1.796**	2.024**
	(0.060)	(0.112)
ACT Score 29	2.221**	2.363**
	(0.060)	(0.113)
ACT Score 30	2.549**	2.604**
	(0.061)	(0.116)
ACT Score 31	3.175**	3.192**
	(0.062)	(0.119)
ACT Score 32	3.931**	3.780**
	(0.064)	(0.130)
ACT Score 33	4.728**	4.641**
	(0.068)	(0.152)
ACT Score 34	5.385**	5.056**
	(0.077)	(0.216)
ACT Score 35	5.903**	5.166**
	(0.114)	(0.411)
ACT Score 36	4.421**	2.258**
	(0.241)	(0.594)
Drank Beer	0.433**	0.284**
	(0.006)	(0.013)
Drank Beer -- Missing	0.300**	0.211**
	(0.044)	(0.093)
Smoked Cigarettes	-0.105**	-0.061**
	(0.007)	(0.014)

Smoked Cigarettes -- Missing	0.009 (0.048)	-0.019 (0.099)
Volunteer Work	0.202** (0.007)	0.224** (0.013)
Volunteer Work -- Missing	0.066 (0.044)	0.207** (0.084)
1+ Hours/Week + on Clubs	0.026** (0.006)	0.003 (0.012)
1+ Hours/Week on Clubs -- Missing	0.114** (0.028)	0.032 (0.058)
5+ Hours/Week on Homework	0.516** (0.006)	0.402** (0.012)
5+ Hours/Week on Homework -- Missing	0.115** (0.031)	0.158** (0.064)

Notes: This table displays the coefficients on the covariates in the regressions displayed in Table 10. The column numbers indicate the columns of the associated regressions in each panel of Table 10. (The regression in the first column of each panel in Table 10 is not included because it does not contain any controls.) The omitted race category is Caucasian while the omitted ACT category is students scoring below 6 on the ACT. If a coefficient on a listed covariate is not displayed, that covariate is not included in the regression. Some ACT score dummies are dropped due to perfect collinearity (few, if any, students earning those scores). Data come from the AFS database. Two asterisks indicate that the coefficient is significant at the 5% level while one asterisk indicates that the coefficient is significant at the 10% level.

¹ Here, middle-income indicates a family income between \$40,000 and \$75,000, while high-income indicates a family income of at least \$75,000.