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ABSTRACT

We consider the relationship between collegiate-football success and non-athlete student performance. We find that the team's success significantly reduces male grades relative to female grades. This phenomenon is only present in fall quarters, which coincides with the football season. Using survey data, we find that males are more likely than females to increase alcohol consumption, decrease studying, and increase partying in response to the success of the team. Yet, females also report that their behavior is affected by athletic success, suggesting that their performance is likely impaired but that this effect is masked by the practice of grade curving.

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“Tailgating rituals, painted faces, and screaming fans are part of American higher education as surely as physics labs and seminars on Milton. . . Big-time athletics is too important to be relegated entirely to the sports pages. . . At issue is whether the university entertainment enterprise is a threat to American higher education or instead is one of its reasons for success.”

—Charles T. Clotfelter, *Big-Time Sports in American Universities*

1 Introduction

In 2010, 211 out of 218 Division I athletics departments at universities subject to open records laws received a subsidy.¹ These subsidies are substantial and rapidly growing. From 2006 to 2010, the average subsidy increased 25-percent, to nine-million dollars. Given the large amount of tax-payer and tuition dollars that are being channeled toward college sports programs, combined with concerns that these programs might be detrimental to the academic missions of universities, the merits of this spending has been the subject of intense debate.

However, almost nothing is known about its effect on human capital acquisition.² The research that has been conducted on big-time college sports has focused primarily on its advertising effects, considering impacts on student applications, student enrollment, and alumni giving.³ To our knowledge, Clotfelter (2011) is the only prior study to plausibly identify a causal effect of college sports on learning and research, which are clearly the most important objectives of post-secondary institutions.⁴ It is important to note that it

¹There are a total of 346 Division I schools, 128 of which are not subject to open records laws. Division I is the highest level of intercollegiate athletics. Relative to other schools in the National Collegiate Athletic Association (NCAA), Division I schools are required to field more sports teams and are allowed to offer financial aid to more athletes. Statistics are based on the analysis of documents gathered by USA Today and Indiana University’s National Sports Journalism Center. These data were available on 10 October 2011 at www.usatoday.com/sports/college/2011-06-23-2011-athletic-department-subsidy-table.n.htm.

²In describing the close-to-twenty years he convened the National Bureau of Economic Research working group on higher education, Clotfelter (2011) reports: “In the 30 meetings of that group that occurred over this period, scholars presented 176 papers on topics ranging from financial aid, rising costs, and preferential admissions to faculty retirement, doctoral training, and sponsored research. But only one paper during this entire period had to do with big-time college sports.”

³See the Knight Commission on Intercollegiate Athletics for further discussion. For recent work, see Pope and Pope (2011).

⁴See Rishe (2003), Tucker (2004), and Mixon and Treviño (2005) for correlational studies examining the relationship between historical measures of sports success and graduation rates.

is not clear *ex ante* what effect to anticipate, as some have argued that college sports are a distraction that diverts time and attention away from academic pursuits whereas others have argued that it could enhance productivity by promoting social capital. To address the question empirically, Clotfelter examines the number of JSTOR articles viewed (as a measure of work done by students and faculty) at 78 research libraries around the time of the NCAA basketball tournament. He finds that having a team in the tournament reduces the number of article views and, further, that unexpected wins have especially large effects.

In this paper, we build on this earlier work by considering how academic performance at a large public university varies with the prominence of university football on campus, as measured by the team's winning percentage in a given year. One of the advantages of our approach that focuses on student GPAs is that it provides a relatively long-run measure of student performance, whereas Clotfelter may be identifying the inter-temporal substitution of study time that might not affect levels of learning. In addition, we can exploit the gender asymmetry in how closely students follow college sports in order to speak to the extent to which the effects might be driven by professor behavior rather than student behavior.

Our paper also contributes to the large literature on gender differences in higher education, where some have argued that there is a pending "boy crisis." This concern is often motivated by the fact that men have fallen further and further behind women in college attendance and completion over the past thirty years (Goldin, Katz, and Kuziemko, 2006). As of 2008, 24 to 29 year old females were 17 percent more likely to have attended college and 29 percent more likely to have completed a baccalaureate degree than similarly-aged males.⁵

Of additional concern is the fact that males tend to be less responsive than females to educational interventions, which suggests that we may need to look beyond traditional educational policies to better understand the determinants of male performance.⁶ In this

⁵Authors' calculation based on the 2008 American Community Survey.

⁶For example, males have been found to be less responsive, if responsive at all, to achievement awards (Angrist and Lavy, 2002; Angrist and Lavy, 2009; Angrist, Lang, Oreopoulos, 2009), tuition reductions (Dynarski, 2008), and offers of academic advising (Angrist, Lang, Oreopoulos, 2009). While Lindo, Sanders,

area, research focusing on the ability level of peers also tends to find greater effects for females than males whereas studies that explore alcohol consumption and its associated activities find mixed results.⁷ Collectively, this research suggests that one would be hard-pressed to reliably identify an important factor that would have a greater influence on males' academic performance than females' academic performance. While instructor gender might appear to be a likely candidate, even the research in this area is mixed.⁸ As such, it is informative to consider a prominent component of college culture that our priors suggest would exhibit a pronounced influence on the male population—the hype and interest associated with the success of the university football team.

The large public university we consider, the University of Oregon, being largely representative of other four-year public institutions and having substantial variation in football success, provides an ideal setting to explore the effects of big-time college sports. Highlighting the significance of the football team, Figure 1 summarizes the number of football games students watched during the 2010 season.⁹ Only 10 percent of females and an even smaller share of males report watching zero games. Some 40 percent of females watched 10 or more games out of 12, while over 50 percent of males watched 10 or more games.

and Oreopoulos (2010) consider gender differences in response to an educational intervention, it is not clear that their results demonstrate that either males or females are “more responsive.” In particular, they find that being placed on academic probation improves the grades of returning females more than returning males, but that it causes males to drop out and has no such impact on females. Helping to inform us as to why females tend to perform better than males in college, Babcock and Marks (2011) document that female students study more than their male counterparts—why there is a gender difference in time spent studying is an important question that remains unanswered.

⁷In particular, Stinebrickner and Stinebrickner (2006), Han and Li (2009), and Carrell, Hoekstra, and West (forthcoming) find greater peer effects among females; Foster (2006) finds larger effects for males but concludes that there is “little evidence of robust residential peer effects on undergraduate performance.” Kremer and Levy (2008) find that being assigned a heavily-drinking roommate affects males but not females; Carrell, Hoekstra, and West (2010) find that the effect of legal access to alcohol is similar for males and females; and Lindo, Swensen, and Waddell (2011) find that the effect of legal access to has affects females but not males.

⁸At the post-secondary level, Hoffmann and Oreopoulos (2009) find small effects overall but report that these effects are “driven more by males performing worse when assigned to a female instructor, with females performing about the same.” In contrast, Carrell, Page, and West (2010) report that “professor gender has little impact on male students, [but] has a powerful effect on female students' performance in math and science classes, their likelihood of taking future math and science courses, and their likelihood of graduating with a STEM degree.” See Hoffmann and Oreopoulos (2009) for an in-depth review of the larger literature that focuses on the primary and secondary levels.

⁹The institutional setting and survey are discussed in detail in later sections.

Our analysis reveals that GPAs vary systematically with the prominence of university football on campus, as measured by the team’s winning percentage in a given year.¹⁰ Our estimates suggest that three fewer wins in a season would be expected to increase male GPAs by approximately 0.02, or to reduce the gender gap by seven to nine percent. In order to speak to the mechanisms at work, we provide evidence that students’ time use and study behaviors respond differentially by gender to the football team’s performance.¹¹ Given that females’ time use and study behaviors are also affected by the team’s performance, it is likely that their performance is affected as well but masked by the usual practice of grade curving. We also explore heterogeneity across race and measures of socioeconomic status—we find that the effects are most severe for non-whites and those from disadvantaged backgrounds.

2 Data Used in Main Analysis

Our primary source of data is based on student transcripts from the University of Oregon, covering all undergraduate classes administered from fall quarter of 1999 through winter quarter of 2007. For our main analysis, we limit the sample to fall quarters to coincide with the collegiate-football seasons.¹² We also limit the sample to non-athlete undergraduate students as we anticipate that athletic success, if not endogeneous to athlete’s academic performance, may interact differently with student-athlete grades.¹³ After making these restrictions, our main sample consists of 29,737 students, or 267,322 student-class observations across nine fall quarters.¹⁴

¹⁰Other documented behaviors associated with collegiate football include increased crime (Rees and Schnepel, 2009) and heavy alcohol consumption (Neal and Fromme, 2007; Glassman, Werch, and Bian, 2007; Glassman, *et. al.*, 2010). Card and Dahl (2011) also find increases in male on female violence associated with NFL football games.

¹¹See Stinebrickner and Stinebrickner (2004) for a discussion on the relationship between time use and educational outcomes.

¹²NCAA Division I-A football runs from late August until early January. Fall terms are in session from late September until early December.

¹³While we are able to identify student athletes, we cannot do so by sport. This prohibits us from dropping only football players, for example.

¹⁴The implied average number of classes per student is low as we do not observe all students’ complete tenure at the institution. Normal patterns of attrition from the university also act to lower this ratio.

We combine these data with readily available reports of the football team’s win-loss records which we use to form our term-specific measures of athletic success—the ratio of total games won to total games played in the regular fall season. Over our sample period, the winning percentage is 67 percent, on average, and varies from 45 percent to 92 percent.

Beyond the degree of variation in athletic success, this large public university also provides a somewhat representative setting in terms of institutional and student characteristics. While twice the size and has higher admission rates than the average public-four-year institution, it is similar in terms of enrollment rates and SAT scores of incoming students. It is also similar to the average college in costs of attendance and in financial aid opportunities. Like most other institutions, the University of Oregon is over half female and predominately white, although at 75 percent it has a larger share of white students than is typical of the universe of U.S. post-secondary institutions.¹⁵ We report summary characteristics of our data in Table 1. Consistent with the discussion in the introduction, males have systematically lower GPAs than females. On average, they earn GPAs of 2.94 whereas the average among females is 3.12. This gap is present for first-year students and students who have been at the university for several years. In unreported analysis, we have verified that the gap cannot be explained by ability upon entry, as measured by high-school GPAs and SAT scores.

3 Empirics

3.1 Main results

In Panel A of Table 2, we report estimates of the effect of athletic success on male GPAs. To begin, in Column 1 we estimate

$$G_{ijt} = \alpha + \theta \text{WinningPercentage}_t + \epsilon_{ijt}, \quad (1)$$

¹⁵See Lindo, Swensen, Waddell (2011) for additional comparisons to other four-year public U.S. institutions.

where G_{ijt} is the grade of student i in class j in the fall term of year t and $WinningPercentage_t$ is the ratio of wins to total games played in year t ; standard errors estimates are clustered on the student. This simple model leads to an estimate of θ of 0.168. To put this magnitude into context, consider the fact that a 100 point increase in SAT scores is associated with a 0.16 increase in GPAs for males. As such, the estimate in Column 1 suggests that a 25 percent increase in the football team’s winning percentage (or three additional wins) leads males to earn GPAs as if their SAT scores were 27 points lower.

Of course, to the extent to which the university experienced grade inflation in the years spanned by the data and the football team’s performance got somewhat worse, this estimate may overstate the negative impact of the football team’s success. Indeed, in Column 2 where we control for a quadratic in time, the point estimate is substantially smaller (-0.052) although it remains statistically significant at the one-percent level.

Our preferred estimates are identified off of within-student longitudinal variation in grades as the football team’s winning percentage varies, corresponding to the regression equation

$$G_{ijt} = \alpha_i + \psi WinningPercentage_t + \beta X_{ijt} + e_{ijt}, \quad (2)$$

where α_i are individual fixed effects. As this approach isolates the effect of athletic success on individual-student performance across fall classes and terms, we are implicitly assuming that the counterfactual for a student’s performance in “high-win terms” is the student’s own performance in “low-win terms” and vice versa. We prefer this approach because it controls for the changing composition of the student body from year to year which may not be well captured by a smooth time trend. Column 3 shows the estimated effect based on this model, still controlling for the overall time trend in order to address grade inflation; it is smaller (-0.031) and no longer statistically significant.¹⁶

¹⁶While not reported, including controls for fixed student attributes (i.e., math and verbal SAT scores, high-school GPA, age at entry, and indicator variables for Black, Hispanic, and Asian, and for having graduated from a private high-school) has a similar influence on the point estimate as controlling for individual fixed effects.

In Column 4, we address the fact that the courses that are offered during fall quarters may differ from year to year and that this might lead to a spurious relationship between the performance of the football team and student grades. We do so by controlling for subject-by-level fixed effects.¹⁷ The estimated effect is unchanged but more precisely estimated with the addition of these controls.

In Column 5, we take an alternative approach to controlling for time-varying factors, including fixed effects for the number of credits a student has accumulated before the quarter begins instead of the overall time trend.¹⁸ This approach is motivated by our desire to control flexibly for the tendency for grades to increase as students make progress towards their degrees. The estimated effect based on this model (-0.075) is larger and statistically significant.

It is important to note, however, that the practice of grading student performance on a curve implies that the estimates in Panel A are likely to understate the true effect on male performance. For example, if the success of the football team impairs all students' performance equally, there would be no effect on any student's GPA under strict curving. In contrast, if the success of the football team has an especially large impact on the performance of a particular group of students (males), we would clearly expect to see their GPAs fall relative to others (females). Further, one would anticipate that latter's "response" to athletic success would appear to offset the former's, consistent with the zero-sum nature of strict grading curves.

With this in mind, in Panel B we perform the same analysis for the female-student population. All of the point estimates are more positive for females than for males. The estimates based on our model with individual fixed effects and a quadratic in time are positive and significant. For the reasons described above, this does not imply that athletic success improves female performance—in Section 4 we present evidence suggesting that female performance is

¹⁷For example, subjects correspond to economics, english, and mathematics, while levels correspond to either 100-, 200-, 300-, or 400-level classes.

¹⁸The fixed effects are a series of indicator variables for credits in intervals of four. The overall time trend must be dropped in order to avoid near-perfect multicollinearity.

likely impaired—but instead likely reflects that the relatively-large impact on males improves females’ *relative* performance which translates into higher grades when grades are based on a curve. In our model that controls for individual fixed effects and the number of credits a student has accumulated before the quarter begins (Column 5), the point estimate for women is close to zero. Combined with the significant negative estimate for males, this estimate would suggest that grade curves are not *perfectly* strict. Additionally, it is important to note that the estimated effects on females’ GPAs suggest that it is unlikely that the effects on males are driven by professor behavior. If athletic success led professors to be more generous or more harsh in assigning grades, we would anticipate observing similar effects on both male and female students.

As a measure of relative performance, the gender gap in grades is not subject to the interpretative challenges discussed above. Inasmuch as grading curves are uniformly applied to male and female students, changes in the gender-gap in GPAs that are systematic with football performance are clearly indicative of changes in gender-specific performance. Pooling male and female observations and adding the interaction of winning percentage and an indicator for being male to the models described above, in Panel C we estimate the effect of athletic success on the gender gap in grades. The coefficient on the interaction of the winning percentage with the indicator for being male provides the estimated effect of athletic success on the gender gap in grades. Whereas the gender-specific estimates varied quite a bit across different specifications, the estimated impact on the gender gap is quite stable as the coefficient estimates range from -0.050 to -0.068 across the five columns. Further, they are statistically significant and virtually identical in columns 4 and 5, which display our preferred estimates. To put the magnitude of estimate (-0.065) into context, it suggests that a 25-percent increase in the football team’s winning percentage (or three additional wins) will increase the gender gap in GPAs (0.18) by nine percent.

3.2 Estimated effects using aggregate data

While we prefer the the approach described above because it allows us to control for several potential confounders, the pattern we have identified is sufficiently regular that it is evident in a plot of the mean difference between male and female grades and winning percentage across years. We provide such a plot in Figure 2, for 1999 through 2007. The correlation coefficient between the difference in grades (i.e., male minus female) and winning percentage is -0.73. Moreover, aggregating grades to the nine fall-term observations at which the variation in winning percentage exists and regressing the difference between male and female GPAs on the winning percentage yields an estimated coefficient of -0.069 and a heteroskedasticity-robust standard-error estimate of 0.025—very close to the point estimates our preferred estimates in Table 2.

3.3 Estimated effects across letter-grade assignments

Because it offers a clearer interpretation, in this subsection and the subsections that follow, we focus on the effect of athletic success on the gender gap in GPAs. We also focus on results based on our preferred models that control for individual fixed effects and subject-by-level fixed effects. However, because there is a tradeoff involved with controlling for time versus controlling for accumulated credits, we present estimates that take each of these two approaches in separate panels.

In Table 3, we explore the potential for winning percentage to influence grades nonlinearly across the grade distribution. Specifically, we replace “grade point” with binary letter-grade assignments on the left-hand side. As such, the coefficient on the interaction of the indicator for being male and the winning percentage in Column (1) is interpreted as the difference between males and females in the impact of athletic success on the probability of receiving a grade of “A” in a given class. Across columns (1) through (4), we observe meaningful decreases in the probabilities of receiving As and Bs and increases in the probabilities receiving Cs or lower. Clearly, the largest effect on the gender gap appears to occur

at the lowest end of the grade distribution. The estimated effect is largest and statistically significant on the gender gap in the probability of receiving a failing grade.

3.4 This pattern is unique to fall terms

In Table 4, we investigate whether similar effects are found in winter and spring quarters, where one would not expect the winning percentage to affect student performance. Doing so provides evidence that only in the quarter we associate with football—the fall quarter—do we find systematic movement in the gender gap in academic performance that varies with athletic success.¹⁹ Among the eight coefficient estimates for the winter and spring quarters, corresponding to the overall effect of the winning percentage and the differential effect on males, just one estimate is statistically significant. If this estimate reflects the truth, it would suggest that there is a spillover effect of athletic success into the winter quarter that is similar for males and females. Given our earlier results and the fact that this finding is not robust across our two preferred specifications, it is most likely significant due to random chance which would not be surprising to see for one out of eight estimates.

3.5 Heterogeneity

In tables 5 and 6, we explore the extent to which there are heterogeneous effects of athletic success on the gender gap. While such heterogeneity is interesting for a variety of reasons, a primary motivation for exploring heterogeneous impacts is to support the external validity of our estimates. For instance, if we see the same phenomenon across different groups at one large public university, it lends credibility to the idea that similar effects might be present at institutions with different compositions of students. We first consider heterogeneity across ability and financial-aid eligibility to determine whether our main results are driven by individuals more likely to struggle with coursework or those from particular eco-

¹⁹Over our sample time period, the football team did not participate in any bowl games that overlapped with the winter quarter.

conomic backgrounds. We then examine the possibility for heterogeneous effects across race.

Table 5 stratifies the estimates by various measures of ability and relative socio-economic status. In columns (1) through (4) the estimates are stratified by ability, where “high ability” students are defined as those with cumulative SAT scores and High School GPAs above the sample medians and “low ability” students are defined similarly. Using either measure of ability, there is strong evidence that the effect of athletic success on the gender gap is most prominent among lower-ability students. For example, Column (2) suggests that, among low-ability students, the gender gap in grades increases as much as 0.028 in response to three additional wins in a season, accounting for 14 percent of the existing gender gap (.201) among those students.

Columns (5) through (8) consider the effects stratified by relative measures of socio-economic status—in columns (5) and (6) we stratify the sample by whether financial need is above or below the median need level.²⁰ While we lack direct measures of family income, we do have student zip codes. Thus, as an alternative measure of socio-economic status, in columns (7) and (8) we stratify the sample by whether the median household income within the student’s zip code is above or below that in the median within our sample. Across all columns, point estimates suggest that the impact on the gender gap is largest among students from more disadvantaged backgrounds, in terms of measured aid eligibility or approximate household income.

In Table 6 we provide estimates stratified by race. In columns (1) and (2), we stratify by white and non-white. Doing so demonstrates that the influence of winning percentage on the gender gap is significant in both white and non-white student populations, but particularly strong in the minority student population. In columns (3) through (5), we further stratify non-white into Black, Hispanic, and Asian. Although estimates are imprecise at this level, across all students there is suggestive evidence that the largest effects are found in the black-student population.

²⁰Note that the sample is also limited to the 70 percent of students who submitted a Free Application for Federal Student Aid (FAFSA).

In general, we note that the estimated effects on the gender gap are negative in all regressions presented in tables 5 and 6. This suggests that the overall impact is not being driven by any one group in particular, even though there is heterogeneity in the effect on the gender gap among different groups.

4 Survey Evidence on Mechanisms

To shed light on the underlying mechanisms driving our main results, we surveyed undergraduate classes during three regularly scheduled class times in the 2011 spring term.²¹ Of the classes surveyed, 183 students were enrolled in an introductory economics course and 80 were enrolled in either of two upper-division economics courses. The students enrolled in introductory economics are largely representative of the freshman and sophomore student body, as introductory economics is a general education requirement for many majors and the majority of students are in their first or second year of school (90 percent of students surveyed in this class were freshman/sophomore). The students we surveyed in the upper division economics courses were primarily (90 percent) juniors and seniors.

4.1 Survey Design

As part of the survey, we collected information on general student characteristics, interest in the university football team, and information about known or anticipated behavioral changes around the outcomes of university football games. We focused on alcohol consumption, partying, studying, and class attendance, with questions worded to elicit differences in these behaviors when the football team wins relative to when the football team loses. In our reported survey results, we limit the sample to the 53 percent of students who had been at the university for two or more years at the time of the survey. While the patterns we report

²¹Our survey design is informed by Clotfelter (2011), who reports that students at highly selective big-time sports universities spend more time exercising and participating in team sports, are more likely to report binge drinking, and possibly spend less time studying and doing research.

are insensitive to this restriction, this ensures that the survey respondents had experienced a regular-season loss.²²

4.2 Survey Results

To broadly measure academic time use related to football success, we collected student responses to the question, “Does the success of the University of Oregon football team decrease the amount of time you study for classes?” Figure 3 summarizes student responses, where categorical responses range from “Definitely Not” to “Definitely.” While both distributions are skewed right, the male distribution shows significantly higher mass to the right, which is consistent with relatively more males reporting a decrease in study time around a football “success.” In fact, 24 percent of males report that athletic success either “Definitely” or “Probably” decreases their study time, compared to only 9 percent of females.

Figure 4 presents student responses to questions regarding changes in alcohol consumption, partying, studying, and class attendance—comparing behaviors when the team wins to when the team loses. In Panel A, we see that roughly 28 percent of men report a tendency to increase alcohol consumption when the football team wins rather than loses, while only 20 percent of women report the same.²³ Although this difference is not statistically significant, the results indicate a large effect on males and females and remains suggestive of a more pronounced effect for men.²⁴

Panel B presents similar results for partying. Despite being unable to determine all

²²Figures for the freshman sample are available on request. In our preferred models, the influence of winning percentage on fall-term grades is independent of post-season bowl activity (i.e., subsequent to fall term grades being posted). However, while first-year students had not experienced a regular-season loss at the time of our survey, they had experienced a loss in the Bowl Championship Series game in January, 2011. However, one might worry that such a loss may overly influence first-year students’ perceptions of how they respond to wins versus losses. Anticipating this, we also asked students to compare “big games” to other games, where big games are described as “a game against a rivalry team, a ranked team, a game that involves significant hype, etc.” While we do not highlight these responses, similar patterns also occur in these survey responses.

²³Conditional on reporting that one consumes alcohol, which we collected in the survey, the estimated difference increases to 12 percentage points ($p=0.155$).

²⁴Exploiting survey questions that asked students to compare alcohol consumption leading up to and following “big games,” the difference between males and females is statistically significant.

activities encompassed by students' definitions of partying, this question allows us to broadly account for additional behavioral responses beyond alcohol consumption that are associated with increased excitement following a win. We observe that 28-percent of females report increased partying when the team wins versus 47-percent of men.²⁵

In terms of educational activities, Panel C shows that the difference between men and women reporting that they study less when the team wins is approximately 14 percent. Panel D indicates that female students are slightly more likely to indicate an increased tendency to miss class associated with a win; however the result is small in magnitude and not significant.

In summary, our survey results lend strong support for a differential impact of athletic success on male and female behaviors. Relative to females, we observe a decrease in male academic time investment and an increase in distracting or risky behaviors in response to increased athletic success. In addition to the gender differential impact, we also find an impact on female behaviors including studying, alcohol consumption, and partying. While our previous empirical analysis can primarily speak to relative performance, our survey results suggest that the aggregate impact of athletic success on academic performance, or learning, likely extends to females.

5 Discussion and Conclusion

We identify the effect of football success with longitudinal variation in student-class level data spanning nine football seasons, 1999 through 2007. Our preferred specifications also include individual-student fixed effects to identify the effect off of longitudinal variation in the performance of the university football team to estimate a student's deviation from his or her own average performance as the winning percentage varies from its average, making a comparison of the deviation of males relative to that of females. We also include controls to account for systematic changes in grades that are expected over time and across courses. Our estimates suggests male grades fall significantly with the success of the football team.

²⁵This difference is statistically significant at the five-percent level.

There is also pronounced heterogeneity among students, suggesting that the impact is largest among students from relatively disadvantaged backgrounds and those of relatively low ability.

In addition to our main analysis, we offer insight into the underlying mechanisms that may be driving the systematic patterns evident in measured academic performance. In particular, we elicit student responses to questions about behaviors around football outcomes. Beyond confirming that there is a high level of student viewership and interest in football, survey responses reveal pronounced gender differences in behavioral responses to athletic success. Relative to women, men report being more likely to increase alcohol consumption, to decrease studying, and to increase partying around the success of the football team. Yet, both male and female students report that their behavior is responsive to athletic success. This suggests that female performance is likely affected by the performance of the football team as well but that this effect is masked by the usual practice of grade curving.

As such, our results support the concern that big-time sports are a threat to American higher education. At the same time, we view our research as taking one of the first steps towards documenting the non-monetary costs associated with college athletics. Whether it is desirable to be investing large amount amounts of public and student money in college sports requires a broad consideration of non-monetary costs, monetary costs, in addition to the benefits that might be generated in the form of social solidarity and charitable donations.

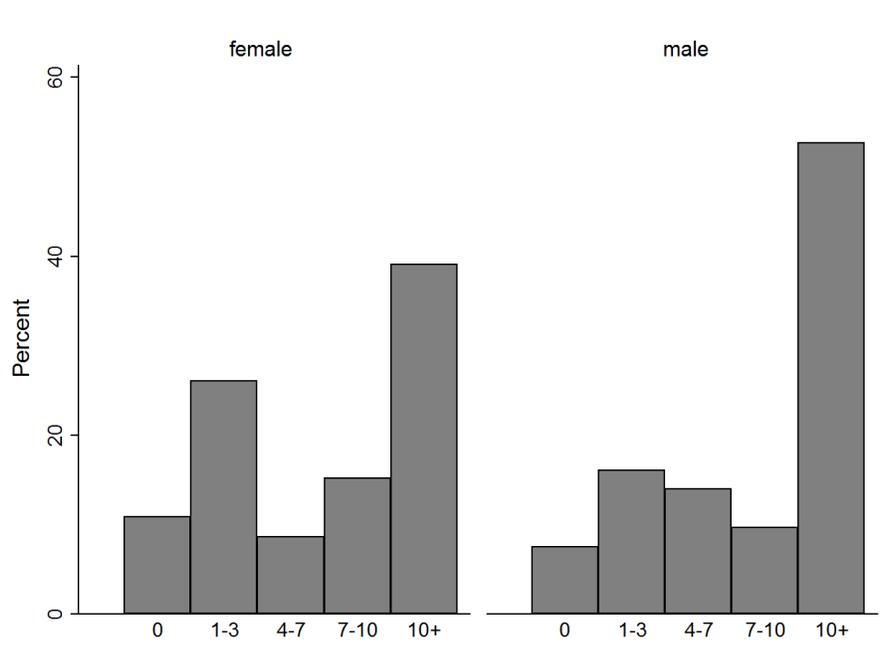
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Figure 1

Responses to the question: “Of the 12 regular-season University of Oregon football games in the 2010 season, how many did you watch on TV or in person?”



Notes: The sample has been limited to students who have been at the university for 2 or more years.

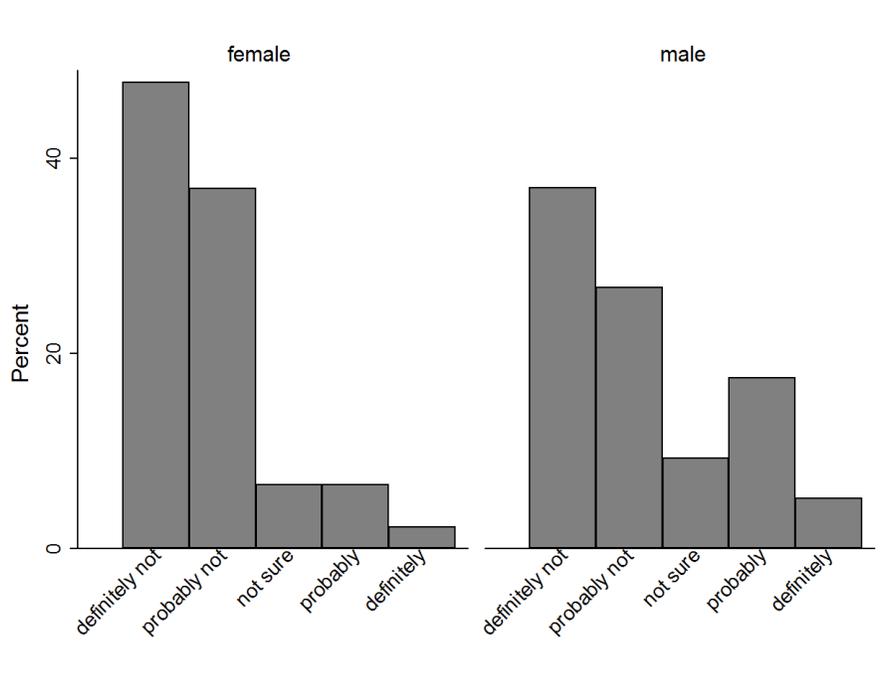
Figure 2
Does Athletic Success Affect the Gender Gap in GPAs?



Notes: The sample is limited to fall term grades. The gender gap is defined as mean male GPA less mean female GPA, at the term level. Win percentage is the ratio of the University of Oregon football team's wins to total games played in a given season. A regression of the winning percentage on the gender gap (i.e., a model with only nine observations) yields an estimated coefficient of -0.069 with a standard error of 0.025.

Figure 3

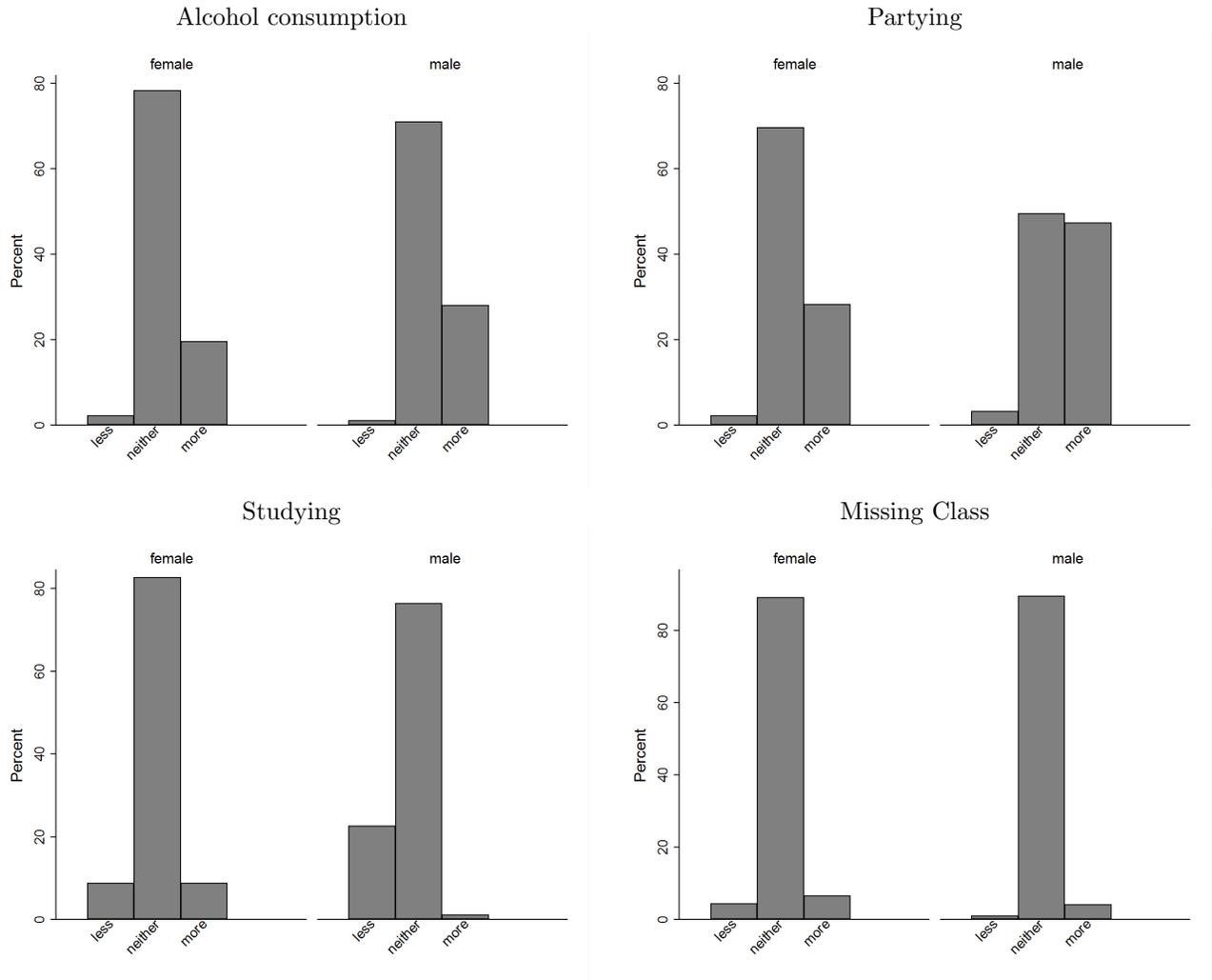
Responses to the question: “Does the success of the University of Oregon football team decrease the amount of time you study for classes?”



Notes: The sample has been limited to students who have been at the university for 2 or more years.

Figure 4

Responses to the question: “Compared to a loss, when the football team wins I tend to...”



Notes: The sample has been limited to students who have been at the university for 2 or more years.

Table 1
Summary statistics

	All Students	Male	Female
Grade Point Average (GPA)	3.04	2.94	3.12
1st Year GPA	3.00	2.90	3.07
2nd Year GPA	3.01	2.92	3.08
3rd Year GPA	3.08	3.00	3.15
4th Year GPA	3.14	3.02	3.24
5+ Year GPA	2.98	2.90	3.10
High-School GPA	3.49	3.40	3.56
SAT	1121	1134	1095
White	0.80	-	-
Asian	0.08	-	-
Black	0.02	-	-
Hispanic	0.04	-	-
Winning Percentage	0.68	-	-
Number of Undergraduates	29,737	13,184	16,553
Number of Student-Class Observations	267,322	119,191	148,131

Notes: Sample data consist of non-athlete University of Oregon undergraduates from 1999 through 2007. Win percentage is the ratio of the University of Oregon football team's wins to total games played in a given season.

Table 2
Estimated Effect of Athletic Success on Male and Female Grades

	(1)	(2)	(3)	(4)	(5)
Panel A: Males					
Winning Percentage	-0.168*** (0.024)	-0.052** (0.024)	-0.031 (0.021)	-0.031 (0.020)	-0.075*** (0.020)
Time Trend	no	yes	yes	yes	no
Student Fixed Effects	no	no	yes	yes	yes
Subject-by-Level Fixed Effects	no	no	no	yes	yes
Accumulated-Credits Fixed Effects	no	no	no	no	yes
Number of Unique Students	13,184	13,184	13,184	13,184	13,184
Student-Class Observations	119,191	119,191	119,191	119,191	119,191
Panel B: Females					
Winning Percentage	-0.103*** (0.020)	0.010 (0.020)	0.046*** (0.017)	0.041** (0.016)	0.007 (0.016)
Time Trend	no	yes	yes	yes	no
Student Fixed Effects	no	no	yes	yes	yes
Subject-by-Level Fixed Effects	no	no	no	yes	yes
Accumulated-Credits Fixed Effects	no	no	no	no	yes
Number of Unique Students	16,553	16,553	16,553	16,553	16,553
Student-Class Observations	148,131	148,131	148,131	148,131	148,131
Panel C: Pooled Sample					
Winning Percentage	-0.103*** (0.020)	0.013 (0.020)	0.035** (0.017)	0.038** (0.016)	-0.000 (0.016)
Male	-0.133*** (0.023)	-0.132*** (0.023)			
Male × Winning Percentage	-0.065** (0.032)	-0.068** (0.032)	-0.050* (0.027)	-0.065** (0.025)	-0.066*** (0.025)
Time Trend	no	yes	yes	yes	no
Student Fixed Effects	no	no	yes	yes	yes
Subject-by-Level Fixed Effects	no	no	no	yes	yes
Accumulated-Credits Fixed Effects	no	no	no	no	yes
Number of Unique Students	29,737	29,737	29,737	29,737	29,737
Student-Class Observations	267,322	267,322	267,322	267,322	267,322

Notes: Panels A and B provide the estimates for male and female students respectively. The dependent variable is the grade points received by a student in a given class, ranging from 0 to 4.3. The sample has been limited to fall-term grades. Winning percentage is the ratio of the University of Oregon football team's wins to total games played in a given season. Standard errors (in parentheses) are corrected for clustering at the individual level.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 3
Estimated Effects Across Letter Grade Assignments

Outcome:	A (1)	B (2)	C (3)	Fail (4)
Panel A: Controlling for time				
Winning Percentage	0.003 (0.009)	0.015 (0.010)	-0.010 (0.007)	-0.008* (0.004)
Male × Winning Percentage	-0.008 (0.013)	-0.015 (0.015)	0.005 (0.011)	0.018** (0.007)
Number of Unique Students	29,737	29,737	29,737	29,737
Student-Class Observations	267,322	267,322	267,322	267,322
Panel B: Controlling for accumulated credits				
Winning Percentage	-0.002 (0.009)	0.006 (0.010)	-0.006 (0.007)	0.002 (0.004)
Male × Winning Percentage	-0.011 (0.013)	-0.012 (0.015)	0.006 (0.011)	0.017** (0.007)
Number of Unique Students	29,737	29,737	29,737	29,737
Student-Class Observations	267,322	267,322	267,322	267,322

Notes: All estimates control for individual fixed effects and subject-by-level fixed effects. Panel A additionally controls for a quadratic in time while Panel B additionally controls for a student's accumulated credits at the beginning of the term. The dependent variables are indicator variables for letter grade assignments corresponding to each column letter. The sample has been limited to fall term grades. Win percentage is the ratio of the University of Oregon football team's wins to total games played in a given season. Standard errors (in parentheses) are corrected for clustering at the individual level.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4
Estimated Effects Across Terms

	Fall (1)	Winter (2)	Spring (3)
Panel A: Controlling for time			
Winning Percentage	0.038** (0.016)	0.003 (0.016)	0.006 (0.017)
Male × Winning Percentage	-0.065** (0.025)	-0.019 (0.025)	-0.010 (0.026)
Number of Unique Students	29,737	29,490	25,298
Student-Class Observations	267,322	271,489	207,837
Panel B: Controlling for accumulated credits			
Winning Percentage	-0.000 (0.016)	-0.033** (0.016)	-0.025 (0.017)
Male × Winning Percentage	-0.066*** (0.025)	-0.016 (0.025)	-0.007 (0.026)
Number of Unique Students	29,737	29,490	25,298
Student-Class Observations	267,322	271,489	207,837

Notes: All estimates control for individual fixed effects and subject-by-level fixed effects. Panel A additionally controls for a quadratic in time while Panel B additionally controls for a student's accumulated credits at the beginning of the term. The dependent variable is the grade points received by a student in a given class, ranging from 0 to 4.3. Placebo quarters include the Winter and Spring quarters during which the football team does not play any games. Win percentage is the ratio of the University of Oregon football team's wins to total games played in a given season. Standard errors (in parentheses) are corrected for clustering at the individual level.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 5
Heterogeneity Across Ability and Relative SES Measurements

	SAT		High-School GPA		Financial Need		Income	
	High (1)	Low (2)	High (3)	Low (4)	High (5)	Low (6)	Low (7)	High (8)
Panel A: Controlling for time								
Winning Percentage	0.034 (0.022)	0.040* (0.023)	0.039** (0.018)	0.021 (0.030)	0.066** (0.027)	0.030 (0.026)	0.057** (0.023)	0.023 (0.022)
Male × Winning Percentage	-0.042 (0.034)	-0.106*** (0.038)	-0.023 (0.032)	-0.072* (0.041)	-0.092** (0.046)	-0.065 (0.040)	-0.073** (0.036)	-0.057 (0.035)
Number of Unique Students	14,560	15,177	14,663	15,074	10,300	10,368	13,817	15,920
Student-Class Observations	138,072	129,250	139,268	128,054	90,511	96,458	124,767	142,555
Panel B: Controlling for accumulated credits								
Winning Percentage	-0.001 (0.022)	0.001 (0.023)	0.024 (0.018)	-0.035 (0.030)	0.015 (0.027)	0.012 (0.025)	0.019 (0.023)	-0.016 (0.022)
Male × Winning Percentage	-0.045 (0.034)	-0.110*** (0.038)	-0.026 (0.032)	-0.071* (0.041)	-0.095** (0.045)	-0.064 (0.040)	-0.080** (0.036)	-0.056 (0.035)
Number of Unique Students	14,560	15,177	14,663	15,074	10,300	10,368	13,817	15,920
Student-Class Observations	138,072	129,250	139,268	128,054	90,511	96,458	124,767	142,555

Notes: All estimates control for individual fixed effects and subject-by-level fixed effects. Panel A additionally controls for a quadratic in time while Panel B additionally controls for a student’s accumulated credits at the beginning of the term. The dependent variable is the grade points received by a student in a given class, ranging from 0 to 4.3. The high SAT group consists of students with SAT scores above the sample median of 1110. The high-school GPA group consists of students high-school GPAs above the sample median of 3.5. The high financial need group consists of students with eligibility above the sample median of 5,506. The high income group consists of students from zip code’s with incomes above the sample median of 45,981. Students in the “low” groups are defined similarly. Standard errors (in parentheses) are corrected for clustering at the individual level.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 6
Heterogeneity Across Race

	White (1)	Non-White (2)	Black (3)	Hispanic (4)	Asian (5)
Panel A: Controlling for time					
Winning Percentage	0.027 (0.017)	0.129*** (0.046)	0.156 (0.169)	0.001 (0.093)	0.154*** (0.056)
Male × Winning Percentage	-0.050* (0.027)	-0.174** (0.072)	-0.388 (0.236)	-0.171 (0.151)	-0.103 (0.087)
Number of Unique Students	25,844	3,893	482	1,034	2,383
Student-Class Observations	232,469	34,853	3,968	8,801	22,124
Panel B: Controlling for accumulated credits					
Winning Percentage	-0.007 (0.017)	0.065 (0.046)	0.065 (0.166)	-0.061 (0.092)	0.089 (0.056)
Male × Winning Percentage	-0.052* (0.027)	-0.171** (0.073)	-0.360 (0.241)	-0.181 (0.151)	-0.102 (0.088)
Number of Unique Students	25,844	3,893	482	1,034	2,383
Student-Class Observations	232,469	34,853	3,968	8,801	22,124

Notes: All estimates control for individual fixed effects and subject-by-level fixed effects. Panel A additionally controls for a quadratic in time while Panel B additionally controls for a student's accumulated credits at the beginning of the term. The dependent variable is the grade points received by a student in a given class, ranging from 0 to 4.3. Standard errors (in parentheses) are corrected for clustering at the individual level.

* significant at 10%; ** significant at 5%; *** significant at 1%

Appendix

Student Survey

1. What is your gender?
 - (a) Male
 - (b) Female
2. What year of school are you in at the University of Oregon?
 - (a) in my first year
 - (b) second
 - (c) third
 - (d) fourth
 - (e) fifth or greater
3. Of the 12 regular-season University of Oregon football games in the 2010 season, how many did you watch on TV or in person?
 - (a) 0
 - (b) 1-3
 - (c) 4-7
 - (d) 7-10
 - (e) 10+
4. Of the 12 regular-season University of Oregon football games in the 2010 season, how many did you watch in person?
 - (a) 0
 - (b) 1-3
 - (c) 4-7
 - (d) 7-10
 - (e) 10+
5. When did you first start following the University of Oregon football team?
 - (a) before deciding to attend the University of Oregon
 - (b) after deciding to attend the University of Oregon
 - (c) I do not follow the football team
6. For a typical University of Oregon football game, do you consume more alcohol before, during, or after the game?
 - (a) before
 - (b) during
 - (c) after
 - (d) none of the above

For questions 7 through 10: Compared to a loss, when the football team wins I tend to

7.
 - (a) drink more alcohol.
 - (b) drink less alcohol.

- (c) neither drink more or less. My drinking behavior doesn't change based on whether or not the football team wins.
- 8. (a) party more.
- (b) party less.
- (c) neither party more or less. My partying behavior doesn't change based on whether or not the football team wins.
- 9. (a) spend more time studying for your classes.
- (b) spend less time studying for your classes.
- (c) neither study more or less. My studying behavior doesn't change based on whether or not the football team wins.
- 10. (a) miss class more often.
- (b) miss class less often.
- (c) My attendance doesn't change based on whether or not the football team wins.

For questions 11-14 consider the following: Compared to other games, leading up to a "big game" (a big game being defined as a game against a rivalry team, a ranked team, a game that involves significant hype, etc...) I tend to

- 11. (a) drink more alcohol.
- (b) drink less alcohol.
- (c) neither. My drinking behavior doesn't change leading up to a "big" game.
- 12. (a) party more.
- (b) party less.
- (c) neither. My partying behavior doesn't change leading up to a "big" game.
- 13. (a) spend more time studying for your classes.
- (b) spend less time studying for your classes.
- (c) neither. My studying behavior doesn't change leading up to a "big" game.
- 14. (a) miss class more often.
- (b) miss class less often.
- (c) neither. My class attendance doesn't change leading up to a "big" game.

For questions 15-18: Compared to other games, after a winning a "big game" I tend to

- 15. (a) drink more alcohol.
- (b) drink less alcohol.
- (c) neither. My drinking behavior doesn't change after a big win.
- 16. (a) party more.
- (b) party less.
- (c) neither. My partying behavior doesn't change after a big win.
- 17. (a) spend more time studying for your classes.
- (b) spend less time studying for your classes.
- (c) neither. My studying behavior doesn't change after a big win.

18. (a) miss class more often.
(b) miss class less often.
(c) neither. My class attendance doesn't change after a big win.
19. Does the success of the University of Oregon football team decrease the amount of time you study for classes?
- (a) definitely (d) probably not
(b) probably
(c) not sure (e) definitely not
20. Have you consumed alcohol since the beginning of fall term this year?
- (a) yes (b) no