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# The impact of college football on academic achievement

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ABSTRACT

We revisit a recent study by Lindo, Swensen, and Waddell (2012), who found a negative relationship between the success of the University of Oregon football team and the academic performance of students as measured by grades. Using data from Clemson University, we also find that the football team's winning percentage is negatively related to academic performance. Although Lindo et al. (2012) found that the academic performance of male students was more sensitive to changes in the winning percentage than the academic performance of female students, we find evidence of the opposite phenomenon in the Clemson data. Moreover, the negative relationship between wins and academic performance at Clemson appears to persist into the spring semester.



## 1. Introduction

Athletic departments claim to support the academic mission of the university, a claim that is consistent with the results of McCormick and Tinsley (1987) and Pope and Pope (2014). McCormick and Tinsley argued that academics and athletics go hand in hand because the elimination of large-scale athletic programs appears to have a detrimental impact on enrollments and academic standards. Pope and Pope found that applications increased after successful football or basketball seasons. However, Clotfelter (2011) and Lindo, Swensen, and Waddell (2012) found evidence that big-time sports can negatively impact the academic performance of non-athletes.

We add to this body of research by analyzing the impact of having a successful football season on academic performance using data from a mid-sized public university: Clemson University, located in Clemson, South Carolina. Our study closely follows the specifications used by Lindo, Swensen and Waddell (henceforth LSW). LSW drew upon 9 years of data from the University of Oregon and focused on the academic performance of non-athletes. They found that increases in the winning percentage of the University of Oregon football team led to lower fall semester grades among both male and female students, although male students appeared to be more responsive to the winning percentage than female students. They also showed that male students consumed more alcohol and studied less than female students in response to increases in the winning percentage and, based on these findings, argued that the growing importance of college athletics may help explain why, nationwide, male academic performance is falling relative to female academic performance.

We revisit the LSW analysis using 20 years of data from Clemson University. Like LSW, we find successful football seasons are associated with lower grades. However, we find evidence that female students were actually more

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**Table 1**
Summary statistics.

| Student characteristics | (A) 1982–2002 | (B) 1983–1985 | (C) 1999–2001 | (D) Change (C – B) |
|---|---|---|---|---|
| Win percentage | 66.7% | 66.7% | 61.1% | −5.6% |
| SAT math | 566 | 554 | 576 | 22 |
| SAT verbal | 552 | 546 | 559 | 12 |
| Male | 0.56 | 0.57 | 0.54 | −0.03 |
| Age | 20.1 | 19.8 | 20.1 | 0.3 |
| Grade | 2.81 | 2.70 | 2.93 | 0.23 |
| Number of students | 89,602 | 18,337 | 23,678 | 5,341 |
| Number of courses attended | 2,512,127 | 321,482 | 410,410 | 88,928 |
| Number of observations | 999,383 | 83,395 | 108,540 | 25,145 |

responsive to the winning percentage of the football team than male students even when we allow the grades of each sex to follow independent quadratic trends, a specification that is absent in previous work. Moreover, we find evidence that the negative effect of a successful football season persists into the spring semester, albeit diminished in magnitude.

## 2. Data and variables

We observe grades earned in all undergraduate courses taken by Clemson students between 1982 and 2002. During this period, approximately 90,000 students took undergraduate courses at Clemson University, which is ranked among the top 100 national universities by *U.S. News and World Report*. Clemson University participates in the Bowl Championship Series (BCS) football conference, and its team has won multiple conference championships and one national championship. In addition to course grades, we also observe SAT scores for over three-quarters of the students who took courses during the period 1982–2002 and individual-level characteristics such as race, sex, and state of residency.[1] One important variable that we do not observe is whether the student was an athlete. As a result of this data limitation, we are unable to restrict our sample to non-athletes and instead estimate the effect of having a successful football season on the grades of all Clemson students. Out of the 15,000 undergraduates who attend Clemson each year, only about 450 are athletes, or approximately 3 percent.

Like LSW, we include student characteristics or student fixed effects on the right-hand side of our estimation equation. We also include subject-level fixed effects; for example, all 200-level economics courses share a fixed effect, all 300-level economics courses share another, while all 100-level English courses share a third. These fixed effects for course-level combinations allow us to capture the different traits and grading patterns in different subjects (Hernández-Julián & Looney, 2013). Including course fixed effects is next to impossible because course numbers were frequently modified, many new courses were created, and many courses were archived over the 20-year period under study.

[1] Some students take the ACT instead of the SAT; for others SAT scores are simply missing.

Table 1 provides descriptive statistics for our sample and illustrates how student characteristics and course choices changed over time. Between 1983 and 1985, the average undergraduate course grade measured on a four-point scale at Clemson was 2.70; between 1999 and 2001, this average had risen to 2.93. In addition, SAT scores rose while male enrollment as a proportion of total enrollment fell slightly.

## 3. Results

Following LSW, we begin by estimating a bare-bones specification:

$$G_{ijt} = \alpha + \theta \textit{Winning Percentage}_t + \in_{ijt}, \tag{1}$$

where $G_{ijt}$ is equal to the grade (on a four-point scale) earned by student $i$ in course $j$ and year $t$, and $\textit{Winning Percentage}_t$ is equal to wins per games played by the Clemson football team in year $t$. The results of this estimation are presented in the first column of Table 2. Results by sex are reported in Panels A and B of Table 2; results for the pooled sample of male and female students are reported in Panel C. An interaction between the sex of student $i$ and *Winning Percentage* is included in Eq. (1) when the pooled sample is analyzed. Our estimate of $\theta$ is −0.304 for male students and −0.439 for female students. These estimates are statistically significant at conventional levels and are significantly different from each other, suggesting that female students were more responsive to changes in the winning percentage of the Clemson football team than were their male counterparts.[2]

Following LSW, we add a linear time trend and its square to the right-hand side of Eq. (1). The results are reported in column (2) of Table 2.[3] With the addition of these variables, the estimated coefficient of *Winning Percentage* is no longer statistically significant except in the pooled sample. In column (3), we add student characteristics such as SAT scores, race, and residency; and in column (4) student fixed effects replace the student characteristics.[4] With student fixed effects on the right-

[2] One might expect that home games would matter more than those played away from home. When we distinguished between home and away wins, we found some evidence, albeit weak, of a positive relationship between the grades of male students and home wins.

[3] Following LSW, standard errors are clustered at the student level.

[4] The estimates reported in columns (1)–(6) of Table 2 are from the same specifications as were used by LSW in their Table 2.

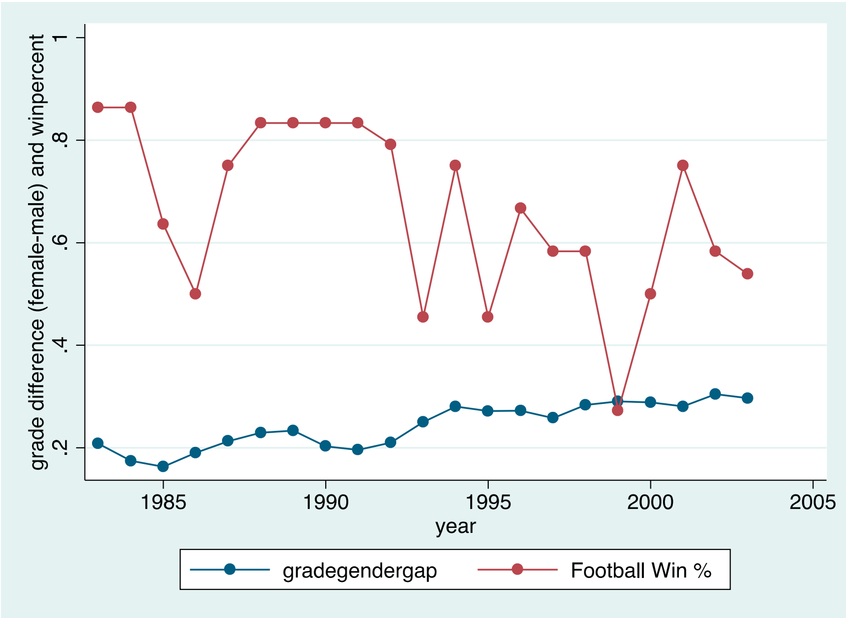


**Fig. 1.** Grades and win percentage over time.

**Table 2**
estimated impact of athletic success on male and female grades.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| **Panel A. Males** | | | | | | | |
| Winning percentage | −0.304*** | −0.006 | −0.011 | −0.007 | −0.004 | −0.006 | |
| | (0.016) | (0.016) | (0.016) | (0.014) | (0.013) | (0.013) | |
| Constant | 2.909*** | 2.583*** | 1.540*** | 2.107*** | 2.024*** | 1.670*** | |
| | (0.011) | (0.017) | (0.091) | (0.025) | (0.036) | (0.061) | |
| Observations | 554,213 | 554,213 | 517,469 | 554,213 | 554,213 | 554,213 | |
| *R*-squared | 0.002 | 0.007 | 0.083 | 0.336 | 0.454 | 0.454 | |
| **Panel B. Females** | | | | | | | |
| Winning percentage | −0.439*** | −0.023 | −0.023 | −0.016 | −0.026** | −0.026** | |
| | (0.016) | (0.017) | (0.016) | (0.014) | (0.013) | (0.013) | |
| Constant | 3.247*** | 2.771*** | 1.641*** | 1.830*** | 1.866*** | 1.706*** | |
| | (0.011) | (0.018) | (0.115) | (0.027) | (0.039) | (0.080) | |
| Observations | 445,170 | 445,170 | 423,867 | 445,170 | 445,170 | 445,170 | |
| *R*-squared | 0.005 | 0.017 | 0.102 | 0.351 | 0.482 | 0.482 | |
| **Panel C. Pooled** | | | | | | | |
| Winning Percentage | −0.439*** | −0.090*** | −0.092*** | −0.057*** | −0.037*** | −0.039*** | −0.029** |
| | (0.016) | (0.017) | (0.015) | (0.014) | (0.013) | (0.013) | (0.013) |
| Male × winning percentage | 0.136*** | 0.139*** | 0.136*** | 0.081*** | 0.039** | 0.0423** | 0.0235 |
| | (0.023) | (0.023) | (0.021) | (0.020) | (0.018) | (0.018) | (0.018) |
| Male | −0.338*** | −0.337*** | −0.302*** | | | | |
| | (0.016) | (0.016) | (0.015) | | | | |
| Constant | 3.247*** | 2.855*** | 1.761*** | 2.021*** | 1.992*** | 1.735*** | 1.686*** |
| | (0.011) | (0.015) | (0.068) | (0.018) | (0.027) | (0.049) | (0.050) |
| Observations | 999,383 | 999,383 | 941,336 | 999,383 | 999,383 | 999,383 | 999,383 |
| *R*-squared | 0.017 | 0.024 | 0.102 | 0.350 | 0.469 | 0.470 | 0.470 |
| **Controls (for all panels)** | | | | | | | |
| Time trend | None | Quadratic | Quadratic | Quadratic | Quadratic | Quadratic | Gender-specific quadratic |
| Student controls | No | No | Yes | – | – | – | – |
| Student level fixed effects | No | No | No | Yes | Yes | Yes | Yes |
| Subject-level fixed effects | No | No | No | No | Yes | Yes | Yes |
| Accumulated credits | No | No | No | No | No | Yes | Yes |

Standard errors in parentheses are corrected for clustering at the student level.
Student controls not presented include SAT scores, high-school class rank, age, and residency status.
The quadratic trend in columns (2)–(6) refers to including a both a linear time trend and its square to the right-hand side of the regression equation. Column (7) interacts these with the dummy variable for male students, allowing the quadratic trend to be gender specific.

* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

**Table 3**
Estimated effects across letter grade assignments.

| Grade | (1) A | (2) B | (3) C | (4) Fail |
|---|---|---|---|---|
| **Panel A: Controlling for time using quadratic trends** | | | | |
| Winning percentage | −0.014** | 0.003 | 0.003 | 0.008* |
| | (0.006) | (0.006) | (0.005) | (0.004) |
| Male × winning percentage | 0.019** | −0.009 | −0.005 | −0.005 |
| | (0.008) | (0.009) | (0.007) | (0.006) |
| Constant | −0.146*** | 0.452*** | 0.527*** | 0.167*** |
| | (0.011) | (0.014) | (0.012) | (0.009) |
| Observations | 999,383 | 999,383 | 999,383 | 999,383 |
| *R*-squared | 0.384 | 0.133 | 0.182 | 0.280 |
| **Panel B: Controlling for accumulated credits** | | | | |
| Winning Percentage | −0.014** | −0.002 | 0.005 | 0.011*** |
| | (0.006) | (0.006) | (0.005) | (0.004) |
| Male × winning percentage | 0.014* | −0.009 | −0.002 | −0.004 |
| | (0.008) | (0.009) | (0.007) | (0.006) |
| Constant | 0.162*** | 0.426*** | 0.322*** | 0.090*** |
| | (0.008) | (0.011) | (0.010) | (0.007) |
| Observations | 999,383 | 999,383 | 999,383 | 999,383 |
| *R*-squared | 0.384 | 0.133 | 0.181 | 0.280 |
| **Panel C: Controlling for time varying gender-specific quadratic trends** | | | | |
| Winning Percentage | −0.007 | −0.002 | 0.002 | 0.008** |
| | (0.006) | (0.007) | (0.005) | (0.004) |
| Male × winning percentage | 0.008 | 5.62e−05 | −0.002 | −0.006 |
| | (0.008) | (0.009) | (0.007) | (0.006) |
| Constant | −0.155*** | 0.459*** | 0.530*** | 0.166*** |
| | (0.011) | (0.014) | (0.012) | (0.009) |
| Observations | 999,383 | 999,383 | 999,383 | 999,383 |
| *R*-squared | 0.384 | 0.133 | 0.182 | 0.280 |

Regressions estimated on pooled sample of male and female students.
All regressions include subject-level and student fixed effects.
Standard errors in parentheses are corrected for clustering at the student level.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

hand side, an increase in *Winning Percentage* from 0 to 1 is associated with a 0.057 reduction grades in the pooled sample. Including subject-level fixed effects reduces this estimate still further, to −0.037. Interestingly, when subject-level fixed effects are included, the estimate relationship between *Winning Percentage* and grades is statistically significant when the sample is restricted to female students but not when the sample is restricted to male students. A similar pattern of results emerges when we control for accumulated credits in column (6).

During the period under study, the performance gap between female and male students at Clemson widened while the winning percentage of the football team fell (Fig. 1). To account for these trends, we experimented with including gender-specific quadratic time trends on the right-hand side of the estimating equation. The results are reported in column (7) of Table 2.[5] The estimated coefficient of the interaction between *Male* and *Winning Percentage*, although statistically insignificant ($p$-value = 0.19) is relatively large and positive. An increase in *Winning Percentage* from 0 to 1 is associated with a 0.029 reduction the grades of female students and a statistically insignificant 0.0055 reduction in the grades of male students.

As noted by LSW, the students receiving the highest grades (A's and B's) may respond differently to successful football seasons than those receiving lower grades (C's, D's and F's). We explore this possibility in Table 3 by replacing the grade earned by student $i$ in class $j$ with one of four indicators: the first is equal to 1 if student $i$ received a grade of A in class $j$, and is equal to 0 otherwise; the second is equal to 1 if student $i$ received a grade of B in class $j$, and is equal to 0 otherwise; the third is equal to 1 if student $i$ received a grade of C in class $j$, and is equal to 0 otherwise; and the fourth is equal to 1 if student $i$ received a grade of D or F in class $j$, and is equal to 0 otherwise. In Panel A of Table 3 we control for time using quadratic trends; in Panel B we include additional controls for accumulated credits; and in Panel C we include time varying gender-specific quadratic trends.

Controlling for the subject level of the course, student fixed effects, and a quadratic trend, we find a negative relationship between *Winning Percentage* and the probability that female students received an A. Specifically, an increase in the football team's winning percentage from 0 to 1 is associated with a 0.014 reduction in this probability. However, among males, an increase in the

[5] This specification was not used by LSW. However, LSW showed that the winning percentage of the Oregon football team and the grade gap between male and female students at Oregon moved independently, suggesting that their results are likely robust to the inclusion of gender-specific time trends.

**Table 4**
Estimated effects on GPAs by term.

| | (1) Fall | (2) Spring |
|---|---|---|
| **Panel A: Controlling for time with quadratic trends** | | |
| Winning Percentage | −0.068*** | −0.054*** |
| | (0.018) | (0.019) |
| Male × winning percentage | 0.096*** | 0.081*** |
| | (0.026) | (0.027) |
| Constant | 1.798*** | 1.623*** |
| | (0.024) | (0.027) |
| Observations | 202,214 | 178,452 |
| *R*-squared | 0.686 | 0.706 |
| **Panel B: Controlling for accumulated credits** | | |
| Winning percentage | −0.071*** | −0.062*** |
| | (0.018) | (0.019) |
| Male × winning percentage | 0.081*** | 0.061** |
| | (0.026) | (0.027) |
| Constant | 2.575*** | 2.541*** |
| | (0.009) | (0.010) |
| Observations | 202,214 | 178,452 |
| *R*-squared | 0.685 | 0.704 |
| **Panel C: Controlling for time with gender-specific quadratic trends** | | |
| Winning percentage | −0.021 | −0.022 |
| | (0.018) | (0.019) |
| Male × winning percentage | 0.013 | 0.023 |
| | (0.026) | (0.027) |
| Constant | 1.752*** | 1.587*** |
| | (0.024) | (0.027) |
| Observations | 202,214 | 178,452 |
| *R*-squared | 0.688 | 0.707 |

Regressions estimated on pooled sample of male and female students.
All regressions include subject-level and student fixed effects.
Standard errors in parentheses are corrected for clustering at the student level.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

**Table 5**
Estimated effects on GPAs by SAT score.

| | (1) All students | (2) Lowest tercile | (3) Middle tercile | (4) Highest tercile |
|---|---|---|---|---|
| **Panel A: Controlling for time using quadratic trends** | | | | |
| | Term GPA | Term GPA | Term GPA | Term GPA |
| Winning Percentage | −0.068*** | −0.070** | −0.053* | −0.062* |
| | (0.018) | (0.031) | (0.030) | (0.032) |
| Male × winning | 0.096*** | 0.090** | 0.049 | 0.103** |
| Percentage | (0.026) | (0.046) | (0.043) | (0.043) |
| Constant | 1.798*** | 1.226*** | 1.710*** | 2.553*** |
| | (0.024) | (0.040) | (0.039) | (0.046) |
| Observations | 202,214 | 63,996 | 69,344 | 68,874 |
| *R*-squared | 0.686 | 0.658 | 0.663 | 0.698 |
| **Panel B: Controlling for accumulated credits** | | | | |
| Winning percentage | −0.071*** | −0.072** | −0.051* | −0.065** |
| | (0.018) | (0.031) | (0.030) | (0.032) |
| Male × winning percentage | 0.081*** | 0.069 | 0.030 | 0.096** |
| | (0.026) | (0.046) | (0.043) | (0.044) |
| Constant | 2.575*** | 2.287*** | 2.533*** | 2.887*** |
| | (0.009) | (0.017) | (0.015) | (0.016) |
| Observations | 202,214 | 63,996 | 69,344 | 68,874 |
| *R*-squared | 0.685 | 0.659 | 0.662 | 0.697 |
| **Panel C: Controlling for time with gender-specific quadratic trends** | | | | |
| Winning percentage | −0.021 | −0.018 | −0.016 | −0.034 |
| | (0.018) | (0.031) | (0.030) | (0.032) |
| Male × winning percentage | 0.013 | −0.012 | −0.019 | 0.059 |

**Table 5** (*Continued*)

| | (1) All students | (2) Lowest tercile | (3) Middle tercile | (4) Highest tercile |
|---|---|---|---|---|
| | (0.026) | (0.046) | (0.043) | (0.044) |
| Constant | 1.752*** | 1.169*** | 1.672*** | 2.525*** |
| | (0.024) | (0.040) | (0.038) | (0.045) |
| Observations | 202,214 | 63,996 | 69,344 | 68,874 |
| *R*-squared | 0.688 | 0.661 | 0.664 | 0.698 |

Regressions estimated on pooled sample of male and female students.
All regressions include subject-level and student fixed effects.
Standard errors in parentheses are corrected for clustering at the student level.
* Significant at 10%.
** Significant at 5%.
*** Significant at 1%.

football team's winning percentage from 0 to 1 is associated with a (statistically insignificant) 0.005 increase in the probability of receiving an A. Using this same specification, we find than an increase in the football team's *Winning Percentage* from 0 to 1 is associated with a 0.008 increase in the probability that female students received an F. When we add a control for the number of credits a student completed, the pattern of results described above remains. However, when we add gender-specific quadratic trends, the relationship between *Winning Percentage* and the probability that female students received an A essentially disappears.

As a robustness check, LSW explored the effect of winning percentage on grades by quarter. They found that increases in the winning percentage of the Oregon football team were associated with lower grades in the fall quarter (i.e., during the football season) but not in other quarters. Clemson divides the year into semesters as opposed to quarters. While the spring quarter at Oregon typically starts in March, well after the football season ends, the spring semester at Clemson typically begins just a few days after the last of the Bowl games are played.

In Table 4, we examine the relationship between winning percentage of the Clemson football team and GPA distinguishing between the fall and spring semesters.[6] The three panels follow the same specifications used in Table 3. We find evidence of a negative relationship between *Winning Percentage* and the grades of female students in both the fall and spring semesters, but the estimates become much smaller and lose significance when gender-specific quadratic trends are included in Panel C.

Finally, LSW split their sample by both SAT scores and financial need. Due to data constraints we can only split our sample based on SAT scores. Table 5 presents results for all students in column (1). In the remaining columns, students who scored in the lowest, middle, and top terciles of the SAT distribution at Clemson are examined separately.[7] The results suggest that students across the ability distribution did worse in the fall semester when the winning percentage of the football team increased, and that females responded more strongly than did their male counterparts. These results, like those in the previous table, are not robust to the inclusion of gender-specific quadratic trends.

## 4. Conclusion

Using data from the University of Oregon, Lindo et al. (2012) found that a successful football season reduces the academic performance of non-athletes. Moreover, they found that this relationship was stronger among male students than among female students. They argued that the growth of college sports could explain why male college students are falling further and further behind female college students in terms of academic performance (Goldin, Katz, & Kuziemko, 2006).

In contrast, we find evidence that female students at Clemson were, if anything, more responsive to the winning percentage of the football team than male students. Given these divergent findings, it would appear that more research is necessary before we can attribute the performance gap between male and female students to the growth of college sports. Factors such as female enrollment, the history of the football program, selectivity and urbanicity may well affect which students respond to being exposed to a successful football season. For instance, the lack of response among male students at Clemson could be because they closely follow their football team regardless of its performance; at Oregon, male students could appear more responsive because they take time off from their studies only when their team is doing well.

Lindo et al. (2012) also found that the negative effect of a successful football season on academic performance was limited to the fall quarter. In contrast, we found that a successful football season is associated with reduced academic performance in both the fall and spring semesters. This result suggests that the impact of a successful football season may be longer lasting at institutions that divide the academic year into semesters as opposed to quarters.

Finally, it is worth noting that while a successful football season may hurt the grades of individual students, it still may benefit the academic reputation of the institution. Studies have shown that colleges receive more applications following good football seasons and may

[6] The number of observations in these regressions is much smaller, since the unit of observation corresponds to the GPA of student *i* in semester *j* instead of the grade earned by student *i* in a specific course.

[7] These regressions include the same controls as the previous table.

become more selective (Pope & Pope, 2014). Independent of the traits of the students, Mulholland, Tomic, and Sholander (2012) argue that administrators and faculty also hold other institutions in higher regard when have successful sports programs, increasing the college's standing in traditional rankings. When investing in football, or big-time sports in general, university leaders appear to face a tradeoff between the publicity and recruitment fostered by athletic success and its negative impact on student performance.

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