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Relations among Undergraduate Quality, Research Funding and Intercollegiate Athletics

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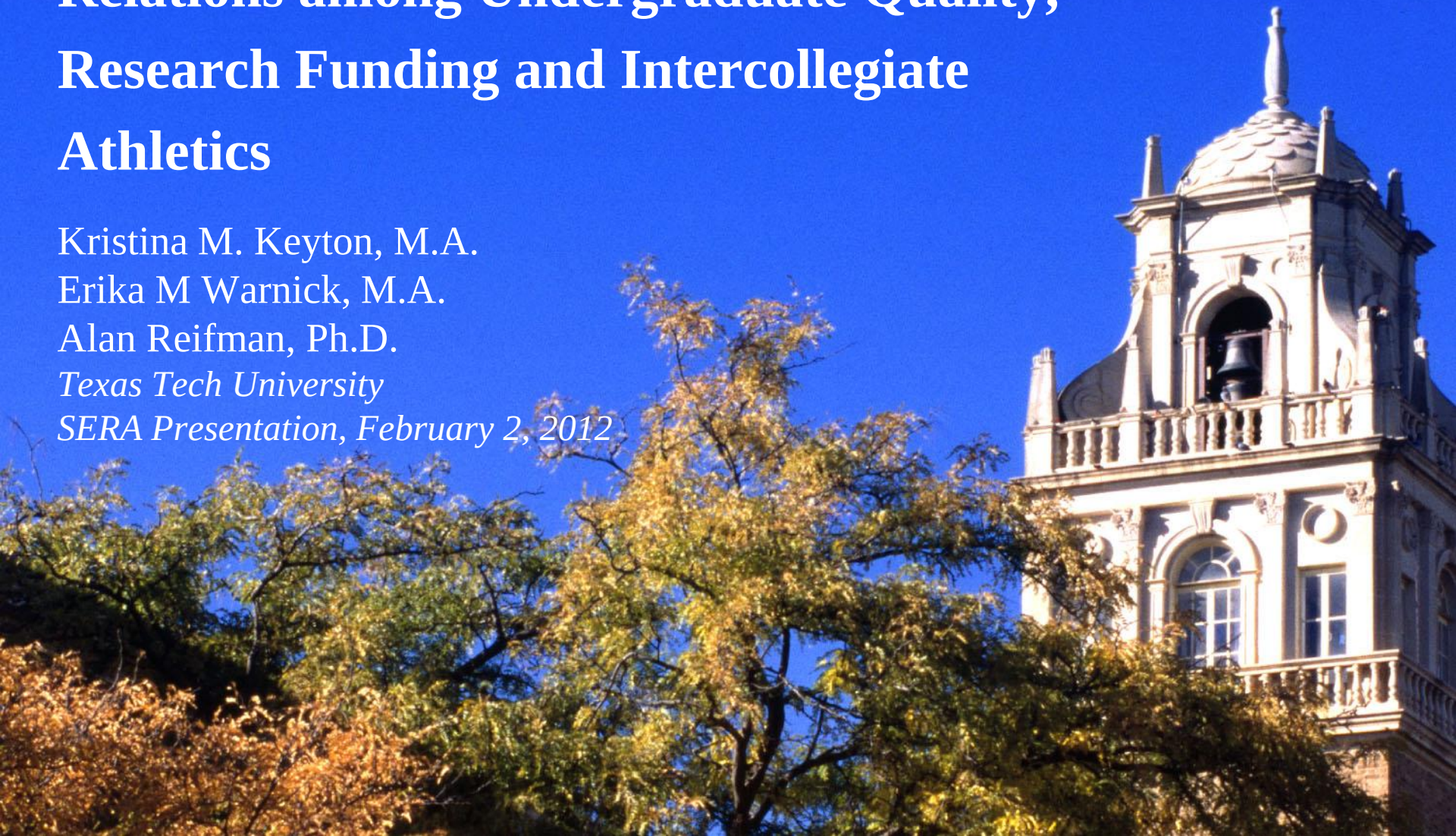


Introduction

- The present study seeks to contribute to the literature on universities' teaching, research, and athletic missions by testing a structural equation model that includes all three constructs.
- Previous studies appear to have evaluated only two of the three at a time. Further, undergraduate-student and faculty-research quality are studied dynamically over time through the use of latent growth-curves, a technique that does not appear to have received wide usage in this literature.
- Because previous findings have been mixed and arguments exist for teaching, research, and athletics having both antagonistic and strengthening effects on each other, our research should be considered a test of open research questions rather than of definitive hypotheses.

Literature Review

- Educators have long been concerned about the relationship between athletics, undergraduate excellence (student quality and educational rigor), and faculty research, and whether or not the three can harmoniously co-exist (Shulman & Bowen, 2001).
- Frederick Rudolph (1962) - as early as 1850, educators were concerned about athletics interfering with such activities as evening prayer (Rudolph, 1962, p. 76).
- Prior literature (Deford, 2005; Sperber; 2000) suggests that undergraduate quality, research, and athletics cannot be mutually compatible.
- Deford (2005) stated bluntly that "the first thing to understand about big-time sports and academia is that they simply cannot work. Never have and never will" (Deford, 2005, p.146).
- However…there is some evidence to suggest undergraduate excellence, research strength, and athletics are positively associated with one another.
  - Such evidence comes from both casual observation and systematic empirical research.

Literature Review, Continued

- Several members of the prestigious Association of American Universities (AAU), have strong athletic programs, often in Division I or IA.
- In 2009, the graduation rates of athletes were the "highest levels since the NCAA began calculating the rate eight years ago (79%, within six years), (Sander, 2009).
- Tucker (2005) found that athletic success has been associated with schools' general student recruitment. For the period from 1996-2002, "an increase of 10% in the winning percentage for a 5-year period increases average SAT scores by about 14 points, ceteris paribus. One additional appearance in the final AP top-20 ranking or an extra bowl appearance during the same period would increase the average SAT scores by more than 12 points" (p. 225).
- Gaski and Etzel, as cited by Fisher (2009), concur that "athletic success might yield a cumulative effect seen only over a long period of time" (Fisher, 2009, p.50).

Methodology

- Utilized archival data about U.S. colleges and universities gathered from publicly available sources.
- Schools included in the analyses were those involved in National Collegiate Athletic Association (NCAA) Division I athletics, which did not have excessive missing data. **The final sample consisted of 215 schools.**
- Quality of institutions' undergraduate student populations was assessed using mid-range SAT scores as reported in popular college guides including Barron's, *U.S. News and World Report*, and the Fiske Guide.
- Across institutions, SAT correlated extremely highly with other markers such as rejection rate and percent of students from the top 10% of their high-school graduating classes, thus seemingly making it a simple and effective indicator of undergraduate quality.

Methodology, Continued

- The 2001, 2005, and 2006 SAT data came from the annual *U.S. News and World Report* guides. The 2003 data were sourced from the other three guides.
- When multiple sources had data on the same school:
  - Data were cross-checked to verify that the guides were comparable.
  - For all years, if ACT only was provided, ACT scores were converted to their SAT equivalents using ACT, Inc.'s online conversion table.
  - Most guides published each school's 25th and 75th percentiles. These two ends of the range were averaged to get an approximation of the median.
  - Occasionally, only a median was published, which we used in these instances. For a few schools, in the 2003 data, both SAT and ACT information were available; in those cases, the original and ACT-converted SAT values were averaged.
- Universities' amount of grant-funded research was obtained online from The Center for Measuring University Performance (MUP) at Arizona State University.
  - Includes several markers of research involvement, including total (federal and non-federal) research expenditures. This variable was used to represent institutions' research/grant orientation.

Methodology, Continued

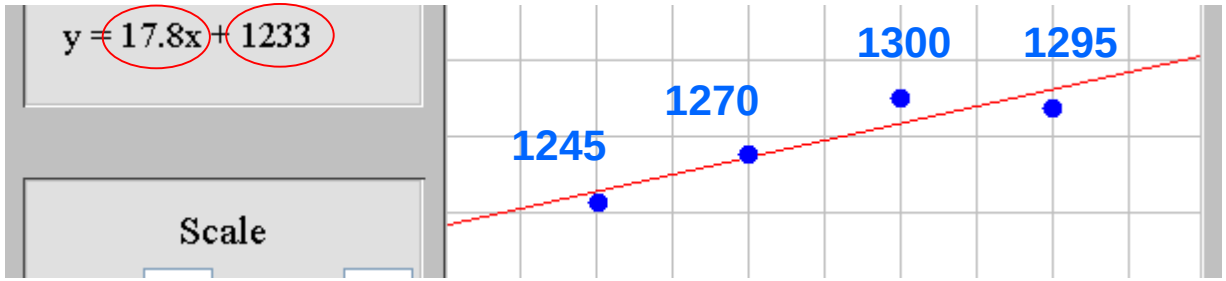
- Athletic scores were taken from the 2000-01 standings of the Directors' Cup. Points are awarded for schools' performances in all sports, with 100 points being awarded for a first-place national finish, 90 for second place, etc.
- Generally, schools that qualify for NCAA postseason tournaments receive some amount of points in a given sport.
  - For a supplemental analysis that examined the possible impact of football success, specifically, *USA Today's* final college-football computer rankings (by Jeff Sagarin) for both the 2000 and 2001 seasons were averaged (two seasons were used to increase reliability). Whereas the Directors Cup format awards points to the top schools but gives most schools zero, the Sagarin ratings provide a numerical rating for all schools.
- Control variables: age of the school as of 2001; whether school was classified as public (coded 0) or private (1); endowment the school had as of 2001, which was square root transformed because of non-normality and outliers.

CONCEPTUAL ANALOGUE OF GROWTH CURVES

Each School's SLOPE and INTERCEPT of Best-Fit Line Serve as Data Points (Boils down data from multiple assessments into two values)

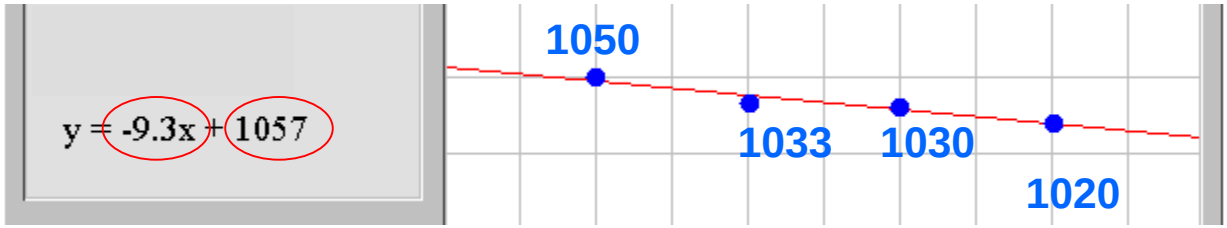
SLOPE and INTERCEPT
(trend) (initial value)

SAT EXAMPLES

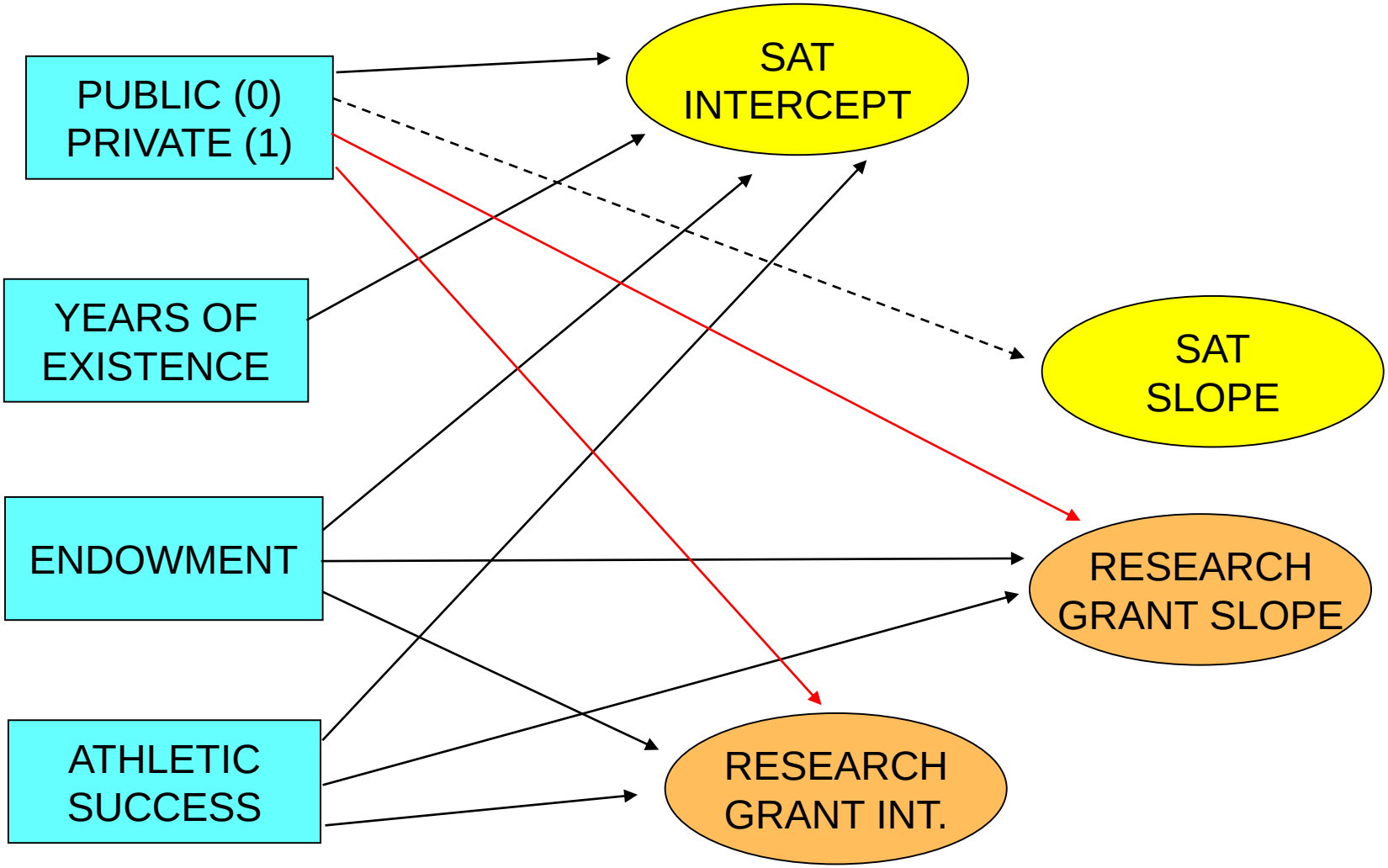


BUCKNELL UNIVERSITY

Note that slope is positive for upward trends, but negative for downward.



FLORIDA ATLANTIC UNIVERSITY



All four predictors had paths tested to all four outcomes, but only significant ones are shown (dashed path, *p* = .053). All paths are positively signed, except for ones in red, which are negative.

Key Results (Unstandardized Solution) and Interpretations

Latent Growth Modeling run in AMOS Structural Equation Modeling program.

- Overall model fit was strong: Normed, Tucker-Lewis, and Comparative Fit Indices ranged from .93-.96, although the Root Mean Square Error of Approximation, at .15, was larger than desirable
- Athletic success (2001) showed significant positive relations to SAT intercept (B = .09, p < .001) and research funding intercept (B = .25, p < .001), documenting concurrent associations.
- Prospectively, athletic success was positively related to total research slope (B = .04, p <.001), signifying that the more successful a school's sports performance in 2001, the more its total research funding grew from 2001-2006. Athletic success did not significantly predict change over time in SAT mid-range values.
- These results all control for the school attributes (private/public, years of existence, and endowment).

School Background Characteristics

- Private universities exceeded their public counterparts on SAT intercept (B = 79.5, p < .001) and slope (B = 6.0, p = .053). The private advantage was predominantly at the beginning of the study (i.e., a roughly 80-point difference), with growth between waves only about 6 points higher at private than at public institutions.
- Regarding research, private universities had lower intercepts (B = -81.7, p < .001; i.e., roughly $82 million less) and less rise (B = -12.9, p < .001) than their public counterparts. These findings for grant receipt may stem from some elite private institutions having relatively small faculties (< 1,000).
- Endowment was positively related to intercepts of SAT (B = 3.1, p < .001) and research funding (B = 3.9, p < .001), and to (rising) research slope (B = .81, p < .001).
- Years of existence significantly predicted only SAT intercept (B = .34, p < .01); for roughly every 30 additional years a school has been in existence, its mid-range SAT would be 10 points higher, all else being equal.
- Many of the background characteristics were significantly correlated with each other, the strongest links being between years of existence and endowment (r = .60, p < .001), and athletic success and endowment (r = .50, p < .001).

Supplementary Analysis

- The athletic findings above pertain specifically to schools' overall portfolios, sometimes including teams in 20 or more sports.
- Because football usually is the focal point when a school seeks to enhance its athletic profile, a supplemental model was run, substituting football success for overall athletic success.
- There were no significant relationships between football success and SAT or research-funding intercepts or slopes.
- However, because many Division I athletic schools do not field football teams, the sample size was reduced to 107 for these analyses.

Discussion

What do our results say about the intersections of undergraduate teaching/student quality, faculty research, and athletics?

- Controlling for university background characteristics such as years of existence, public/private, and endowment, we found undergraduate quality and research funding to be surprisingly independent of each other.
- Tentative evidence was found for an overall, well-rounded athletic program possibly enhancing a university's research portfolio.
- The latter finding may result from successful teams making a university more attractive to prospective faculty members (those who follow sports, at least) or athletic success signifying a robust campus atmosphere of activity, including not just sports and academics, but other extra-curricular endeavors.

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