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Do high school sports build or reveal character? Bounding causal estimates of sports participation[☆]



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ABSTRACT

We examine the extent to which participation in high school athletics in the United States has beneficial effects on future education, labor market, and health outcomes. Due to the absence of plausible instruments in observational data, we use recently developed methods that relate selection on observables with selection on unobservables to estimate bounds on the causal effect of athletics participation. We do not find consistent evidence of individual education or labor market benefits. However, we do find that male (but not female) athletes are more likely to exercise regularly as adults, but are no less likely to be obese.

1. Introduction

Participating in sports is a cultural rite of passage for adolescents in many countries, including the United States. According to the National Federation of State High School Associations (NFHS), in the US, 7.9 million high school students (56%), play some kind of sport. Sports participation has also trended upward over time, and participation in sports organized by high schools has increased steadily over the past 25 years (National Federation of State High School Associations, 2017).

Given widespread participation in sports, it is natural to ask if the benefits outweigh the costs, both to individual athletes and to schools. While potential benefits of sports participation on long-term individual outcomes have been widely publicized (Dick's Sporting Goods, 2017), participating in athletics may be costly for individual students by taking time away from academic pursuits (Coleman, 1961) or increasing injury risk (Fair & Champa, 2017). Moreover, maintaining athletic programs is a non-trivial cost for schools—so much so that athletic programs are being dropped from an increasing number of school districts. It is estimated that 27% of public high schools will have no athletic programs by the year 2020 (Dick's Sporting Goods, 2017; Up 2 Us Sports, 2017). This is a particularly surprising trend in light of the continued growth in

the number of students participating.

The primary question amid the debate of whether to maintain funding for high school athletics is whether or not athletic participation benefits students in line with the purposes of schools. That is, does participation enhance human capital of students in ways that will improve their lives, as opposed to simply providing an enjoyable recreational activity? We add our analysis to a large number of previous studies that have used observational data to also investigate this question. The primary empirical approach in existing studies has been to either assume that athletes are randomly assigned, or to use instrumental variables or quasi-experimental policy changes to estimate a plausibly causal effect. We take a different approach by instead asserting that, outside of one-time large-scale policy changes, no plausibly exogenous instruments exist. Instead, we make use of recently developed econometric methods that relate selection on observables with selection on unobservables to bound the causal effects of participation in high school sports (see also Altonji, Elder, & Taber, 2005b; Krauth, 2016; Millimet & Tchernis, 2013; Millimet, Tchernis, & Husain, 2010; Oster, 2017).

The econometric method we utilize in our analysis is developed by Krauth (2016) and allows researchers to empirically test the extent of

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deviations from exogeneity in a linear model with univariate treatment. Specifically, this method puts bounds on the correlation between the policy variable and the unobservable characteristics relative to the correlation between the policy variable and observable characteristics. We implement the method as a sensitivity analysis to include the case where sports participation is correlated with the error term in the outcome equation.

Athletic participation is strongly positively correlated with a number of outcomes—including high school graduation, college attendance, college graduation, wages, exercise habits, and absence of obesity—but we find that this correlation is almost completely due to selection. For most of the outcomes that we consider, we find that even if the correlation between athletic participation and unobservable characteristics is a small fraction of the correlation between athletic participation and observable characteristics, then there is no effect of sports. Across several different outcomes and different samples, we find no consistent benefit from high school sports. However, in a few cases that we discuss below, we do find statistically significant effects from sports participation that are arguably causal.

We analyze three separate nationally representative longitudinal surveys that link athletic participation in high school with future individual outcomes such as post-secondary education, labor market earnings, health, and propensity to engage in risky behaviors. The three surveys are the National Longitudinal Survey of Youth, 1979 (NLSY79); the National Education Longitudinal Study of 1988 (NELS:88); and the National Longitudinal Study of Adolescent to Adult Health (Add Health). Each of these studies has been used previously by researchers to analyze effects of high school sports, but no study has jointly analyzed all three.¹

Our primary contributions are three-fold: (i) to assess the sensitivity of previous causal claims using recently developed econometric methods; (ii) to document the impact of sports participation on health and behavioral outcomes in addition to education and labor market outcomes; and (iii) to examine heterogeneity in the effects by gender.

Our generally null results inform the policy debate on high school sports by providing evidence against claims that sports foster skills that improve educational or labor market outcomes. Such skills, often mentioned by proponents of high school athletics, include leadership, teamwork, patience, persistence, and positive health habits (Dick's Sporting Goods, 2017). There are two potential pathways through which this null effect might operate. First, participation in sports requires a minimum level of social or health skill. For sports participation to be causal, it would need to be the case that post-participation skill levels among athletes be even higher than the initial levels of these skills. Second, even if sports raise the level of these skills among participants, it is possible that alternative activities such as non-athletic clubs also foster these skills. That is, sports participation might crowd out other activities that would encourage accumulation of the same or similarly valuable skills.

Our paper proceeds as follows. In the next section, we outline the relevant variables from our various data sources. Section 3 discusses reasons for why athletics might have an impact on future outcomes and also discusses identification problems and how our method overcomes them. Section 4 presents our primary empirical results, and Section 5 concludes.

2. Data

Our analysis makes use of three separate nationally representative American data sets that survey youth during their secondary school

¹ Ewing (1998), Barron, Ewing, and Waddell (2000), and Ewing (2007) use the NLSY79; Anderson (1998), Anderson (2001), Leeds, Miller, and Stull (2007), Lipscomb (2007), and Troutman and Dufur (2007) each use the NELS:88; and Gory (2016) and Rees and Sabia (2010) both use the Add Health.

years with repeated surveys into their adult life. The three studies we use are: (i) the National Longitudinal Survey of Youth 1979 (NLSY79); (ii) the National Education Longitudinal Study of 1988 (NELS:88); and (iii) the National Longitudinal Study of Adolescent to Adult Health (Add Health).² Each survey contains slightly different information on sports participation, as well as other contextual variables and outcomes. Below, we summarize the similarities and differences among the three surveys.

2.1. NLSY79

The NLSY79 surveyed 12,686 American youth who were between the ages of 14 and 22 in 1979 and followed respondents annually or biennially for 25 rounds, until 2012. Youth were sampled at the household level, and all interviews were conducted at home. The NLSY79 includes data on the following topics which are relevant to our analysis: (i) personal and family background, including cognitive and non-cognitive test scores, race, ethnicity, family income, parental education, parental co-residence, and year of birth³; (ii) high school sports participation; (iii) educational attainment, including high school graduation, post-secondary college attendance, and four-year college graduation; (iv) labor market outcomes, including full-time employment status and wages; and (v) health outcomes such as height and weight, which we use to compute Body Mass Index (BMI), the metric used to diagnose obesity.

The sports participation question in the NLSY79 is asked in the fifth round of survey, when respondents would have been between 19 and 27 years old, and asks respondents to select from a list all high school clubs or extracurricular activities they had participated in. The list of activities includes student government, performing arts, yearbook/newspaper staff, National Honor Society, and “athletics, cheerleading, or pep clubs.” An additional question asks each respondent to identify the activity that he/she was “most active in.” We consider this alternative definition in a robustness check later on.

2.2. NELS:88

The NELS:88 was conducted by the United States National Center for Educational Statistics (NCES). The potential sample consists of about 25,000 students from 1052 randomly selected public and private schools in the United States. Respondents were 8th-grade students in 1988 at the time the survey was initiated. (Each school could contribute up to 26 students to the sample.) The study conducted four additional follow-ups: in 1990 (when most of the cohort was in the 10th grade); in 1992 (12th grade); again in 1994 (two years after most students had left high school); and a final follow-up in 2000 (when most students would have been out of high school for eight years). The survey includes responses from students, parents, teachers, and school administrators, so there are detailed data about parental background, school activities, and school characteristics. The NELS:88 contains information on race, ethnicity, family income, parental education, parental co-residence, and intelligence test scores. We observe post-secondary education and college graduation as educational outcomes. Labor market outcomes include full-time employment status in 2000 and earnings in 1999. Respondents also report exercise and drinking habits in the final round of the survey.

² There is a fourth survey that tracks American youth through adulthood. The 1997 panel of the NLSY (the NLSY97) surveyed 8984 youth who were born between 1980 and 1984. The panel began collecting data in 1997 and completed its 17th round in 2015. The NLSY97 does not collect information on participation in extracurricular activities during high school, so we are unable to use it in our analysis.

³ We use as the cognitive test score the Armed Forces Qualifying Test (AFQT) score. For the non-cognitive test score we use the Rotter Locus of Control, which is a measure of the extent to which individuals believe their outcomes are due to their own effort, or due to luck. The Rotter score in the NLSY79 has a maximum of 16, with lower values corresponding to more “control” and higher values corresponding to more “luck.”

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