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From High School Jocks to College Grads

Assessing the Long-Term Effects of High School Sport Participation on Females' Educational Attainment

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Various studies show that interscholastic sport participants, and specifically female athletes, enjoy numerous educational benefits at the high school level. Because of the influx in the number of females engaging in high school sport that has occurred during the past 30 years, few studies have been able to adequately assess whether females' involvement in interscholastic sport has any long-term consequences. In this study, the authors examine whether females who participated in high school athletics are more likely to graduate from college than are their counterparts. The authors use data from the National Education Longitudinal Study and employ multilevel models with random effects. They find that females who engage in interscholastic high school sport have higher odds of completing college than do their counterparts.

Keywords: *academic achievement; extracurricular activities; postsecondary education*

Numerous studies centered on high school athletics have demonstrated that participants in interscholastic sport enjoy various positive benefits from their involvement. Although some investigations have examined long-term implications and effects of high school sport participation, they tend to ignore female athletes. Because women's increased participation in high school sport is a relatively recent development, exploding during the past 30 years in part

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because of legislative intervention designed to provide more opportunities for women, investigations may now begin to look at whether the positive effects of women's sport participation persist or dissipate over time. In this article, we examine the long-term effects of high school sport participation on females' postsecondary educational attainment.

Literature Review

Coleman's (1961) work on adolescence and education in the United States is commonly recognized as the study that prompted sociological attention on athletic participation and academic achievement. He proposed that extracurricular activities were detrimental to an individual's success in school. Time and energy allotted to these activities diverted time away from academic pursuits. This notion, that time on nonacademic endeavors directly competes with and thus detracts from time on academic endeavors, implies a zero-sum theory. The solitary analysis that has supported this theory as it relates to athletic involvement (Landers, Feltz, Obermeier, & Brouse, 1978) looked only at males and did not use a nationally representative sample or control for socioeconomic status (SES). Because research tends to offer support for the presence of a positive relationship between sport participation and academic achievement, numerous theories explaining this relationship have been proposed. The key assumptions of these theories are that sport involvement serves as a socialization and integration mechanism.

Nationally representative analyses on sport involvement's more immediate effects, or those experienced at the time of involvement, have uncovered various positive benefits related to this extracurricular activity. In terms of health, student athletes report fewer mental problems, eating and dietary problems, and general health problems than do nonathletes (Steiner, McQuivey, Pavelski, Pitts, & Kraemer, 2000). In addition, high school athletes report higher self-concepts, express a more internal locus of control, and have fewer discipline problems (Broh, 2002; Fejgin, 1994; Marsh, 1993). Involvement in interscholastic sport is also related to academic achievement. Participants have higher grades, spend more time on homework, have higher educational aspirations, and are more likely to attend college than are their counterparts (Barnes, Farrell, Melnick, Miller, & Sabo, 1999; Broh, 2002; Eccles & Barber, 1999; Fejgin, 1994; Hanks, 1979; Marsh & Kleitman, 2003).

The benefits of sport are not, however, generalizable to all forms of extracurricular activities. Broh's (2002) study compared student academic

achievement (measured by senior year math and English grades and reading and math test scores) across various extracurricular activities and found interscholastic athletic participation to be "the most beneficial form of participation for students' achievement" (p. 84).[1] All other activities either had less influence on academic achievement, no influence, or, in the case of vocational clubs and intramural sports, a negative influence on academic success (see also Marsh & Kleitman, 2003). A similar study that compared extracurricular activities' influence on students found that athletic participation significantly reduces a student's likelihood of dropping out, whereas involvement in academic or vocational clubs has no effect (McNeal, 1995).[2] Researchers attributed these positive effects of sport in part to the stronger social ties and bonds associated with this activity. Compared to various other extracurricular activities, interscholastic sport requires a more time-intensive commitment, resulting in more frequent interaction with members of the group and membership in larger, more intense social networks (Broh, 2002; McNeal, 1995).

Studies examining the postsecondary educational effects of participation in high school sport have found that athletic participation is positively related to college attendance (Braddock, 1981; Eccles & Barber, 1999; Hanks, 1979) and educational attainment (Howell, Miracle, & Rees, 1984; Otto & Alwin, 1977). A problem with many of these studies, however, is that they have neglected including females in their sample (Braddock, 1981; Howell et al., 1984; Otto & Alwin, 1977). Given the small percentage of women participating in sport in many of the samples used, it is not surprising that women were excluded. In 1971 only 7.5% of high school athletes were female. This percentage has increased dramatically during the past few decades, and in 1996 girls made up approximately 40.0% of high school athletes (U.S. Department of Education, 1997). The change in the number of females engaging in interscholastic sport has largely been attributed to Title IX of the Education Amendments of 1972, which prohibited any institution receiving federal funding from practicing gender discrimination in educational programs or activities. The large increase in the number of females participating in sport has led to numerous investigations on athletic participation's effect on females. Recent studies have discovered that adolescent girls involved in sport experience some unique benefits.

Female adolescent athletes have been found to enjoy benefits related to mental health, self-confidence, and academic achievement. Gore, Farrell, and Gordon's (2001) analysis found that participation in team sports helped protect girls, but not boys, with low GPAs from depression. Hanson and Krauss's (1998) investigation revealed that female sport participation was

positively related to success in science, math, and engineering in the participants' sophomore and senior years of high school. This finding was not true of male athletes. Instead, boys' involvement in sport either had no effect or a negative effect on success in these subjects. Female athletes have also been found to be more achievement oriented, independent, self-confident, and inner controlled than their nonparticipating female counterparts (Sabo, 1993). These findings suggest that athletic participation has considerable benefits for females at time of involvement. Whether women continue to enjoy these benefits later in life is largely unknown.

Although all of these benefits are worthy of investigation, this study centers on the relationship between female high school athletic participation and college completion because of relatively recent increases in both. In 1971, 13.8% of women between the ages of 25 and 29 had bachelor's degrees; by 1996, this percentage had risen to 28.2%, surpassing males by 2.0% (U.S. Department of Commerce, Bureau of the Census, 2002). Although there is evidence of a relationship between females' former interscholastic sport involvement and college attendance, the question of whether these women are more likely to graduate from college remains. Two studies that did include females in their sample concerning sports' postsecondary educational effects offer some valuable insight on this relationship.

The first of these (Sabo, Melnick, & Vanfossen, 1993) tracked postsecondary educational and occupational progress of high school athletes who graduated in 1982. Longitudinal data for this analysis were obtained from the High School and Beyond study (1980-1986). Sabo et al. (1993) found that high school athletic participation was significantly related to the educational progress of rural and suburban White females and rural Hispanic females. Athletic participation was unrelated to Black females' college attendance and progress. It should be noted, however, that the expansion of sport opportunities for young women and the removal of the negative stigma attached to female athletes were still underway when the women in this study were in high school (Hanson & Krauss, 1998). In particular, subsequent court decisions (*Cohen v. Brown [II]*, 1997; *Homer v. Kentucky High School Athletic Association*, 1994; *Kelley v. Board of Trustees, University of Illinois*, 1994; *Pedersen v. Louisiana State University*, 2000) have interpreted Title IX to require high schools and colleges to provide proportional athletic opportunities for girls, leading in part to the substantial increase in female participation since the High School and Beyond data were collected.

A second study (Marsh & Kleitman, 2003) offers a more up-to-date analysis on the relationship between females' high school sport involvement and postsecondary education. This investigation draws from the first four

waves (1988, 1990, 1992, and 1994) of the National Education Longitudinal Study (NELS), which examines the high school graduating class of 1992. Marsh and Kleitman (2003) discovered that 2 years after high school (1994), former athletic participation had positive effects on university enrollment, months in university, educational aspirations, and highest level of postsecondary education achieved. Because the data set only allowed for analyses of educational attainment 2 years following high school graduation, whether former athletes were more likely to complete college could not be determined. Investigating whether high school athletes are more likely to graduate from college is important because it is the completion of a bachelor's degree that is indicative of an individual's occupational opportunities and ultimate earning power (U.S. Department of Education, 2004).

This study adds to the ongoing investigation of educational effects of sport by looking at the relationship between females' participation in high school sport and postsecondary educational attainment. College completion is an appropriate dependent variable for this study because the recent increase in the number of women earning bachelor's degrees parallels the increased number of girls playing high school sport. Educational attainment is also useful to examine because of the immense impact it has on an individual's future; better educated people enjoy higher pay and lower levels of unemployment (U.S. Department of Labor, 2003) and live longer and healthier lives (Evans, 1994). Furthermore, this analysis makes the comparison between female athletes and female nonathletes to produce a more accurate analysis of sport's academic effects on females because, despite improvements, females' access to athletic participation opportunities continues to be disproportional to males (Braddock, Sokol-Katz, Greene, & Basinger-Fleischman, 2003), and thus comparisons between male and female athletes may be problematic. We expect that female sport involvement is related to long-term consequences and that women who participate in interscholastic high school sports are more likely to graduate from college than are women who do not participate.

Method

Sample

Our analysis of the effect of female high school sport involvement on attainment of a bachelor's degree draws on data from the NELS sponsored by the National Center for Education Statistics (2000), U.S. Department of

Education. The base-year study, conducted in 1988, used a stratified, clustered national probability sample of 1,052 private and public schools and 24,599 eighth graders. Data for each student were collected by means of questionnaires given to students, parents, teachers, and school administrators. Follow-ups 1 and 2 were conducted in 1990 and 1992, when respondents were in 10th and 12th grades, respectively. Follow-ups 3 and 4 were conducted in 1994 and 2000, 2 years and 6 years after the normal time of high school graduation, respectively. Response rates for all follow-ups were higher than 85%.

The NELS currently provides the most recent nationally representative longitudinal data on high school sport participation and educational attainment. Questions in the first three waves allow for the separation of interscholastic sport participation from other types of participation (e.g., intramural or nonschool sports). Information on students' postsecondary educational attainment 6 years following high school completion is particularly important for this investigation because we are looking specifically at completion of a bachelor's degree, which, on average, takes 55 months from first enrollment to achieve (U.S. Department of Education, 2003). The longitudinal design of the NELS is also essential because it allows us to assess change over time. By examining measures of various independent variables at two points in time, a stronger case for the causal relationship between sport participation and postsecondary educational attainment can be made (Broh, 2002; Melnick, Vanfossen, & Sabo, 1988; Sabo et al., 1993).

Although the NELS does not have information on senior high school grades or GPA, it does offer standardized test scores. These scores are more objective than grades because they eliminate the potential bias of teachers' reports. Also, the fourth wave of the NELS does not provide information on respondent's self-esteem, locus of control, or social capital indicators, which may have direct or indirect effects on college graduation. Even so, the NELS currently provides the best available data to answer the question of whether female sport involvement is related to college completion.

This study uses data from four waves of the NELS (1988, 1990, 1992, and 2000). Students must have participated in the 8th grade base-year survey, remained in high school through 12th grade, have valid measures for highest postsecondary educational attainment in 2000, and be female to be included in the analysis. Our original sample of females consisted of 6,362 cases and dropped to 5,103 when all missing cases on highest postsecondary degree attained as of 2000 were eliminated.

Heckman's two-step correction method was used to address sample selection bias. Because we are interested in whether sample members graduated

from college and only those who attended college can report whether or not they graduated, a selection problem arises. Heckman's two-step approach helps counter this problem by allowing for the modeling of both the selection component (college attendance) and the selected component (college completion) of the distribution (Hoffmann, 2004). In the first step of Heckman's method, the selection of students into attending college at all is estimated using a probit model. The independent variables for this selection equation are SES, parent's educational expectations, and race.[3] The coefficient estimates produced by this model allow for the construction of a correction coefficient. The second step of Heckman's method involves running an explanatory probit, or in this case logit, model with this newly obtained correction coefficient and all other variables in the model.

Measures

Table 1 describes the variables used in this analysis. A dichotomous variable was created to measure the dependent variable, completion of bachelor's degree. Respondents' answers to highest level of postsecondary education attained as of 2000 were grouped into categories consisting of any education below a bachelor's degree (0) or a bachelor's degree and any education higher than this (1).

The primary independent variable, high school athletic participation, was created by combining a series of students' answers on the subject in the 10th and 12th grades. Participation in any level (junior varsity or varsity) or type (baseball or softball, basketball, football, soccer, swimming, and other team or other individual sport) of interscholastic sport in 10th or 12th grades was grouped into one variable and coded 1. All other categories (school does not offer sport, did not participate, played intramural sports, and missing) were coded 0. Any participation in high school sport, rather than continuous involvement, is assessed here because it provides the strictest measure of the long-term effect of sport.

Previous research has found that educational expectations, standardized test scores, high school grades, SES, family size and composition, race, type of school and school neighborhood (Frehill, 2000; Hanks, 1979; Haveman & Wolfe, 1994; Hofferth, Boisjoly, & Duncan, 1998; Kao & Thompson, 2003; Persell, Catsambis, & Cookson, 1992; Sabo et al., 1993; Smith, Beaulieu, & Seraphine, 1995) influence postsecondary educational attainment. All of these variables except high school grades were available through NELS and are included in our model as background and control variables. Along with these, we control for participation in intercollegiate

Table 1
List of Concepts, Variables, Metrics, and Means or Modes Used for Substitution

Concept or Variable	Description	Metric (Mean or Mode)
Dependent variable		
College completion (2000)	Student's report of highest educational attainment as of 2000	1 = bachelor's degree or higher; 0 = less than bachelor's degree
Independent variable		
Participated in interscholastic sport (1990 and 1992)	Combination of student's report of participation in baseball or softball, basketball, football, soccer, swimming, other team sport, other individual sport in 10th grade or 12th grade	1 = participant; 0 = otherwise
Individual-level control variables		
Student's educational expectations (1988 and 1992)	Student's report of how far in school she or he thinks she or he will go	1 = bachelor's degree or higher; 0 = less than bachelor's degree
Composite test score (1988 and 1992)	National Education Longitudinal Study (NELS) composite of student's standardized test scores for math and reading	1988: 32.4-75.81 (μ = 51.8317); 1992: 28.37-70.81 (μ = 51.4969)
Socioeconomic status (1992)	NELS composite created using parent's report of education, occupation, total household income	–2.889 to 2.541 (μ = –.07256)
Race/ethnicity (1992)	NELS composite based on student report of race	Dummy variables differentiating Asian and Pacific Islander, Hispanic and American Indian, Black, and White respondents. White is the reference group.
Family size (1992)	NELS composite constructed from questions administered to parents on the total number of people living with teen	1-10 (mode = 4)

Family composition (1992)	NELS composite of a series of questions administered to parents regarding with whom their teen lives	1 = mother and father; 0 = otherwise
Participated in college sports (1994)	Student's report of participation in intercollegiate varsity sport	1 = participated; 0 = otherwise
Postsecondary grades (2000)	Student's report of grades at postsecondary institution	1 = *D*s and below; 7 = mostly *A*s
School-level control variables		
Type of school (1992)	School administrator's report of school type	1 = private; 0 = otherwise
School neighborhood	NELS assessment of school setting	Set of dummy variables: urban, suburban, rural. Suburban is the omitted category.

sport and postsecondary grades that might influence educational attainment in the form of athletic and academic scholarships.

A dichotomous variable was created for student's educational expectations in 1988 and 1992. Students' aspirations of attaining a bachelor's degree or higher were grouped into one category (1), whereas anything lower than this was coded 0. NELS composite for standardized test scores in 8th grade and 12th grade was used to tap ability because it takes into account the student's math and reading scores.[4] Mean substitution was used for all missing cases in this variable. SES and family size were also measured using the NELS composite scores. The NELS composite score for SES combines parents' report of occupation, income, and highest level of education attained. The combination of parents' responses on how many people live in the household with their teen was used to create NELS composite for family size. Mean substitution was used for all missing cases in SES, whereas mode substitution was employed for missing cases in family size. We created dummy variables to account for mean and mode substitution in all of these variables. Apart from family size, these background variables are expected to have a positive effect on college completion.

A dichotomous variable was created to measure family composition, with mother and father in the home coded 1 and all other family types coded 0. To assess race, dummy variables were created with White serving as the reference group and a categorical dummy variable distinguishing any missing cases. Research suggests that individuals from families where both parents are in the home are more likely to complete college and that Asians and Whites attend and complete college at higher rates than do other groups (Frehill, 2000; Haveman & Wolfe, 1994; Hofferth et al., 1998; Kao & Thompson, 2003). Intercollegiate sport participation was measured with a dichotomous variable (0 = did not participate, 1 = participated), and postsecondary grades were measured with an ordinal variable ranging from 1 to 7.

A dichotomous variable was created to measure school type with the various types of private schools (religiously affiliated and nonaffiliated) equal to 1 and all public schools equal to 0. To measure school neighborhood, dummy variables were created with suburban serving as the reference category and a categorical dummy variable indicating any missing cases. Based on past research, it is anticipated that individuals who attended private high schools and go to schools in suburban neighborhoods will be more likely to complete college (Hofferth et al., 1998; Kao & Thompson, 2003; Persell et al., 1992; Smith et al., 1995).

Estimation

Logistic regression is used to examine whether females who played sport in high school are more likely to graduate from college because of the dichotomous nature of the dependent variable, college completion. The advantage of this function is that the estimates cannot go outside the 0 to 1 range of the dependent variable. This type of analysis allows for the estimation of the log odds of females' attainment of a bachelor's degree, which can be converted into the odds ratio.

Multilevel logistic regression models with random effects are estimated, as opposed to regular logistic models, because our data include individual-level and school-level variables; as a result, our data violate assumptions of ordinary regression. The individuals in our sample are not independent but rather are nested within another unit of analysis—schools. Students attending the same school are more likely to have similarities than are students who attend different schools. Multilevel models with random effects are able to take this dependence into account and alleviate problems such as biased standard errors caused by correlated error terms (Hoffmann, 2004).

Multilevel models employ separate equations for two levels and are represented by the following:

$$\begin{aligned} \text{Level 1 (students): } y_{ij} &= \pi_{ij} + e_{ij} \\ \text{Logit } (\pi_{ij}) &= \alpha_j \\ \text{Level 2 (schools): } \alpha_j &= \alpha + u_j \end{aligned}$$

In these equations, y_{ij} signifys the binary dependent variable, college completion for student i in school j. The expected value of y_{ij}, that is, the probability of college completion, is conveyed by π_{ij}. The inclusion of two random errors marks the primary difference between these equations and logistic regression. Level 1 error e_{ij} represents unmeasured student characteristics affecting college completion, and Level 2 error u_j represents unmeasured school-level variables influencing this outcome. The college completion rate of the jth school is treated as randomly varying across schools instead of as a constant (Johnson & Hoffmann, 2000).

Multilevel models with random effects extend the logistic linear combination of the explanatory variables, written as

$$\eta_l = \beta^T x_i$$

by introducing a random intercept u_i into the linear predictor, so the equation reads as follows

$$\eta_{ij} = \beta^{T}x_{ij} + u_i$$

with η_{ij} signifying the binary dependent variable, college completion for student i in school j. The random intercept, u_i, is independently normally distributed and has a mean of 0 and a variance of r^2 (Rabe-Hesketh & Everitt, 2004).

Analytic Strategy

We begin our analysis by comparing the means of all the variables included in our model by participation in high school sport. We then employ multilevel logistic regression models with random effects on college completion and participation in any high school sport, adding individual-level controls and then all control variables.

Results

Table 2 displays the means, standard deviations, and results of one-way ANOVA tests of the variables included in our model by participation in high school sport. Approximately 42% of high school females in our sample participated in interscholastic sport in 10th and/or 12th grade. On average, girls who engaged in high school sports were more likely than were those who did not to have completed college 6 years after graduating from high school.

Consistent with past research, students (in this particular case, females) involved in sport report higher educational expectations than those who are not involved (Fejgin, 1994; Marsh & Kleitman, 2003; Melnick et al., 1988) and, on average, scored higher on standardized math and reading tests (Broh, 2002). White females were the most likely to participate in sport, with the percentage of White participants surpassing nonparticipants by 11%. Similar patterns did not occur for any other racial group. Hispanic and Black females were actually less likely to be involved in sport, and for Asians there was no difference between the two groups. In terms of family background characteristics, female athletes were more likely to come from families with a higher SES and to live with both parents. Female athletes were also more likely to attend private school and schools in suburban or rural neighborhoods. College grades did not differ significantly between the two groups and in subsequent analyses (not shown here) had collinearity problems, so they were dropped from all other models.

Table 2
Means, Standard Deviations, and ANOVA for Variables by Participation in High School Sport

	Participated		Did Not Participate		
Variables	*M*	*SD*	*M*	*SD*	ANOVA
Dependent variable					
College completion	0.57	0.50	0.35	0.48	***
Individual-level control variables					
Student's educational expectations (1988)	0.82	0.39	0.68	0.47	***
Student's educational expectations (1992)	0.80	0.40	0.63	0.48	***
Composite test score (1988)	55.23	9.43	52.07	9.21	***
Composite test score (1992)	54.23	8.11	51.86	7.86	***
Socioeconomic status	0.27	0.76	–0.08	0.76	***
Asian	0.08	0.27	0.08	0.26	
Hispanic or Native American	0.09	0.29	0.17	0.37	***
Black	0.07	0.26	0.11	0.32	***
White	0.75	0.43	0.64	0.48	***
Mother and father at home	0.64	0.48	0.53	0.50	***
Family size	4.30	1.31	4.20	1.36	**
Participated in college sport	0.12	0.33	0.01	1.12	***
College grades	5.46	1.06	5.42	1.12	
School-level control variables					
Private school	0.18	0.39	0.10	0.30	***
Urban	0.26	0.44	0.30	0.46	**
Suburban	0.42	0.49	0.38	0.49	**
Rural	0.30	0.46	0.28	0.45	*
n	2,155		2,948		
%	42.2		57.8		

Source: National Education Longitudinal Study of 1988.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 3 shows the results of multilevel logistic regression analysis on the odds of college completion among females. In Model 1, as predicted, females' involvement in interscholastic high school sport is positively related to attainment of a bachelor's degree. The odds of college completion among females who played high school sport are 73% higher than the odds of college completion among females who did not engage in interscholastic sports. According to this analysis, college completion varies by school.

In Model 2, when all individual-level variables are controlled for, the effect of participation in high school sport on college completion decreases

Table 3
Multilevel Logistic Estimates of Female High School Sport Participation (Model 1), Individual-Level Control Variables (Model 2), and All Other Background Characteristics (Model 3) on the Odds of College Completion

Variable	Model 1	Model 2	Model 3
Independent variable			
Participated in high school sports	1.733***	1.416***	1.411***
	(0.70)	(0.76)	(0.78)
Individual-level control variables			
Educational expectations (1988)		1.593***	1.608***
		(0.097)	(0.097)
Educational expectations (1992)		4.58***	4.765***
		(0.116)	(0.120)
Composite test score (1988)		1.033***	1.033***
		(0.006)	(0.006)
Composite test score (1992)		1.063***	1.063***
		(0.007)	(0.007)
SES[a]		1.370***	1.454***
		(0.087)	(0.090)
Asian		2.086***	2.090***
		(0.142)	(0.144)
Black		1.368*	1.362*
		(0.132)	(0.133)
Hispanic or Native American		0.771*	0.764*
		(0.122)	(0.764*)
Family size		0.983	0.982
		(0.029)	(0.029)
Mother and father at home		1.638***	1.628***
		(0.079)	(0.079)
Participated in college sports		2.649***	2.648***
		(1.73)	(0.079)
School-level control variables			
Private			1.505**
			(0.137)
Urban			0.967
			(0.097)
Rural			0.903
			(0.092)
Heckman	5.215***	1.644***	1.383**
	(0.058)	(0.102)	(0.160)
Intercept	–2.004***	–7.723***	–7.648***
	(0.074)	(0.345)	(0.346)

(continued)

Table 3
(continued)

Variable	Model 1	Model 2	Model 3
Variance (intercept)	0.056***	0.026*	0.020
	(0.004)	(0.004)	(0.004)
Log likelihood	–2748.80	–2354.207	–2348.432
n	5,103	5,103	5,103

Source: National Education Longitudinal Study of 1988.
Note: Standard errors are in parentheses.
a. The dummy variable used to flag missing values in SES was significant at $p < .01$.
*$p < .05$. **$p < .01$. ***$p < .001$.

by 32% but retains its significance. The odds of college completion among females who participated in high school sport are still 42% higher than the odds of college completion among nonparticipating females when influential individual-level variables, such as SES, are controlled.

Various individual-level control variables help further explain factors associated with females' educational attainment. Not surprisingly, educational expectations had the greatest positive effect on females' college completion. The odds of women expecting to earn a bachelor's degree or higher actually doing so 6 years after high school were 4.4 times higher than the odds of women with lower educational expectations after controlling for the effects of all other variables in the model. Likewise, composite standardized test scores, SES, living with both parents, and participating in intercollegiate sports had a strong, positive relationship with college completion. The odds of Asians graduating from college were more than 2 times the odds of Whites graduating, whereas the odds of Hispanics and Native Americans graduating were 23% lower than those for Whites after controlling for all other variables in the model. Black females' odds of college completion were also higher than were those for Whites by about 37%. This finding is likely a result of our particular sample and the fact that Black college attendees with similar levels of prior educational achievement complete college at rates equal to or higher than White college students (U.S. Department of Education, 2001). Also, in more recent investigations where background differences are controlled for, Black females have been found to achieve more schooling than Whites (Haveman & Wolfe, 1994). Interestingly, family size was found to be an insignificant predictor of women's attainment of a bachelor's degree. College completion still appears to vary across schools, although the significance of the variance of the intercept decreases with the inclusion of these variables.

In Model 3, when all individual-level and school-level background variables are controlled for, participation in high school sport still significantly affects the odds of college completion. In this analysis, the odds of graduating from college in 6 years are 41% higher for females who played interscholastic sport than the odds of college completion among females who did not engage in high school athletics. Attending a private high school was positively related to obtaining a bachelor's degree; however, unlike Sabo et al.'s (1993) study, neighborhood type did not significantly affect women's educational attainment one way or the other. Also, college completion no longer significantly varies across schools, suggesting that the variables in this model explain the random effect of college completion across schools.

Discussion

Using multilevel models with random effects, we examined whether females' high school sport participation affected college. Results from this sample of females provide evidence that supports the hypothesis that females who played high school sport are more likely to graduate from college than are their counterparts. Even though background characteristics played the most significant role in decreasing the effect of high school sport participation on college completion, the odds of former high school athletes obtaining a bachelor's degree 6 years after completing high school were still significantly higher than were those of nonathletes. The positive relationship between females' former high school athletic involvement and college completion is consistent with past research that has shown sport participation to be related to positive outcomes and more specifically on the relationship between athletics and academic success. As indicated by previous studies on the subject, there does not appear to be a zero-sum relationship between sport participation and educational achievement for girls.

The positive relationship found between females' former high school athletic involvement and college completion helps validate legislation mandating equal opportunities and funding for female sports. Although Title IX greatly contributed to the progression toward more equal athletic opportunities, females in high school are still offered 8% fewer single-gender interscholastic sports than are boys, and only two states, which implemented additional state laws, have reached the actual parity threshold of Title IX (Braddock et al., 2003). Recent steps taken by the Bush administration to change the way Title IX administration affects female athletic participation may put additional opportunities for high school girls at risk. Specifically,

new regulations from the Department of Education suggest that greater weight be given to student interest surveys (U.S. Department of Education, 2005), despite previous court findings:

> To assert that Title IX permits institutions to provide fewer athletics participation opportunities for women than for men, based upon the premise that women are less interested in sports than are men, is (among other things) to ignore the fact that Title IX was enacted in order to remedy discrimination that results from stereotyped notions of women's interests and abilities. (*Cohen v. Brown [II]*, 1996)

Our findings, however, suggest a societal benefit to female sport participation in the form of increased educational attainment. Given the importance of educational attainment in subsequent SES, and coupled with previous findings demonstrating other benefits to female participation in sports, the results of this study suggest that, rather than looking for ways to excuse schools from Title IX compliance, the federal government should join state and local efforts to promote equal athletic opportunities for female students.

Findings from this research are also useful for educational policy and the allocation of resources. America's education system is experiencing increased pressure to improve students' proficiency and standardized test scores, and in some instances, costly extracurricular activities have received reduced funds or been cut entirely. This analysis of sport's long-term educational effect on females should aid policy makers in their decisions regarding funding for interscholastic sport programs. Providing more opportunities for female participation in sport may help bring about positive academic changes. It is imperative that these opportunities be open to minority and low-income students who are less likely to participate in high school sports.

Although this study offers valuable insight on females' high school sport involvement as it relates to postsecondary education and current theoretical debate on the matter, some important considerations were not addressed that should be investigated in future research. For example, the effect of different types of sport (e.g., team vs. individual), level of involvement (junior varsity vs. varsity), years of participation, degree of commitment, and expectations of future involvement in sport on educational attainment have yet to be examined. It is possible that variations in these variables affect academic success differently. Future research might also aim to better understand how social capital in this activity differs from other extracurricular activities that do not produce the same academic benefits. In addition, previous research provides mixed evidence for whether male students' participation in sports

provides the same benefits female students' participation does. Additional research into whether the long-term effects of sport participation for boys mirror those of girls or how the mechanism of sport participation might work differently for boys and girls is still needed.

The findings from this investigation suggest the need for further research on other levels as well. From this study, it appears that females' involvement in sport is beneficial to academic outcomes not only at time of involvement but also after participation has ceased; whether participation in sport has long-term benefits unrelated to females' educational attainment, such as health, internal locus of control, and self-concept, is largely unknown.

Notes

1. These activities include intramural sports, cheerleading, school music groups, school drama, student council, yearbook or journalism, and vocational clubs. Broh's (2002) study also found involvement in school musical groups to render consistent benefits for students' grades and test scores. Compared to interscholastic athletic participation, however, involvement in music groups had a less impressive impact.

2. McNeal (1995) found that participation in fine arts also significantly reduces the likelihood of dropping out. The effect of fine arts, however, was weaker than athletic participation and did not retain its significance when all extracurricular activities were examined simultaneously.

3. Using similar sets of independent variables in the selection equation and the selected equation is permissible (Hoffmann, 2004).

4. Although the correlation between test scores in 8th and 12th grades was high (.718), the standard errors never became inflated, and thus both measures are included in the regression analyses.

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