

Extracurricular Activities, Athletic Participation, and Adolescent Alcohol Use: Gender-Differentiated and School-Contextual Effects*

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This research investigates the effects of extracurricular activities on alcohol use among male (n = 4,495) and female (n = 5,398) adolescents who participated in the 1990–92 National Education Longitudinal Study. Previous studies have assessed the association between extracurricular activities and alcohol use, but none have explored whether the association depends on the school context. Using a multilevel model, I examine whether school-level factors affect the relationship between involvement in athletic or nonathletic activities and changes in adolescent alcohol use from 1990 to 1992. The results indicate that the negative association between nonathletic activities and alcohol use is stronger among males in low-minority-population schools. Moreover, the positive association between athletic involvement and alcohol use is stronger among females in lower-socioeconomic-status schools and males in higher-socioeconomic-status schools. I propose that these results reflect variation in high school cultures and in the resources available to schools.

The prevalence of alcohol use among high school students in the United States has remained at more than 50 percent for several decades. For many students, drinking alcohol, although illegal, is a key rite of passage in the transition to adulthood. Trend data suggest the continuing popularity of alcohol use: Annual surveys conducted in the 1990s and early 2000s consistently indicate that more than 70 percent of high school seniors report alcohol

use, and approximately 30 percent report binge drinking or getting drunk in the past year (Johnston et al. 2004). It is interesting to note that the percentage of high school seniors who report alcohol use is similar to the percentage who participate in extracurricular school activities: About 70 percent of students are involved in some activity such as clubs, music, plays, and student government associations. In addition, more than 50 percent of students participate in school-sponsored athletics (Eccles and Barber 1999; Barber et al. 2005).

Studies regularly indicate that male and female students who participate in extracurricular activities, including athletics, derive a host of benefits: better grades, a higher likelihood of college attendance, a lower likelihood of dropout, higher educational aspirations, more satisfaction with schools and teachers, higher life satisfaction, broader conventional peer networks, less involvement in delinquent behavior, and less drug and alcohol use (Crosnoe 2002; Eccles et al. 2003; Hoffmann and Xu

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2002; Mahoney 2000; Mahoney and Cairns 1997; Mahoney, Cairns, and Farmer 2003; Marsh and Kleitman 2003). Some research suggests that females garner more benefits from athletic participation than do males, whereas males derive more benefits from other extracurricular activities (Crosnoe 2002; Dodge and Jaccard 2002). Moreover, participation may be more beneficial for students from lower-socioeconomic-status (SES) backgrounds or among minority students (Guest and Schneider 2003; McNeal 1995; Marsh and Kleitman 2002). However, an important exception to these general findings is that participation in athletics may be associated with more alcohol use and binge drinking (Eccles and Barber 1999; Eccles et al. 2003; Miller et al. 1998).

There is no commonly accepted theoretical model that is utilized to explain the beneficial effects of extracurricular participation on adolescent behaviors. Yet this general finding fits within several social-psychological models. For instance, social control theory contends that a lack of attachment to or involvement with conventional institutions such as schools allows innate risk-taking propensities to emerge. Accordingly, adolescents who fail to develop these bonds (or for whom they are severed) are at increased risk of problem behaviors (Hirschi 1969; Nagasawa, Qian, and Wong 2000), whereas students involved in extracurricular activities develop conventional bonds to their schools and reap various social benefits. Social learning theories argue that social relations and networks of affiliations determine the likelihood of problem behaviors (Akers 1992; Dorius et al. 2004). Because extracurricular activities expose students to conventional peers and positive adult role models (Eccles et al. 2003; Mahoney et al. 2003), the social networks of students who participate in extracurricular activities are likely to motivate them to engage in conventional activities and eschew problem behaviors.

Yet using these or other theoretical models to explain the association between extracurricular activities and adolescent outcomes fails to address some important issues. The finding that athletic participation and alcohol use are positively associated is one example of this failure. In general, an important limitation is that these explanations do not consider the many contexts within which adolescents negotiate their worlds. For example, the attachment

to schools fostered by extracurricular participation presumably attenuates the likelihood of alcohol and drug use (Jenkins 1995), but adolescents may have an appreciation of or connection to any of a number of different aspects of the school environment. Some students identify more with schools as social environments, others with schools as academic institutions, and others with school-based athletic programs or clubs. Schools provide alternative environments for diverse students, depending on preferences, skills, and motivations. For some, high school is seen as a time spent in "hell," when one's identity is subject to assault as one struggles to find a place in a social world that values physical skill, attractiveness, and social grace (Baldwin and Hoffmann 2002; Shapiro 2005). For others, high school is a sanctuary from family turmoil or community disorder. Some adolescents find acceptance mainly in school and build their lives around a social world of school-related activities (Eder 1995; Hansell 1985).

Although past studies have used various social-psychological theories to understand the association between extracurricular activities and alcohol use, I seek a more contextualized view of this relationship in three ways. First, I distinguish between participation in athletics and participation in other extracurricular activities. Both athletics and other extracurricular activities may enhance the social bond students have with schools or provide socialization environments that discourage alcohol use, but they also have unique implications for adolescent behavior (cf. Hoffmann and Xu 2002). Second, consistent with previous studies (Crosnoe 2002; McHale et al. 2005), I assess whether there are distinct gender patterns in the associations among extracurricular activities and adolescent alcohol use. Third, unlike previous research that has examined these associations, I explore whether these associations depend upon characteristics of schools, such as socioeconomic status, ethnic composition, size, type, and location.

BACKGROUND

Participation in extracurricular activities provides an important socialization experience for many youth. Involvement in these activities allows adolescents to broaden their social networks and develop new peer relations; practice

their social, physical, interpersonal, and intellectual skills; learn how to communicate effectively; and learn vital social norms (Adler and Adler 1998; Barber et al. 2005). Yet there is a diverse set of school activities in which students may participate, and particular activities may have distinct effects on various outcomes. For example, athletic participation exposes students to academically oriented peers and enhances students' socialization experiences (Marsh and Kleitman 2003; McHale et al. 2005), but it may also foster aggressiveness and facilitate opportunities for sexual experimentation. Involvement in nonathletic activities enhances a student's sense of identity and self-satisfaction, and strengthens the youth's bonds with school, yet it may also detract from family or community involvement (Davalos, Chavez, and Guardiola 1999; Mahoney et al. 2003; Oliver 1995; Quiroz, Gonzalez, and Frank 1996). Studies suggest that involvement in a host of extracurricular activities diminishes involvement in delinquent behaviors such as violence and theft, although findings are inconsistent (Cernkovich and Giordano 1992; Hoffmann and Xu 2002; Wiatrowski and Anderson 1987).

There is mixed support for the notion that extracurricular activity participation decreases the likelihood of drug and alcohol use. Athletic participation may discourage drug use, in particular smoking tobacco or marijuana, because it is based on being physically fit and promotes greater bonding to schools. Yet athletics are often part of a school and peer environment in which the use of certain drugs (e.g., alcohol or smokeless tobacco) is encouraged. Empirical studies indicate that smoking (tobacco or marijuana) and cocaine use are lower among athletes than among the general school population (Crosnoe 2002; Melnick et al. 2001; Naylor, Gardner, and Zaichkowsky 2001). Other studies find that the use of alcohol and smokeless tobacco is higher among athletic participants than among other adolescents (Eccles and Barber 1999; Eccles et al. 2003; Melnick et al. 2001; Moore and Werch 2005; see, however, McHale et al. 2005).

Research investigating the relationship between nonathletic activities and alcohol use also yields inconsistent evidence. Some studies indicate that there is little or no relationship between extracurricular involvement and alcohol use (Heights and Jenkins 1996; Wiatrowski and Anderson 1987). Others find a consistent

negative relationship, with adolescents involved in nonathletic activities less likely to engage in alcohol use (McBride et al. 1995; Zill 1995).

There are at least three issues that should be addressed in attempts to explain these inconsistent results. First, the potential relationship between extracurricular activities and alcohol use may differ by gender (Crosnoe 2002). For instance, given the diverse meanings that athletic participation holds for males and females, it likely has distinct influences on involvement in alcohol use or other forms of delinquent behavior. Second, many previous studies are based on cross-sectional data [but see Crosnoe (2002) and Eccles and Barber (1999) for exceptions]; hence, the temporal order of alcohol use and extracurricular participation remains unclear. Students who use alcohol may be less likely to participate in certain extracurricular activities or more likely to be involved in athletics. Third, as discussed by several researchers (e.g., Felson et al. 1994; Johnson and Hoffmann 2000; McNeal 1999), school context often affects the relationship between students' attributes and behaviors. In some types of schools, there may be a negative association between extracurricular activities and student behavior, but in other types of schools the association may be positive.

Gender as Context

Involvement in extracurricular activities in the United States tends to differ for female and male high school students. Although the 1972 passage of the federal Title IX law led to a rapid increase in athletic participation among adolescent females, male high school athletes still outnumber female athletes by about one million, with about 50 percent of males and 36 percent of females participating in athletics (Dufur 1999). This gender specificity extends to other school activities as well: Females are more likely than males to be involved in school clubs and organizations. For example, approximately 30 percent of females and 18 percent of males are involved in music or performing arts; 17 percent of females and 12 percent of males are in academic clubs; and 13 percent of females and 8 percent of males participate in student council/government (Eccles et al. 2003; National Center for Education Statistics 2005).

Numerous studies suggest that the association between extracurricular activities and various outcomes, ranging from academic achievement to sexual behavior, differs by gender. For instance, athletic participation is associated with less sexual behavior among females but more sexual behavior among males (Miller et al. 1998, 2002). As shown by Crosnoe (2002), there also appear to be gender-based distinctions in the relationship between athletic participation and alcohol use. Crosnoe finds that male athletes do not differ from male nonathletes in their level of alcohol use, but female athletes are less likely than male athletes or nonathletes to use alcohol. Because alcohol use is affected by peer associations, group norms, gender roles, and the sub-cultural climates within which they are embedded (Akers 1992; Dorius et al. 2004; Hagan 1991; Huselid and Cooper 1992; Miller et al. 2000), alcohol consumption may be an important cultural marker for some male athletes but may not be germane to the lives of female athletes.

It is unclear whether the same gender-distinct processes extend to nonathletic extracurricular activities. Research has not examined whether there are gender differences in the association between participation in nonathletic activities and alcohol use. However, recent research suggests that there may be school-level differences in the association between extracurricular activities and alcohol use.

School as Context

Although extracurricular activities may reduce the risk of alcohol use for some adolescents, the effects are probably moderated by school characteristics. However, few studies of adolescent alcohol use take into account school characteristics. Socialization experiences in the school influence adolescent development because interactions in schools affect broader social relationships. Schools provide a place where some students feel they belong and where they are valued and respected, whereas other students may find the school experience frustrating or even noxious. Students who participate in extracurricular activities tend to be more comfortable in school, with greater feelings of belonging and more cohesive social networks than other students (Barber et al. 2005; Mahoney et al. 2003;

Quiroz et al. 1996). However, schools vary in their ability to offer rewarding and significant extracurricular experiences; thus, school-related influences on adolescent behavior are affected by various social characteristics of the school (Guest and Schneider 2003; McNeal 1999). It is therefore important to assess whether school-level variables affect the relationship between extracurricular activities and alcohol use.

Multilevel studies suggest that the proportion of minority students in a school and students' SES affect the relationship between extracurricular activities and delinquent behavior (Gottfredson 2001; Hoffmann and Johnson 2000; Hoffmann and Xu 2002; McBride et al. 1995). Hoffmann and Xu (2000) determine, for instance, that the association between nonathletic activities and delinquency is negative in low-minority and wealthier schools, but positive in high-minority and poorer schools. This is likely due to disparities in resources among wealthier and poorer schools. Extracurricular activities are funded more generously in schools in wealthier areas; thus, wealthier schools do more to promote conventional behaviors and attract more achievement-oriented students. Nonetheless, studies also suggest that students who attend school in poor communities and minority students [many of whom attend high-minority and low SES schools (Frankenberg, Lee, and Oldfield 2003)] benefit more academically from athletic activities (Guest and Schneider 2003; McNeal 1995; Marsh and Kleitman 2002). Whether these results extend to the association between extracurricular activities and alcohol use is unclear; but, given the similar patterns of correlates of alcohol use and delinquency found in many studies, it is important that studies explore school-level contextual effects.

In sum, this study investigates the association between extracurricular activities and adolescent alcohol use. It extends previous research by (1) distinguishing between athletic and nonathletic activities; (2) investigating gender-distinct patterns; and, most importantly, (3) assessing the effects of school-level factors on these associations. I hypothesize that participation in nonathletic activities provides a stronger protective effect against alcohol use than athletic participation. Based partly on recent research (Crosnoe 2002; Moore and Werch 2005), I also hypothesize that female

athletic participation is associated with less alcohol use, whereas male athletic participation is associated with more alcohol use. A final hypothesis, based on research by Hoffmann and Xu (2002), is that these relationships are stronger in low-minority and wealthier schools than in other schools.

DATA AND METHODS

Sample

To examine the hypotheses, I use longitudinal data from the 1990–1992 National Educational Longitudinal Study (NELS). These data, collected for the National Center for Education Statistics by the National Opinion Research Center, are based on a national probability sample of 10th–12th grade students in the United States. The advantages of using NELS extend beyond the fact that it is nationally representative. A key advantage of NELS is that it provides not only individual-level data but also school-level data with which to conduct multilevel analyses (McNeal 1999; Roscigno 1998). Moreover, the longitudinal design allows the temporal order of extracurricular activities and alcohol use to be identified more precisely.

Beginning in 1988 with a national sample of 8th-grade students, NELS employed a two-stage stratified sample design, with schools chosen at the first stage and students chosen at the second stage. The school sampling resulted in a diverse set of public and private schools. Follow-up rates were 96 percent in 1990 and 94 percent in 1992. Moreover, each wave of data collection included a “refreshment” subsample, so that those dropping out of the sample were replaced with students who shared similar demographic characteristics. This allowed NELS to continue to employ a nationally representative sample of students in the United States at each wave. However, I use the 1990 sample as the baseline in this study (when most of the students were in the 10th grade), with the same students followed from 1990 to 1992. NELS used self-administered questionnaires in a classroom setting to gather information from students, and it collected data on school characteristics from school administrators (National Center for Education Statistics 1994). School records of misbehavior are unreliable because of significant prob-

lems with record-keeping and reporting errors (Gottfredson and Gottfredson 1985); therefore, this study uses self-report data to measure involvement in alcohol use.

After omitting missing data, the analyses are based on an analytic subsample that consists of 9,893 students nested in 940 schools. Although some students switched schools between 1990 and 1992, an auxiliary analysis indicates that adjusting for school changes does not alter the results of the analysis. The sample used in the analysis includes 5,398 females and 4,495 males. A comprehensive description of the NELS sample design and data collection procedures may be found in National Center for Education Statistics (1994).

Measurement of Variables

Alcohol use during 1990 and 1992 is measured using two items. The students were asked, “In the last 12 months, how many times did you do the following: (1) drink alcohol; (2) have five or more drinks in a row?” The respondents reported this frequency using a scale that ranges from 0–3, where 0 = no occasions, 1 = 1–2 occasions, 2 = 3–19 occasions, and 3 = 20+ occasions. I summed these frequency measures to gauge past-year alcohol use during each year ($\gamma = 0.72$ in 1990, 0.75 in 1992). The 1992 survey included a question about being drunk at school, but because that question was not included in the 1990 survey I did not include it in the measurement of alcohol use. The resulting variables are positively skewed, so I use their natural logarithms plus 1 to normalize the distributions.

The independent variables (measured in 1990) are classified as individual-level and school-level. The key exogenous variables used in this analysis are participation in nonathletic and athletic extracurricular activities. Participation in nonathletic activities is measured on an 11-item scale based on responses to the following questions: “In the last school year, did you participate in: school musical groups, school plays or musicals, school government, academic honor society, school yearbook or newspaper, school service clubs, academic clubs, school hobby clubs, school FTA, FHA, or FFA?” Response options include: “school does not have,” “did not participate,” “participated,” or “participated as an

officer/leader." I recoded "school does not have" and "did not participate" as 0 and "participated" and "participated as an officer/leader" as 1 (cf. Marsh and Kleitman 2002). The responses were then summed so that higher scores indicate more involvement in school activities. The distribution is positively skewed, so I transform this measure in the analysis by taking the natural logarithm after adding 1.

Participation in athletic activities is measured by responses to seven questions that ask whether the respondents (1) "played softball/baseball at school," (2) "played basketball at school," (3) "played football at school," (4) "played soccer at school," (5) "participated on swim team at school," (6) "played other team sport," and (7) "played an individual sport." Response options are yes = 1 and no = 0. These items were summed to indicate overall involvement in school athletics. The distribution is positively skewed, so I transform this measure in the analysis by taking the natural logarithm after adding 1. In an auxiliary analysis I also differentiated among types of athletic participation by distinguishing individual sports from team sports and by distinguishing more socially popular sports (football, basketball) from less popular sports. Although this resulted in some discrepancies from the final results, they were minimal. I also conducted analyses of both extracurricular scales with different measurement schemes and with quadratic terms to examine floor and ceiling effects, but, similar to Marsh and Kleitman's (2002) findings, I detected none. (Additional details of the analyses using these different measurement approaches are available from the author.)

It is important to control for the effects of family process variables that might affect alcohol use. I therefore include two types of parent-child relations in the model: parental behavioral involvement and parental interest in school. Parental behavioral involvement is determined by three items. Respondents were asked, "Since the beginning of the school year, have either or both of your parents or guardians done the following: (1) attended a school meeting, (2) spoken to teachers/counselors, or (3) attended a school event?" The respondents reported yes (1) or no (0) to each item. I summed these items to yield the measure of parental behavioral involvement in school.

Three items are used to measure parental

interest in school. Respondents were asked, "Since the beginning of the school year, how often have you discussed the following with either or both of your parents or guardians: (1) programs at school, (2) school activities, and (3) things studied in class?" The respondents reported this frequency on a scale of 1–3, where 1 = not at all, 2 = once or twice, and 3 = three or more times. I summed these items to yield a measure of parental interest.

The NELS data do not include suitable measures of peer behaviors, so, unfortunately, there is no way to measure peer alcohol use. Given the strong and consistent association between peer alcohol use and adolescent alcohol use (Mason and Windle 2001), this omission may lead to a certain degree of specification error. Nonetheless, studies show that school dropout is positively associated with adolescent drug and alcohol use (Krohn, Lizotte, and Perez 1997). I thus use the self-reported number of friends who drop out of high school as a proxy for peer deviant behavior. This variable, based on a question about the number of friends who have dropped out of high school, is measured as 0 = none, 1 = some, 3 = most, and 4 = all.

Grade-point average (GPA) is not available from official records in the NELS public use file. I therefore use the mean responses to a set of questions that asked respondents to report their grades in the following subjects: English, mathematics, science, and history. The individual questions ranged from 1 (all As) to 10 (all Fs or failing grades). After creating the scale, I reverse-coded it so that GPA is measured from low grades (1) to high grades (10).

The students report their own ethnic identification using four categories: white, African American, Latino, and other ethnic groups. In the analyses, three dummy variables are used to represent African American, Latino, and other groups. Whites serve as the comparison group. SES, a composite standardized score constructed for the NCES, is based on parents' education and income.

At the school level, the following variables are used to gauge the impact of school characteristics on the relationship between extracurricular activities and alcohol use: school SES, school minority status, student/teacher ratio, type of school (public, private non-Catholic, or Catholic), school size, and school location (urban vs. suburban vs. rural).

Student/teacher ratio is based on two questions that ask school administrators to report the number of students and teachers in the school. The NELS data do not include a direct measure of school-level SES. As a proxy, I use an item that asks school administrators about the percent of students who receive free or reduced price lunch. The variable is coded 0–3, with 0 = 0–10 percent, 1 = 11–24 percent, 2 = 25–50 percent, and 3 = 51–100 percent. Minority status is based on a question that inquired about the proportion of nonwhite students in the school. This measure includes seven categories that range from 1 = 0–10 percent to 7 = 90 percent or more. School size indicates total school enrollment. School administrators report school size using the following categories: 1 = 1–399, 2 = 400–599, 3 = 600–799, 4 = 800–999, 5 = 1,000–1,199, 6 = 1,200–1,599, 7 = 1,600–1,999, 8 = 2,000–2,499, 9 = 2,500 or more. Type of school is measured by a set of dummy variables that indicate public, Catholic, and private non-Catholic (religious and nonreligious); public is

the omitted, reference category. Finally, school location consists of dummy variables indicating whether the school is located in an urban, suburban, or rural area, with urban location serving as the reference category.

Table 1 provides descriptive statistics for all the variables included in the analysis, by gender. Consistent with previous research (Huselid and Cooper 1992; Johnston et al. 2004), males report more alcohol use than females. Moreover, females tend to be involved in more nonathletic activities, whereas males tend to be involved in more athletic activities (cf. Eccles et al. 2003).

Modeling Strategy

In order to determine the association between extracurricular activities and alcohol use across various types of schools, I employ a multilevel linear regression model, with level 1 defined as the individual level, and level 2 defined as the school level. Such a model is

TABLE 1. Descriptive Statistics, NELS 1990–92

Variables	Female		Male	
	Mean	SD	Mean	SD
<i>Individual Level</i>				
Alcohol use (logged) 1990	.70	.52	.74*	.54
Alcohol use (logged) 1992	.81	.60	.94**	.68
Athletics (logged)	.43	.29	.60***	.53
Non-athletics (logged)	.75	.45	.57***	.45
African American	.08	.27	.07	.25
Latino	.10	.31	.10	.30
White	.75	.60	.76	.61
Other	.07	.25	.07	.26
Family SES ^a	-.05	.80	.07**	.79
Parent involvement	4.51	2.32	4.50	2.31
Parent interest	6.83	2.75	6.32**	2.77
Peer dropout	.25	.46	.23	.47
Grade-point average	6.12	1.38	5.87***	1.48
<i>School Level</i>				
Mean SES	1.06	.51	.98*	.52
Student/teacher ratio	17.44	4.69	17.19	4.72
Percent minority	2.61	1.90	2.59	1.97
School size	4.56	2.35	4.61	2.35
Catholic	.05	.23	.06	.24
Private	.07	.26	.08	.28
Public	.88	.35	.86	.34
Urban	.26	.42	.26	.42
Suburban	.39	.49	.41	.48
Rural	.35	.47	.33	.47
Sample size		5,398		4,495

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed tests)

Notes: NELS = National Education Longitudinal Study. SES = socioeconomic status. Significant differences between males and females are denoted with asterisks. Significance tests are based on chi-square tests (for dummy variables) and Welch's t -tests (for continuous variables), and they are verified with nonparametric Wilcoxon-Mann-Whitney tests.

^a Standardized variable with overall mean of zero.

useful for carefully exploring not only whether participation in athletic and nonathletic activities affects alcohol use net of the association with other relevant variables, but also whether school characteristics condition the association between these activities and alcohol use (Goldstein 1995). (Note: Given the limited distribution of alcohol use, I also estimated a multilevel Poisson regression model, but the results did not vary from the results of the linear model.)

An examination of the association between alcohol use and extracurricular activities is complicated by their presumed temporal order. Using cross-sectional data to examine this association fails to specify whether participation precedes alcohol use or vice versa: Adolescents who use alcohol may be either more or less likely to participate in extracurricular activities. To overcome this complication, the models regress alcohol use at time 2 on alcohol use at time 1, along with the exogenous variables. Hence, the models estimate the change in alcohol use that is associated with participation in athletic and nonathletic activities (Finkel 1995).

The multilevel model proceeds in four stages. The first stage determines whether there is significant variability in alcohol use across schools in the United States, using a simple variance components model (Goldstein 1995). The second stage examines the effects of extracurricular activities on changes in alcohol use. However, unlike a standard linear regression model, I utilize a random intercept model that allows alcohol use to vary across schools. (Tests for other random effects yielded no significant results.) The third stage adds the control variables and the level 2 (school-level) variables to the model to determine whether the effects of extracurricular activities persist. The final stage includes cross-level interaction terms that assess whether the effects of activities on alcohol use vary by school characteristics. Rather than including a comprehensive list of these interactions, the models include only those that proved statistically significant in the final model-building stage. Note that each step is conducted using gender-specific models. Model fit is determined by Akaike's information criterion (AIC), with smaller values indicating better-fitting models. The Bayesian information criterion for each model was also estimated; it confirmed the AIC results, so they are not

TABLE 2. Variance Components of Adolescent Alcohol Use, by Gender, NELS 1990-92

	Coefficient	Standard Error
<i>Fixed Effect</i>		
Alcohol use (logged) 1992		
Female	.807***	.011
Male	.942***	.014
<i>Variance Components</i>		
Between schools		
Female	.041***	.005
Male	.044***	.008
Within schools		
Female	.328***	.008
Male	.422***	.012
Intraclass correlation		
Female	.111	
Male	.094	

*** $p < .001$ (two-tailed test)

Note: NELS = National Education Longitudinal Study.

reported (Kuha 2004). The McFadden R^2 , a rough approximation of a coefficient of determination from an ordinary least squares regression model that is based on the models' log-likelihood statistics (Long 1997), is also included as a measure of model fit.

RESULTS

Table 2 shows the variance components of alcohol use in 1992. On average, males report about 13.9 percent more alcohol use in 1992 than females. The results indicate that, among females, about 11 percent of the variability in alcohol use is between schools. Among males, about 9 percent of the variability in alcohol use is between schools. These intraclass correlations suggest that most of the variability is within schools. They also imply that there is a modest clustering of alcohol use among students across American high schools. Similar to previous research (e.g., Cleveland and Wiebe 2003), most of the difference in alcohol use occurs within schools.

Table 3 shows bivariate correlations among the dependent and key independent variables in the model, by gender. (The full correlation matrix is available from the author upon request.) They tend to support previous research, with, for instance, African American youth less involved and white youth more involved in alcohol use (cf. Stewart and Power 2003). Moreover, higher GPA is negatively

TABLE 3. Bivariate Correlations among Key Variables, by Gender, NELS 1990-92

	Males				Females			
	Alcohol use (logged) 1992	Alcohol use (logged) 1990	Non-athletics (logged)	Athletics (logged)	Alcohol use (logged) 1992	Alcohol use (logged) 1990	Non-athletics (logged)	Athletics (logged)
Alcohol use (logged) 1992	N/A				N/A			
Alcohol use (logged) 1990	.503	N/A			.491	N/A		
Non-athletics (logged)	-.056	-.110	N/A		-.055	-.081	N/A	
Athletics (logged)	.070	-.013	.165	N/A	.069	-.001	.141	N/A
African American	-.146	-.142	-.039	-.005	-.103	-.102	-.037	.028
Latino	-.034	-.004	-.103	-.053	-.017	.009	-.060	-.013
Other ethnic group	-.090	-.094	.063	.008	-.088	-.103	.056	.002
White	.170	.149	.061	.036	.127	.118	.029	-.008
Family socioeconomic status	.084	.030	.224	.165	.026	-.022	.192	.152
Parent interest	-.106	-.164	.096	.085	-.067	-.147	.080	.099
Parent involvement	-.063	-.155	.256	.178	-.058	-.131	.216	.199
Peer dropout	.072	.218	-.150	-.131	.049	.172	-.074	-.107
Grade-point average	-.137	-.246	.306	.160	-.134	-.236	.286	.168
Mean socioeconomic status	.125	.059	.125	.114	.063	.014	.116	.121
Student/teacher ratio	-.022	-.030	-.110	-.067	-.058	-.057	-.094	-.059
Percent minority	-.135	-.063	-.084	-.093	-.096	-.048	-.084	-.071
School size	-.060	-.005	-.154	-.132	-.106	-.029	-.156	-.164
Public	-.083	-.016	-.087	-.097	-.052	.005	-.113	-.139
Catholic	.082	.023	-.030	.028	.054	.012	-.001	.050
Private	.030	-.001	.138	.100	.016	-.020	.145	.133
Urban	-.020	-.013	-.001	-.011	-.032	-.043	-.003	-.008
Suburban	.036	.043	-.049	-.001	.014	.026	-.076	.002
Rural	-.019	-.032	.051	.010	.015	.013	.082	.005

Note: NELS = National Education Longitudinal Study.

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associated with alcohol use but positively associated with participation in athletic and nonathletic extracurricular activities for males and females. At the school level, mean SES is positively related to alcohol use in 1992 and with extracurricular activities. Most of the correlations are quite modest in magnitude.

Table 4 provides the results of three multi-level models, analyzed by gender. Model 1 is limited to previous alcohol use and extracurricular activities. The stability of alcohol use is considerable, with a highly significant cross-lagged effect of 0.49 for females and 0.51 for males. However, the positive association between athletic activities and changes in alco-

hol use is similar for female and male high school students. Each 1 percent increase in athletic participation is associated with an 8 percent increase in alcohol use ($[e^{.08} - 1] \times 100$). Yet participation in nonathletic activities is associated with less alcohol use for males only. Each 1 percent increase in nonathletic participation is associated with a 4 percent decrease in alcohol use.

Model 2 introduces the control variables and the school-level variables. In general, the results support past research concerning the correlates of alcohol use. African Americans and students from other ethnic groups report less alcohol use than white students. Higher

TABLE 4. Multilevel Regression Model of Changes in Adolescent Alcohol Use, by Gender, NELS 1990–92

Variable	Model 1		Model 2		Model 3	
	Female	Male	Female	Male	Female	Male
Intercept	.40***	.50***	.60***	.81***	.58***	.85***
Alcohol use (logged) 1990	.49***	.51***	.45***	.49***	.46***	.49***
Athletics (logged)	.08***	.07***	.08***	.06***	.11***	.07***
Nonathletics (logged)	-.02	-.04**	-.02	-.07**	-.02	-.10**
African American ^a			-.14***	-.12***	-.14***	-.11*
Latino ^a			-.01	-.00	-.01	.01
Other ^a			.10***	-.08*	-.11***	-.09*
Family socioeconomic status			.01	.01	.01	.00
Parent involvement			-.01*	-.00	-.01*	-.00
Parent interest			.00	-.00	.00	-.00
Peer dropout			.00	.02	.03	.02
Grade-point average			-.02**	-.02*	-.02**	-.02*
Mean SES			.08**	.06*	.10**	.03
Student/teacher ratio			-.00	-.00	-.01	-.00
Percent minority			-.01*	-.00	-.01	-.02*
School size			.01	-.02**	-.00	-.02**
Catholic ^b			.13**	.04	.04*	.03
Private ^b			-.02	-.05	-.01	-.05
Suburban ^c			.02	-.00	.02	-.01
Rural ^c			.04	-.02	.03	-.03
<i>Cross-Level Interactions</i>						
Athletics × mean SES					-.07*	.09*
Athletics × % minority					-.01	.00
Athletics × Catholic					-.01	.05
Athletics × private					.00	.02
Nonathletics × mean SES					.02	-.02
Nonathletics × % minority					-.01	.02**
Nonathletics × Catholic					.17*	.01
Nonathletics × private					.16*	.01
<i>Random Effects</i>						
Intercept	.02***	.02***	.01***	.02***	.01***	.02***
Level-1 error	.25***	.33***	.24***	.32***	.23***	.31***
AIC	6,065	5,643	6,008	5,622	6,004	5,618
McFadden R ²	.15	.13	.16	.14	.18	.16

* $p < .05$; ** $p < .01$; *** $p < .001$ (two-tailed tests)

Notes: NELS = National Education Longitudinal Study. SES = socioeconomic status. AIC = Akaike's information criterion. The models are based on 5,398 female and 4,495 male respondents in the 10th–12th grades, nested in 940 schools. The outcome variable is the natural logarithm of alcohol use measured in 1992.

^a Whites comprise the reference category.

^b Public schools comprise the reference category.

^c Urban schools comprise the reference category.

GPA is associated with less alcohol use similarly among males and females. Yet peer dropout, a proxy for deviant peer behavior, is not associated with alcohol use. An auxiliary analysis indicates that a significant association between peer dropout and alcohol use is attenuated once GPA is included in the model. Mean SES is positively associated with increases in alcohol use. Among females, there tend to be larger increases in alcohol use in Catholic schools and in low-minority schools. Among males, school size is associated with decreases in alcohol use. A *z*-test designed to compare coefficients across regression models (Brame et al. 1998) indicates that the following coefficients differ significantly across the two gender groups in model 2: nonathletics, school size, and Catholic ($p < .05$, two-tailed test).

There is little change in the relationship between participation in extracurricular activities and alcohol use once the control variables and school-level variables are added to the model. Rather, there continues to be a significant positive association between athletic participation and alcohol use and a significant negative association, among males, between nonathletic participation and alcohol use.

Model 3 includes a set of cross-level interaction terms designed to evaluate the proposition that the relationship between extracurricular activities and alcohol use is affected by school-level characteristics. There are four significant cross-level coefficients (tests for additional cross-level interactions revealed no others). They imply that, among females, athletic participation and alcohol use are more weakly related in wealthier schools than in other schools. In other words, females who participate in athletic activities report larger increases in alcohol use in schools with a low mean SES. Among females, though, participation in nonathletic activities negatively affects alcohol use in public schools; participation in nonathletic activities does not significantly affect alcohol use in Catholic or private schools. Among males, the pattern of cross-level interactions differs. The pattern suggests that the protective effect of nonathletic activities is weaker in high-minority schools than in low-minority schools. Moreover, the positive association between athletics and alcohol use is stronger in high-SES schools than in low-SES schools. Similar to Hoffmann and Xu's (2002) results, participation in nonathletic activities provides less protection against alcohol use in

high-minority schools than in low-minority schools, but this effect is limited to male students only.

DISCUSSION

A wealth of previous research indicates that high school students' participation in extracurricular activities—athletic and nonathletic—yields numerous benefits for them, including better academic performance, higher rates of college attendance, lower risk of dropout, and better interpersonal and cognitive skills that serve them well during adulthood (e.g., Eccles et al. 2003; Guest and Schneider 2003; Marsh and Kleitman 2002). Yet there are some curious exceptions to this generally promising set of results. Specifically, in some studies, athletic involvement—particularly among males—is associated with more alcohol use, even as it is associated with less frequent use of drugs such as marijuana and cocaine (e.g., Eccles and Barber 1999; McHale et al. 2005).

The results of the multilevel models support this finding; but, contrary to one of the guiding hypotheses (see also Crosnoe 2002), this effect applies to both boys and girls: Among males and females, athletic participation is associated with increases in alcohol use over a two-year period. This association is not explained by differences among athletes and nonathletes in race/ethnicity, family SES, parental involvement, peer dropout, GPA, or several school-level variables. Moreover, given the change analysis utilized in this study, it is unlikely that alcohol users are simply more involved in subsequent athletic activities.

Yet, as predicted by the hypotheses, participation in nonathletic activities such as school clubs, student government, and honor societies is associated with decreases in alcohol use, although this result is limited to male adolescents. Hence, it appears that involvement in nonathletic activities is beneficial for male students not only in terms of their academic success, but also in reducing involvement in a common health-risk behavior (Eccles and Barber 1999; Hoffmann and Xu 2002; Melnick et al. 2001; Zill 1995). Why this benefit does not extend to female students is not clear, although the explanation may involve females' generally higher participation in nonathletic extracurricular activities.

These results support the notion that athlet-

ic participation among students reinforces certain cultural scripts that lead to participation in one form of drug use. Athletics provide an environment where peer groups form and where subsequent preferences, values, and behaviors are affected (Eccles et al. 2003). Such a view is consistent with research on the key mechanisms that explain adolescent alcohol use. That is, male athletic participation is often accompanied by a greater propensity to socialize and attend parties where alcohol may be available. Alcohol use is often seen as a rite of passage for adolescent boys who attend after-school or weekend parties. The availability of alcohol and an atmosphere that supports the use of this substance may be a frequent part of the male athlete's social world. The results suggest, moreover, that this experience also operates for females who participate in athletics. If parties are places where athletes, male and female, tend to congregate on weekends or after school, and alcohol is commonly available at these gatherings, then it is not surprising that we find more alcohol use among athletes of both genders, especially as they move through the successive years of high school. On the other hand, male students who participate in nonathletic extracurricular activities may not be as involved in social environments or with peer groups that encourage alcohol use. Thus, it appears that differential exposure to social situations and peer environments enhances or diminishes the use of alcohol among adolescents.

The principal contribution of this study, however, is its assessment of school-context effects. Recent research points to the many discrepancies among schools in their ability to offer beneficial activities to students (Guest and Schneider 2003; McNeal 1999). Moreover, a recent study finds that nonathletic participation is associated with less delinquency only in low-minority schools (Hoffmann and Xu 2002). Based on these and other studies that suggest the importance of school context, I hypothesized that the relationship between extracurricular activities and alcohol use is stronger in low-minority and wealthier schools than in other schools. This proposition is supported only when considering nonathletic activities among males. Males who participate in nonathletic activities are less likely to report alcohol use, especially when they attend low-minority schools. The reasons underlying this finding are not evident, but they might be

linked to the greater social capital or economic resources available in schools with relatively few minority students (Roscigno 1998). Presumably, programs in these schools are better funded than in high-minority schools, so they offer more opportunities for social engagement and environments where alcohol use is not condoned. Moreover, because many colleges and universities look for school activities on applications as a way to distinguish high-achieving applicants, it is likely that many of the highly involved students in these schools are part of a college-tracking curriculum (cf. Quiroz et al. 1996). Alcohol use may be antithetical to such goals. Because a lower proportion of males than females participate in nonathletic activities, participation in school clubs and student council may better distinguish between high-achieving and low-achieving males in low-minority schools. Alcohol use is a risky activity that tends to be avoided by highly involved males.

The other significant cross-level interactions indicate that (1) among females, athletic participation is associated with increases in alcohol use to a greater extent in low-SES schools than in high-SES schools; and (2) among males, athletic participation is associated with increases in alcohol use to a greater extent in high-SES schools than in low-SES schools. Given a lack of research, there is no clear explanation for these results. Perhaps athletics provide an entrée to a "party subculture" (Hagan 1991) among females more in low-SES schools than in high-SES schools. Athletics in high-SES schools is part of a subculture of high achievement for female students. On the other hand, athletic participation may serve as a key subcultural experience for male athletes in higher-SES schools as they attend weekend or after-school parties. Perhaps traditional gender roles that support the use of alcohol among males but not among females are more germane in higher-SES schools, thus affecting differences in the likelihood of alcohol use among male and female athletes from these schools (Huselid and Cooper 1992). Because the data do not allow a satisfactory test of these explanations, assessing differences in the roles played by athletics and other school activities in schools with various levels of resources and various student ethnicities is an important goal for future studies. Moreover, do these results also differ for various demographic groups, such as minority students or

lower-SES students? There are myriad contexts that might affect the association between extracurricular activities and alcohol use or other behaviors. The task for future studies is to explore these associations in finer detail while continuing to address the school context.

LIMITATIONS AND CONCLUSIONS

There are several limitations to this research that make its conclusions tentative. First, the NELS data do not allow an assessment of several important correlates of alcohol use. For instance, there are no questions about peer alcohol use, the availability of alcohol, time spent with peers, or several other variables that might enable a modeling of the specific peer networks and social environments of the NELS respondents (cf. Eccles et al. 2003; Cleveland and Wiebe 2003; Johnston et al. 2004). This is unfortunate, as peer behaviors and networks are consistently associated with alcohol use (see, e.g., Kandel 1996; Mason and Windle 2001). The omission of peer alcohol use variables, in particular, may lead to an unknown degree of specification error in the models.

Second, the NELS data used in the analysis are more than a decade old. Recent years have seen a marked increase in female participation in athletics and in school-mandated participation in community service, even as the prevalence of alcohol use has remained constant. Therefore, the results of this study that are at odds with other studies and that have extended other research (e.g., school-level effects) should be tested using more recent data.

Third, school-level characteristics that influence adolescent behavior extend beyond sociodemographic variables. Aggregate school characteristics such as “values” and “attachment” may affect alcohol use and participation in extracurricular activities over and above the effects of individual-level characteristics (Battistich et al. 1995; Hoffmann and Johnson 2000). Although the NELS data may be used to construct rough proxies for some of these concepts by aggregating individual responses to the school level, I am hesitant to do so because it would likely result in substantial measurement error (see Goldstein 1995, Chapter 10). Future research might attend to this issue by collecting data on large numbers of students per school, thus reducing the measurement error of aggregated responses.

Finally, the NELS data do not allow an assessment of other ecological contexts, in particular neighborhood characteristics that may affect involvement in alcohol use (Ennett et al. 1997; Hoffmann 2002). As social disorganization theorists recognized long ago, community characteristics such as poverty levels and residential mobility have both direct and interactive effects on various forms of delinquent behavior. Hence, the results are tempered by an inability to determine whether they reflect only school characteristics or are driven by broader ecological characteristics such as community disorganization.

In sum, the main protective effect that extracurricular activities have against alcohol use is generated by participation in nonathletic activities. This occurs primarily among males who attend low-minority schools. Yet, among both males and females, participation in athletics is related to increasing alcohol use over time. The most important result of this analysis, though, is the finding that the positive association between athletic participation and alcohol use occurs among males in higher-SES schools and females in lower-SES schools. Hence, it is not a simple matter of male and female athletes imbibing or enacting a “party” subculture together (Hagan 1991), but rather distinct social environments that encourage alcohol use among some sets of high school athletes. The task for future research is to explore these distinct social environments to determine the different meanings that extracurricular activities hold among males and females who attend schools with various social and demographic characteristics.

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