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HIGH SCHOOL ATHLETIC PARTICIPATION AND ADOLESCENT SUICIDE:

A Nationwide US Study

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Abstract

Suicide is the third leading cause of death among US adolescents aged 15–24, with males incurring higher rates of completion than females. This study used hierarchical logistic regression analysis to test whether athletic participation was associated with lower rates of suicidal ideation and behavior among a nationally representative sample of over 16,000 US public and private high school students. Net of the effects of age, race/ethnicity, parental educational attainment, and urbanicity, high school athletic participation was significantly associated with reduced odds of considering suicide among both females and males, and reduced odds of planning a suicide attempt among females only. Though the results point to favorable health outcomes for athletes, athletic participation was also associated with higher rates of injury to male athletes who actually attempted suicide.

Keywords

adolescence; athletic participation and gender; health; suicide

Suicide is the third leading cause of death among US adolescents aged 15–24, with males incurring higher rates of completion than females (Portner, 2001; Stillion, 1995; USDHHS, 1999). Although the suicide rate in the United States has remained stable over the past 40 years, the estimated rate among adolescents and young adults has nearly tripled (CDC, 2002; Peters et al., 1998).

Despite the seriousness of adolescent suicide, researchers have only recently begun to explore its relationship with athletic participation (Baumert et al., 1998; Choquet et al., 1993; Ferron et al., 1999; Miller et al., 2000; Oler et al., 1994; Sabo et al., 2002; Tomori and Zalar, 2000; Unger, 1995, 1997). Millions of US adolescents participate in school-based and community

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sports programs and, furthermore, athletic involvement is ostensibly associated with protective factors that have been generally found to reduce suicide risk among young people: e.g. lower rates of illicit drug use, greater social supports, reduced risk for depression (Mazza et al., 2001; Price et al., 2001). This study tests whether athletic participation is related to reduced risk for suicidal ideation and behavior in a nationally representative sample of US high school boys and girls.

Theories of Sport and Adolescent Suicide

The possibility that athletic participation is associated with lowered risk for adolescent suicide can be rooted in classical sociological thought. To the extent that adolescents become enmeshed in the social network of teammates, coaches, health professionals, family and community that emerges around organized youth sports, athletes should experience greater social integration. Development of an athlete identity and adoption of team values and goals might also lessen the contemporary adolescent experience of anomie (Durkheim, 1966 [1897]). Merton (1960) argued that suicide rates are likely to increase as the gap widens between a society's ideal goals and the means provided to attain them. Athletic participation may provide adolescents with the social opportunities and utilitarian skills to pursue and achieve culturally defined goals or, more subjectively, the expectation that sports involvement will help them achieve desired goals in school and in later adult life. Both of these social–psychological processes should be associated with reduced social strain, and thus lowered suicide risk.

Thorlindsson and Bjarnason (1998) demonstrated the strengths of Durkheim's classic theory of suicide for modeling youth suicidality. But they also recognize that Durkhiem's macrosociological analysis presumes rather than explicitly details how specific social psychological processes influence suicidal ideation and behavior among young people. When suicidality is conceptualized as a deviant behavior, some contemporary theories point to social psychological factors that may be related to suicidal ideation and behavior among teenage athletes. For example, control theory (Hirschi, 1969) further suggests that strong social bonds reduce individual deviance. Athletic participation promotes the development of social bonds within an institutional setting and the adoption of inner and outer controls during adolescence. Involvement in sports is generally accompanied by attachment to influential others (such as coaches and teammates) as well as reinforcement of conventional beliefs and values. Moreover, a commitment to organized sports gives adolescent participants something to lose. For all of the above reasons, athletic participation should reduce the risk of suicidal ideation and behavior among adolescents.

While it can be argued that sport involvement enhances social integration, reduces social strain, and promotes stronger social bonds, contemporary critical sociologists are quick to argue that athletic participation unfolds within institutional structures that are stratified by class, gender and race. These processes foster access and mobility for some groups but not others, and unequal treatment is also likely to persist after gaining entry, e.g. historical discriminatory practices that barred blacks and women from athletic opportunities (Hargreaves, 2000; Lapchick, 2001). Athletic participation is, therefore, related to a set of multifaceted institutional processes in which adolescents develop identity, enact a variety of cultural scripts for social behavior, and build personal and social resources. The implications of these processes for understanding suicidal ideation and behavior still need to be addressed. In this article we highlight the potential relevance of cultural resource theory to ongoing conceptual efforts to understand suicidality in general and, in particular, variations in suicidal ideation and behavior among teenage athletes (Miller et al., 1998, 1999, 2002; Sabo et al., 2002). Cultural resource theory shows promise because it integrates both exchange theory and gender theory to explain the linkages between athletic participation and adolescent health risk behavior, including suicidality.

Resource-Building and Suicidal Ideation and Behavior

Cultural resource theory combines two key theoretical components in order to understand the relationship between sports and suicidal ideation and behavior. The first component speaks to the development of personal and social resources that buffer against suicidality. Participation in high school sports has long been a highly valued source of popularity for boys. While the sport arena was historically denied to girls, growing female sports participation since the 1970s has been accompanied by shifting attitudes toward femininity and female athleticism. Today female high school athletes, like boys, enjoy elevated popularity (Heywood and Dworkin, 2002; Holland and Andre, 1994; Kane, 1988; Melnick et al., 1992; Suitor and Carter, 1999). The research also shows that both female and male athletes are more likely than non-athletes to be involved with school extracurricular activities and community organizations (Melnick et al., 1992; Sabo et al., 1993).

Parents and school officials typically perceive sports as a wholesome activity that ‘builds character’ and contributes to success in adult life (Coakley, 2002; Rees et al., 1990). Through sports involvement, adolescents make friends, become more popular, and acquire college-related values and expectations. Successful development of an athletic identity may also contribute to a young person’s self-efficacy, gender identity development, social acceptance, leadership skills, and upward mobility (Dobosz and Beaty, 1999; Melnick et al., 1988). In other words, adolescents who construct an athletic identity, both subjectively and institutionally, tend to be rewarded with status gains within the school and, to some extent, greater educational and labor market success as adults (e.g. Barron et al., 2000). We contend that greater social integration and status attainment should be associated with lowered risk for suicidality.

Gendered Cultural Scripts and Suicidal Ideation and Behavior

The second component of cultural resource theory related to suicidal ideation and behavior revolves around the cultural scripting of general behavior and gender identity formation. Adolescents, who lack an extensive repertoire of personal experience, may be particularly inclined to draw upon existing cultural scripts as they strive to construct personal identities and locate themselves within social hierarchies. Though scripts may vary substantially along racial/ethnic, class, or subcultural lines, it is not difficult to identify a cluster of characteristics and behaviors that have come to be institutionalized as ‘feminine’ or ‘masculine’. The traditional feminine cultural script or ‘emphasized femininity’ (Connell, 2000) celebrates fragility, passivity, compliance with men’s desires, and sexual receptivity, which in turn, may predispose girls to internalizing problem behaviors such as anxiety, depression, suicidality, and disordered eating. In contrast, the traditional masculine script often can prompt boys to adopt externalizing problem behaviors such as aggression and delinquency (Leadbeater et al., 1995; Pipher, 1994; Scaramella et al., 1999).

Sport has also been theorized as a cultural milieu in which boys, and increasingly girls, are encouraged to perceive and adopt athletic practices defined as ‘masculine’, thereby making sport an institutional conduit for the enactment of hegemonic masculinity (Burstyn, 1999; Connell, 2000; McKay et al., 2000). In US sport, hegemonic masculinity emphasizes aggression, dominance-striving, conformity to authority, the devaluation of femininity, and the glorification of suffering and sacrifice (Harvey, 1999). Messner (2002) identifies a similar clustering of manly traits at the center of media representations of the sport subculture as the ‘televised sports manhood formula’; e.g. toughness, strength, hardness (avoidance of being soft), aggression, and a willingness to compromise personal health in order to win.

During the last three decades, millions of US girls have begun to participate in competitive sports (McKay et al., 2000), and today, young athletes of *both* sexes pursue the prevailing athletic traits and cultural practices once considered exclusively ‘masculine’, such as

competitiveness, instrumentalism, success striving, stoicism, and aggression. As more female athletes experiment with scripts that valorize competition, goal attainment, and physical assertiveness, their identification with traditional 'femininity' — with its implications for depression, suicidality, and other internalizing characteristics — may be weakened.

Cultural resource theory recognizes resource-building and gendered cultural scripting as complementary paths that buffer teenage athletes against suicidality, a process further mediated by social psychological processes. For example, Ferron et al. (1999) argued that the lower suicide rates of adolescent athletes were attributable to better psychological adjustment, less nervousness or anxiety, more energy, and more life satisfaction; athletes also reported being less sad, depressed and desperate than non-athletes. A longitudinal study of New Zealand 9–13-year-olds found that global and academic self-esteem significantly predicted reduced risk at age 15 for a variety of health compromising behaviors, including suicide (McGee and Williams, 2000). Greater self-esteem has often been tied to lower suicide risk among adolescents (Pipher, 1994; Real, 1999). High school sports foster popularity and status gains for many youth, thereby increasing their self-worth, which in turn can reduce suicide risk.

There is also some evidence that adolescent athletic participation is associated with reduced likelihood of depression (Oler et al., 1994; Sanders et al., 2000). Gore et al. (2001) found that sports team involvement helped to protect against depressed mood among high school females (though not males) under some circumstances. Although no existing studies have tested the supposition that sport reduces female depression and thus suicide risk by attenuating girls' reliance on traditional gendered cultural scripts, the nascent research evidence is not inconsistent with this contention.

Both components of cultural resource theory — resource-building and cultural scripting of gender identity — favor athletic participation as a deterrent to adolescent suicidality. The logic suggests that high school athletes are less likely than their non-athlete peers to consider, plan, or attempt suicide. However, for those adolescents who do in fact attempt to kill themselves, the theoretical implications are somewhat different. Critical sociological studies of sport have showed that during the latter 20th century, men's team sports (e.g. baseball, basketball, football, hockey and rugby) reproduced cultural practices that encouraged boys to conform to hegemonic masculinity (Burstyn, 1999; Harvey, 1999; Kidd, 1990; McKay et al., 2000). By identifying with such hegemonically masculine traits such as violence proneness ('be tough', 'kick ass'), goal attainment ('win at all costs'), emotional inexpressivity ('suck it up'), and stoicism ('no pain, no gain') in the face of physical and emotional duress, male athletes may actually incur greater physical injury from suicide attempts. In contrast, the adoption of hegemonically masculine traits associated with the athlete script may not be associated with an increased rate of physical injury among adolescent girls. To begin with, girls typically use less violent and aggressive means than boys in their suicide attempts (Moscicki, 1994). Second, whereas gender identity development among boys in many sports often amplifies traits associated with hegemonic masculinity, girls' gender identity development vis-a-vis sport and the adoption of more masculine traits is weakened by cultural pressures to conform to traditional notions of femininity. Female athletes who attempt suicide, therefore, would not bring the same degree of goal-directedness, violence-proneness, and physical or emotional denial to the act as their more hegemonically masculine male athlete counterparts.

The theoretical framework outlined fostered the following hypotheses.

1. For both genders, athletes will be less likely than their non-athlete counterparts to consider, plan, and attempt suicide.
2. For both genders, higher degrees of athletic participation will be associated with reduced risk for suicidality; i.e. when compared with non-athletes, the highly involved

athletes will show less risk for considering, planning and attempting suicide than moderately involved athletes.

3. Among male adolescents who attempt suicide, athletes will be at greater risk for resultant injury than their non-athlete counterparts.

4. When compared with their respective non-athlete counterparts, male athletes who attempt suicide will have greater risk of resultant injury than female athletes who attempt suicide.

Data and Methods

Data for the study are from the 1997 national, school-based Youth Risk Behavior Survey (YRBS), conducted biennially by the Centers for Disease Control and Prevention. The YRBS employed a three-stage cluster sample design to generate a nationally representative sample of US public and private high school students in grades 9 through 12. An 88-item questionnaire, which assessed an array of health risk behaviors, was administered to students in selected classrooms of schools chosen on the basis of urbanization, racial/ethnic makeup, and size. African-American and Latino respondents were over-sampled in order to facilitate hypothesis testing. In the 1997 YRBS, a total of 16,262 questionnaires were completed in 151 schools. Eighty-seven percent of students responded from 79 percent of the schools invited to participate in the survey, for an overall response rate of 69 percent. (For additional methodological details, see Kann et al., 1998.)

Variable Measures

Separate statistical analyses were conducted for each gender. In light of selection effects associated with participation in youth sports, we controlled for several sociodemographic characteristics that might distinguish athletes from non-athletes, including age, race/ethnicity, social class, and urbanicity. Students ranged in age from 14 to 18 (a small number of slightly younger or older students were recoded to the ends of this range). Dummy variables for urban and rural residence were constructed, with suburban as the reference category, based on identification of the respondent's school location (urban, suburban, or rural).

In order to measure race/ethnicity, students were asked to describe themselves using only one of the following categories: white, not Hispanic; black, not Hispanic; Hispanic or Latino; Asian or Pacific Islander; American Indian or Alaskan Native; and Other. Due to the comparatively small number of American Indian/Alaskan Native respondents (n = 139, or less than 1 percent of the sample) and the conceptual ambiguity of the 'Other' designation, these two categories were subsequently combined into a single category that has been included but not interpreted in this analysis. Multivariate analyses included dummy variables for all racial/ethnic categories (black, Hispanic, Asian/Pacific Islander, and American Indian/Other) except white, which served as the reference category.

Parental educational attainment served as a proxy for social class. Students identified each parent's highest level of education from four options: did not finish high school (coded as 10 years of education); graduated from high school (12 years); some education after high school (14 years); and graduated from college (16 years). If mother's and father's education levels differed, or if the respondent provided data for only one parent, the higher available response was coded. The whole–sample mean of 13.92 was used in cases where neither parent's educational attainment was available.

Athletic participation—Athletic participation was measured by combining responses to two items: 'During the past 12 months, on how many sports teams run by your school did you play? (Do not include PE classes.)' and 'During the past 12 months, on how many sports teams run

by organizations outside of your school did you play?' Responses were coded dichotomously as 'did not participate' (on any teams) and 'did participate' (on one or more teams in or out of school). Based on the assumption that the number of teams on which an athlete plays can serve as a proxy for degree of involvement in sports, an alternate measure coded respondents as 'non-athletes' (participated on no teams), 'moderately involved athletes' (participated on one or two teams), and 'highly involved athletes' (participated on three or more teams).

Suicide—Respondents were asked if they had, within the past year, ever 'seriously considered attempting suicide'; 'made a plan about how you would attempt suicide'; and/or 'actually attempted suicide'. Those who did attempt suicide were further asked if 'any attempt resulted in an injury, poisoning, or overdose that had to be treated by a doctor or nurse'.

Data Analysis

In order to accommodate the complex survey design of the Youth Risk Behavior Survey, all analyses were conducted using the Stata statistics/data analysis package (Stata Corp, 2001). Descriptive statistics were calculated to compare the rates of suicidal ideation and behavior for non-athletes with those for all the athletes in the sample and, secondarily, with rates for a specific subgroup of highly involved athletes. Participation in sports is associated with several factors that may also be related to suicidal ideation and behavior. In order to control for some of these potentially confounding factors, we carried out gender-specific logistic regression analyses (controlling for age, race/ethnicity, social class, and school location) in order to compare non-athletes' and athletes' odds of engaging in each suicidal behavior. The odds ratios reported here estimate the athletes' likelihood of an event (such as considering, planning, or attempting suicide) relative to the non-athletes' likelihood of the same event. In order to obtain a clearer insight into whether the degree of athletic participation was associated with differential rates of suicidal ideation and behavior, a second set of odds ratios was also calculated that compared the risks of the highly involved athletes to the non-athletes. An odds ratio (OR) of 1.00 (technically, 1:1) is equivalent to a statistical 'toss-up', while an OR greater than 1.00 means that the athletes' odds are greater than the non-athletes' odds; an OR less than 1.00 means that the athletes' odds are smaller than the non-athletes' odds.

Results

A higher proportion of boys (68%, $n = 5110$) than girls (51%, $n = 3507$) reported participating on at least one sports team in their school or community during the year prior to the survey. Thirty-four percent of the female athletes (17% of all girls) and 43 percent of the male athletes (29% of all boys) were 'highly involved', having participated on three or more teams during the past year.

Table 1 compares sociodemographic characteristics and suicidal ideation/behavior of the female respondents in the sample. F-tests of mean differences indicated that girls who engaged in athletic activity were significantly younger, more likely to be white, higher in parental education level, and less likely to attend an urban school than non-athletes; the differences for age, race/ethnicity, and parental education were even larger when comparing highly involved athletes with non-athletes.

A significantly lower percentage of female athletes than non-athletes reported seriously considering or planning suicide during the year prior to the survey. The prevalence of suicidal ideation was even lower among the highly involved subset of female athletes, who were also less likely to report a past-year suicide attempt than their non-athlete peers. However, among those girls who did attempt suicide, the athletes and especially the highly involved athletes reported somewhat higher rates of resultant injury, although this trend did not reach statistical significance.

Table 2 provides descriptive data for male adolescents. Like their female counterparts, male athletes were characterized by lower mean age, a greater tendency to be white, and higher levels of parental education than non-athletes, though sports participation rates did not differ significantly by school location. Suicidal thoughts and plans were also less common among male athletes than the male non-athletes, and highly involved male athletes were less likely to have attempted suicide in the past year than male non-athletes. Significantly higher rates of injury were reported among suicidal male athletes, including highly involved athletes, than suicidal non-athletes. These patterns resembled those found for female respondents, but were more dramatic. That is, lower percentages of boys than girls reported thinking about, planning, or attempting suicide. However, boys' suicide attempts were disproportionately likely to result in injury severe enough to require medical treatment. More than half of all male athletes' suicide attempts culminated in serious injury.

For each of the four measures of suicidal ideation/behavior, we conducted two sets of gender-specific, hierarchical logistic regression analyses. Odds ratios and confidence intervals were first calculated for athletes, with non-athletes as the reference category, after controlling for the potentially confounding effects of sociodemographic variables. Next, we repeated the analysis for moderately involved and highly involved athletes, again employing non-athletes as the reference category. Results of both analyses are collapsed into a single table for each indicator of suicidality (see Table 3 through Table 6).

Although they were not the primary focus of the analyses, several patterns of interest emerged with respect to our control variables: age, race/ethnicity, parental educational attainment, and urbanicity. In the case of parental education, the pattern was reasonably consistent across gender; girls' risk of considering, planning, or (especially) attempting suicide was inversely related to parental education, as was boys' risk of considering or attempting suicide. In contrast, increasing age decreased the odds of suicidal ideation and behavior for girls but not boys. Urbanicity was a significant factor only in that urban boys were less likely than suburban boys to consider suicide. Interestingly, while black girls were less likely than white girls to consider or plan suicide, black boys were more likely than their white counterparts to attempt suicide, and Hispanic boys' odds of planning or attempting suicide were higher still.

Net of the effects of age, race/ethnicity, parental educational attainment, and urbanicity, athletic participation was significantly associated with reduced odds of seriously considering suicide for both male (OR = .70, $p < .01$) and female adolescents (OR = .79, $p < .01$). In particular, highly involved athletes of both genders were significantly less likely to consider suicide than non-athletes (female OR = .62, $p < .001$; male OR = .58, $p < .001$). Moderately involved athletes' odds of considering suicide did not differ significantly from those of non-athletes (see Table 3). Female (OR = .73, $p < .01$) but not male athletes were significantly less likely than their non-athlete counterparts to make a plan for committing suicide (see Table 4). Both moderately (OR = .80, $p < .05$) and highly involved female athletes (OR = .59, $p < .01$) had reduced odds of planning a suicide attempt. A similar tendency for male highly involved athletes reached only marginal statistical significance (OR = .74, $p < .1$).

Athletes did not differ significantly from their non-athlete peers of either gender with respect to their odds of reporting actual suicide attempts (see Table 5).

Table 6 reports relative odds of suicide-related injury among those respondents who reported having attempted suicide in the year prior to the survey. Athletic participation did not significantly predict odds of injury for suicidal girls. However, suicidal male athletes were significantly more likely to report injury than their non-athlete suicidal peers (OR = 3.31, $p < .01$); for boys who had participated in three or more sports teams, the odds were nearly five times as high (OR = 4.84, $p < .01$).

Discussion and Conclusions

Descriptive statistics showed that both female and male athletes in this study reported significantly lower rates of suicidal ideation and behavior than their non-athlete counterparts, and the associations were most notable for highly involved athletes. After controlling for the effects of age, race/ethnicity, parental educational attainment, and school location, however, a more nuanced set of findings resulted. Athletes of both genders were less likely than non-athletes to have considered suicide, with highly involved athletes enjoying the lowest risk. The relationship between athletic participation and making an actual plan for committing suicide differed by gender; only female athletes (particularly those who were highly involved) were at less risk of planning a suicide attempt. The findings on suicide attempts, however, yielded no significant relationships for either females or males; i.e. the reported prevalence of suicide attempts among athletes of both sexes was not different than the rates of their non-athlete counterparts. Finally, suicidal male athletes (especially the highly involved athletes) were more likely than their non-athlete counterparts to report serious injury after a suicide attempt; no differences between suicidal female athletes and non-athletes were evident in this regard.

These results provide mixed support for the four hypotheses. As yet, we can only speculate about the gender-specific social, psychological, and physiological mechanisms by which athletic participation can influence suicide risk.

The findings that athletic participation was associated with reduced adolescent risk for considering suicide and, for girls only, planning to commit suicide, are generally consistent with social integration theory (Durkheim, 1966 [1897]), structural strain theory (Merton, 1960) and control theory (Hirschi, 1969). Sports involvement may promote greater social integration of potentially at-risk adolescents into protective social networks, and facilitate the development of personal resources for achieving socially approved goals. Athletic participation strengthens social bonds as well; as young people become more involved in athletic activities, their attachment to teammates and coaches, as well as acceptance of the normative structure of sport, becomes stronger, thereby lowering their risk for suicide.

The findings that higher rates of athletic participation for both females and males were related to some reduced suicidal ideation are also consistent with cultural resource theory. Status attainment and gender identity formation in sport may promote the formation of social bonds in a Durkheimian sense, but, leaning toward Merton's scheme, they may help adolescents to reduce social strain by providing them with the means to attain socially approved goals; e.g. parental and community approval, college/university attendance, and success in adult life. For boys, the successful pursuit of hegemonic masculinity through sport may also be said to foster upward mobility within gendered hierarchies, produce respect in accordance with prevailing gender beliefs, and foment social inclusion. As individual male athletes attempt to achieve status gains, in a collective context, their successes and failures reproduce hierarchical power relations among males and inequities between males and females (McKay et al., 2000). The resulting struggles of adolescent males to build resources, to form social bonds, and to manage social strain may play a role in reducing their suicidal ideation. In addition, to the extent that girls' athleticism and identification with elements of hegemonic masculinity now enhances their popularity, social inclusion, and status attainment in school and community (Bolin and Granskog, 2003), as it has done historically for many boys, sports participation may also reduce their risk of suicidal ideation.

The hypothesized differences between athletes and non-athletes with regard to suicidal behavior (i.e. reported attempts) were unsubstantiated among both females and males. Why would athletic participation be linked to reduced risk for ideation but not behavior? It may be that the circumstances and/or etiology of suicidal ideation differ among athletes and non-

athletes. For example, extant research shows that physical activity and athletic participation are likely to lower risk for depression. It may be, however, that when teenage athletes do become depressed, it is more likely to result from an acute episode (e.g. failing to make first team or perceiving rejection by a coach) rather than a chronic condition. Future researchers might explore whether depression is more chronic among non-athletes than athletes, and whether acute or episodic depression is more prevalent among athletes than non-athletes. Chronicity might account for the higher rates of suicidal ideation among the non-athletes in our study. More research is needed to explore these social–psychological processes.

Although differences may exist in the ways that athletic participation influences the gender identity development and social integration of boys and girls, our analysis revealed several similarities between the sexes with regard to suicidal ideation and behavior. For both genders, the reported prevalence of suicidal ideation was lowest among highly involved athletes and highest among non-athletes. After controls were instituted, however, athletic participation significantly lowered only girls' risks for considering and planning suicide. Yet there were marked differences between females and males in relation to reported injury after a suicide attempt.

The marked differences between females and males who reported serious injury after a suicide attempt need further discussion. Classical sociological theorists did not analyze injuries incurred from suicide attempts. Cultural resource theory, however, can help begin to explain the finding that highly involved male athletes (and not female athletes) who attempted suicide were significantly more likely than their non-athlete peers to incur serious injury. We suspect that highly involved male athletes are more apt to embrace traits and behaviors consistent with hegemonic masculinity; e.g. goal-directedness, violence-proneness, stoicism. These males may be more determined to complete a suicide attempt once their minds are made up. Traditionally, male athletes learn to suppress their emotions and physical pain and that, in turn, might explain their greater injury proneness (Sabo and Panepinto, 1990; Young and White, 2000). Also, epidemiologists and suicidologists have long observed that, although females attempt suicide more often than males, the latter are more likely to succeed (USDHHS, 1999). It may be that male athletes adopt more traditionally 'masculine' methods and self-destructive mindsets when attempting to kill themselves; e.g. aggression, use of lethal weapons, goal directedness and denial of feelings (Canetto, 1995, 1997; Stillion, 1995). In this context, it might be argued that highly involved athletes of *both sexes* today are likely to construct an athletic identity around hegemonic masculinity which, theoretically, would place them at greater risk for seriously hurting themselves during a suicide attempt. However, the developmental outcomes of gender identity formation in relation to sport may be different for males and females. For many boys who enter the sport subculture, the scripts for masculinity are a continuation of their previous gender learning. In contrast, when girls enter the more 'masculine' subculture of sport, their experience is likely to be something of a departure from earlier constructions of femininity. Dominant cultural pressures for girls to avoid physical competition may be lessened by learning competition in sport. In short, gender identity development in sport generally 'is often one-sided and narrowing for boys and multifaceted and expansive for girls' (Sabo, 1988: 87).

The findings suggest three important implications for sociologists who study sport, gender, and health. First, it is important that highly involved female athletes displayed significantly lower risk for suicidal ideation than female non-athletes. Highly involved male athletes also had lower risk for considering suicide than their non-athlete male counterparts. When assessing individuals for potential suicide, clinicians often assume a continuum of risk, with increasing lethality as individuals move from considering suicide, through devising a plan for suicide, to an actual attempt. It may be important from a public health perspective, therefore, that highly involved athletes of both genders display less risk than their non-athlete counterparts at

considering suicide. While future researchers must not oversimplify or overstate the associations between athletic participation and adolescent suicide risk, the preventive implications of this finding merit serious consideration by public health advocates and health planners.

Second, although directional findings for lowered odds of planning a suicide in male athletes did not attain statistical significance, the overall findings were similar. Likewise, Brown and Blanton's (2002) analysis of a nationwide sample of US university students showed that athletes of both sexes reported lower rates of suicidal behavior than their non-athlete counterparts. Both gender similarities and differences appear to influence the biological, psychological, and socio-cultural processes that, in turn, inform health processes and outcomes. Future researchers need to be aware of these interactions and complexities, particularly as social forces continue to transform gender relations in sport.

Third, the finding that highly involved male athletes who attempted suicide were nearly five times as likely as male non-athletes to require medical attention has preventive implications. No person who exhibits suicidal thinking should be ignored. But teachers, school counselors, and coaches may want to pay particular attention to depressive symptoms among highly involved male athletes, since those who fall into this category are at unusually high risk for harm.

School and community-based sport programs are often regarded as extracurricular sites for learning and character development. We need to know more about how sport settings can operate as social vehicles for health promotion and prevention (Miller et al., 1998; Sabo et al., 2002, 2004). When young people become members of athletic teams, they are typically drawn into a formal health system that facilitates contact with medical professionals such as physicians, nurses, and athletic trainers. Physical examinations are required for participation and periodic check-ups and/or treatment for injuries are routine. Athletes often have access to health care professionals who can answer questions about their bodies and health-related matters. Public health planners need to assess whether the erosion of funds and social support for high school and community-based sports programs is detrimental to adolescent health.

This study shares several methodological limitations with previous research on adolescent suicide, which has mainly relied on retrospective and descriptive studies and less rigorous statistical analyses. Adolescent suicidal behavior is a multifactorial phenomenon and this study, similar to other investigations, focused on a limited number of variables. For example, combinations of several high-risk behaviors have been found to influence adolescent suicidal ideation and behavior (Burge et al., 1995; Flisher et al., 2000; Windle and Windle, 1997; Woods et al., 1997). Future researchers will need to compare how suicidality co-varies with other health risk behaviors for adolescent athletes and non-athletes.

We also recognize that, while gender identity plays a key role in our theoretical framework, our data analysis does not contain measures of masculinity and femininity. Our data analysis is further hampered by the lack of a measure for depression. More critically, while cultural resource theory points toward key social psychological processes related to athletic participation (e.g. creation of social bonds, status gains derived from athletic participation, or gender identity), these variables could not be formally operationalized within the current design. While the primary purpose of this study was to extend theoretical debate and understanding of adolescent suicide, future research on sport, gender and suicidality needs to include measures of social psychological processes.

Future researchers also need to explore bio-psychosocial explanations for these findings. For example, researchers might examine possible links between physical activity and depression (Unger, 1995), a frequent correlate of suicide. Frydenberg and Lewis (1993) speculated that

because sport involvement fosters positive peer relations and social integration between families and school, it helps adolescents deal with stress. Researchers might further explore the influence of social context and stress in relation to sport and adolescent suicide. More work needs done to disentangle the interfaces between athletic participation, exercise, and adolescent suicide.

Finally, sport is an institutional setting in which millions of young people interact regularly with supportive adults in ways that can influence health processes and outcomes. A greater understanding of the developmental importance of sport in adolescent subcultures will help shape effective preventive and health promotional interventions.

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Table 1

Weighted means: female adolescent suicidality by athletic status

	Non-athletes (n = 4486)	All athletes[b] (n = 3507)	Highly involved athletes[ac] (n = 1040)
Age (mean years)	16.24	15.92***	15.81***
Proportion white[d]	.52	.69***	.73***
Proportion black[d]	.17	.11***	.12*
Proportion Hispanic[d]	.12	.08**	.07**
Proportion Asian/Pacific Islander[d]	.04	.03	.02
Parental education (mean years)	13.88	14.54***	14.87***
Proportion urban	.36	.28*	.26+
Proportion suburban	.51	.56	.55
Proportion rural	.14	.16	.18
Seriously considered suicide, past year	.29	.25**	.20***
Made suicide plan, past year	.23	.18**	.14***
Attempted suicide, past year	.13	.11	.09*
Injured in suicide attempt[e]	.26	.32	.36

* $p > .05$

** $p > .01$

*** $p > .001$

[a] Highly involved athletes are the subset of all athletes who participated on three or more sports teams during the year prior to the survey.

[b] Asterisks indicate significant F-test of mean differences between athletes and non-athletes.

[c] Asterisks indicate significant F-test of mean differences between highly involved athletes and non-athletes.

[d] Proportions do not sum to 1.00 because data for American Indian/Alaskan Native/Other have not been included.

[e] Includes only respondents who have attempted suicide in the year prior to the survey (n = 936).

Table 2

Weighted means: male adolescent suicidality by athletic status

	Non-athletes (n = 2715)	All athletes[b] (n = 5110)	Highly involved athletes[ac] (n = 2126)
Age (mean years)	16.32	16.17*	16.12**
Proportion white[d]	.59	.67**	.67*
Proportion black[d]	.10	.11	.13*
Proportion Hispanic[d]	.11	.09***	.08**
Proportion Asian/Pacific Islander[d]	.05	.03**	.02***
Parental education (mean years)	14.22	14.78***	14.91***
Proportion urban	.34	.35	.34
Proportion suburban	.51	.51	.50
Proportion rural	.15	.14	.16
Seriously consider suicide, past year	.20	.13***	.11***
Make suicide plan, past year	.15	.11*	.10*
Attempt suicide, past year	.06	.04	.03*
Injured in suicide attempt[e]	.32	.53*	.55*

* $p > .05$

** $p > .01$

*** $p > .001$

[a] Highly involved athletes are the subset of all athletes who participated on three or more sports teams during the year prior to the survey.

[b] Asterisks indicate significant F-test of mean differences between athletes and non-athletes.

[c] Asterisks indicate significant F-test of mean differences between highly involved athletes and non-athletes.

[d] Proportions do not sum to 1.00 because data for American Indian/Alaskan Native/Other have not been included.

[e] Includes only respondents who have attempted suicide in the year prior to the survey (n = 395).

Table 3

Hierarchical logistic regressions predicting adolescent suicide consideration, by gender (adjusted odds ratios and 95% confidence intervals)

	Female (*n* = 7864		Male (*n* = 7589)	
	OR	**95% CI**	**OR**	**95% CI**
Sociodemographic variables[a]				
Age	.91*	.84–1.00	.97	.87–1.09
Black	.76*	.62–.94	.74	.54–1.01
Hispanic	1.09	.82–1.44	1.14	.78–1.65
Asian/Pacific Islander	.95	.61–1.47	1.27	.81–2.00
Parental education	.93**	.89–.97	.90***	.87–.94
Urban school location	.89	.65–1.22	.73**	.58–.92
Rural school location	.77	.47–1.27	.90	.65–1.24
Sports participation, past year[b]	.79**	.67–.94	.70**	.56–.86
Level of sports involvement, past year[b]				
Moderately involved (1–2 teams)	.88	.73–1.06	.78	.60–1.00
Highly involved (3+ teams)	.62***	.48–.79	.58***	.45–.76

* $p < .05$

** $p < .01$

*** $p < .001$

[a] Odds ratios and confidence intervals for the American Indian/Alaskan Native/Other variable have been omitted.

[b] Though both are included in the same table, the data for the sports participation variable and the level of sports involvement variable represent two separate analyses. For each analysis, variables were entered in two blocks: first sociodemographic variables, and then the sport variable.

Table 4

Hierarchical logistic regressions predicting adolescent suicide plan, by gender (adjusted odds ratios and 95% confidence intervals)

	Female (*n* = 7871)		Male (*n* = 7593)	
	OR	**95% CI**	**OR**	**95% CI**
Sociodemographic variables[a]				
Age	.89*	.82–.98	.97	.88–1.07
Black	.78*	.63–.97	.79	.56–1.12
Hispanic	1.20	.90–1.60	1.52*	1.11–2.08
Asian/Pacific Islander	1.00	.67–1.49	1.24	.79–1.96
Parental education	.93*	.88–.99	.98	.93–1.02
Urban school location	.98	.77–1.24	.94	.74–1.20
Rural school location	.80	.59–1.08	1.01	.78–1.31
Sports participation, past year[b]	.73**	.60–.89	.80	.58–1.11
Level of sports involvement, past year[b]				
Moderately involved (1–2 Teams)	.80*	.66–.98	.85	.58–1.23
Highly involved (3+ Teams)	.59**	.42–.81	.74	.52–1.05

* $p < .05$

** $p < .01$

*** $p < .001$

[a] Odds ratios and confidence intervals for the American Indian/Alaskan Native/Other variable have been omitted.

[b] Though both are included in the same table, the data for the sports participation variable and the level of sports involvement variable represent two separate analyses. For each analysis, variables were entered in two blocks: first sociodemographic variables, and then the sport variable.

Table 5

Hierarchical logistic regressions predicting adolescent suicide attempt, by gender (adjusted odds ratios and 95% confidence intervals)

	Female (*n* = 7285)		Male (*n* = 6897)	
	OR	**95% CI**	**OR**	**95% CI**
Sociodemographic variables[a]				
Age	.80***	.73–.87	.94	.76–1.16
Black	.85	.62–1.17	1.87*	1.11–3.15
Hispanic	1.30	.83–2.05	2.18**	1.29–3.66
Asian/Pacific Islander	1.12	.63–1.99	1.08	.55–2.12
Parental education	.89***	.84–.94	.89*	.80–.99
Urban school location	.82	.57–1.19	.89	.57–1.40
Rural school location	.97	.65–1.44	.89	.48–1.66
Sports participation, past Year[b]	.86	.65–1.14	.83	.52–1.32
Level of sports involvement, past year[b]				
Moderately involved (1–2 Teams)	.92	.68–1.25	.93	.54–1.58
Highly involved (3+ Teams)	.73	.52–1.02	.70	.45–1.08

* $p < .05$

** $p < .01$

*** $p < .001$

[a] Odds ratios and confidence intervals for the American Indian/Alaskan Native/Other variable have been omitted.

[b] Though both are included in the same table, the data for the sports participation variable and the level of sports involvement variable represent two separate analyses. For each analysis, variables were entered in two blocks: first sociodemographic variables, and then the sport variable.

Table 6

Hierarchical logistic regressions predicting injury among adolescents who attempt suicide, by gender (adjusted odds ratios and 95% confidence intervals)

	Female (*n* = 901)		Male (*n* = 368)	
	OR	**95% CI**	**OR**	**95% CI**
Sociodemographic variables[a]				
Age	1.03	.86–1.24	.94	.61–1.44
Black	1.31	.61–2.78	.54	.16–1.82
Hispanic	.84	.36–1.97	.38	.13–1.06
Asian/Pacific Islander	.34*	.12–.97	1.34	.12–15.6
Parental education	.94	.83–1.07	.91	.75–1.09
Urban school location	1.12	.62–2.03	2.05	.83–5.07
Rural school location	.94	.26–3.40	1.84	.52–6.61
Sports participation, past year[b]	1.39	.81–2.38	3.31**	1.50–7.33
Level of sports involvement, past year[b]				
Moderately involved (1–2 Teams)	1.26	.62–2.56	2.81*	1.12–7.04
Highly involved (3+ Teams)	1.72	.72–4.17	4.84**	1.92–12.2

* $p < .05$

** $p < .01$

*** $p < .001$

[a] Odds ratios and confidence intervals for the American Indian/Alaskan Native/Other variable have been omitted.

[b] Though both are included in the same table, the data for the sports participation variable and the level of sports involvement variable represent two separate analyses. For each analysis, variables were entered in two blocks: first sociodemographic variables, and then the sport variable.