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Alcohol Use, Sexual Activity, and Perceived Risk in High School Athletes and Non-Athletes

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Abstract

Purpose—The current study examined one's sense of personal invincibility as a contributing factor to high school athletes' more frequent behavioral risks compared to non-athletes. Perceived risk was assessed as a mediator of sports participation and alcohol use, and sports participation and sexual activity among high school athletes.

Methods—Prior to leaving home, college bound high school graduates (n=2,247) completed web-based surveys assessing alcohol use, sexual activity, sports participation, and perceived risk. The mediational models were analyzed using Generalized Linear Modeling (GLM) and the procedures of Baron and Kenny (1986).

Results—Relative to non-athletes, athletes reported greater alcohol use, more sexual partners, and lower perceived risk. Perceived risk mediated the association between sports participation and alcohol use for both young men and women. Perceived risk also mediated the association between sports participation and number of sexual partners for women and partially mediated this association for men. Perceived risk partially mediated the association between sports participation and episodes of unsafe sexual activity in both men and women.

Conclusions—These findings suggest a potential cognitive mechanism which may account for differences in alcohol use and sexual activity between athletes and non-athletes during late adolescence.

Keywords

Athletics; Perceived Risk; Alcohol Drinking; Sexual Activity

Studies among younger athletes indicate that sports participation may serve as a protective factor against behavioral risk, such as alcohol use and risky sexual activity [1–4]. Studies among older athletes, however, suggest sports participation leads to greater behavioral risk [5–7]. For example, student athletes consume significantly more drinks per week and drink more frequently than non-athletes [8,9]. Moreover, highly active high school athletes are more likely to binge drink, use tobacco, and use multiple drugs (i.e., steroids) concurrently than non-athlete peers [10–12]. In sum, the extant literature suggests that athletes are a high-risk population for alcohol use and other risk behaviors.

Research on sexual activity among athletes and non-athletes has yielded mixed findings. Several studies have found athletes report less sexual activity than non-athletes [1,2]; however,

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these studies' samples are comprised of individuals with a mean age of 15 years. When examining sexual activity in athletes and non-athletes between 18–21 years of age (mean age of 19), athletes engage in sexual activity more often and with more partners than non-athletes [13,14]. As adolescents age and athletic roles become more competitive and prominent, there seems to be a shift in sexual activity between athletes and non-athletes. Unfortunately, studies have not assessed what may underlie athletes' more frequent sexual activity or whether high school athletes are at similar risk as college athletes.

The dual role as athlete and student may create an environment that increases the likelihood of athletes engaging in behavioral risks, including sexual activity and alcohol use [15]. Athletes must contend with both academic and athletic demands, thus separating athletes from their non-athlete peers [15,16]. Furthermore, the collective nature of athletic teams could have a normative effect on perceptions and behaviors. A recent study on athletes and perceived alcohol norms found perceived alcohol use by peer athletes was strongly associated with personal consumption of male athletes [17]. Athletes also face elite treatment that could exacerbate normative beliefs [18,19]. Studies have shown that athletes may experience special treatment or privilege because of their athletic status [20–22] and often feel a sense of entitlement as a result [16]. For example, one well-known university has enforced a tutoring policy whereby athletes receive different tutoring (i.e., one-on-one) than other students [23]. Some athletes have also reportedly received minimal punishment for offenses such as illicit drug use, unwanted sexual activity, and driving while intoxicated [24,25]. This special treatment may lead athletes to believe they can engage in various behaviors without negative consequences. An extensive search of current literature revealed no studies assessing athletes' feelings of invincibility, or their sense of personal vulnerability, and how these factors may affect drinking or other behavioral risks.

Perceived risk, or “the degree of risk an individual associates with a substance, event, or behavior [26, p.44],” is a powerful variable in predicting and preventing substance use and behavioral risk [27]. Gonzalez [28] proposed that perceived risk motivates people to engage in health-promoting behaviors where high perceived risk would buffer against unhealthy behaviors [29]. Empirical studies show low perceived risk is correlated with unsafe sexual behavior, increased rates of STDs and HIV, tobacco use, and multi-substance misuse [29–31]. Perceived risk was a significant predictor of alcohol, marijuana, and cocaine use in college students [32,33], but researchers have not assessed perceived risk of substance use and sexual activity in student athletes.

Young adolescent athletes engage in fewer behavioral risks than non-athletes [1–4], but in college, athletes engage in certain behavioral risks more often than their non-athlete peers [13,14]. As such, there seems to be a shift at some point where athletes become at-risk for substance use and sexual activity. If college athletes drink more often and in greater quantities and engage in sexual activity more often than non-athletes, but younger athletes do not, this shift in behavior may occur in high school, just before the spotlight of collegiate athletics. The purpose of this study was to assess whether athletes begin to engage in more alcohol use and sexual activity before college, and if low perceived risk plays a role in this process. Furthermore, as both sports participation and perceived risk are associated with alcohol use and sexual activity, the current study examined whether perceptions of risk mediated the association between high school sports participation and alcohol use, and sports participation and sexual activity for young men and women. Through a mediational model, it is hypothesized that athletes have a lower perceived risk of harm than non-athletes. Through exposure to special opportunities, positive reinforcement for performance, and elite status, athletes may believe they are invincible or less likely to experience negative consequences from alcohol use or sexual activity. Thus, it was predicted that perceived risk would at least partially account for

the association between sports participation, alcohol use, and sexual activity among high school athletes.

Method

Participants and Procedures

Participants were recent high school graduates ($n=2,138$) who were invited to participate in a four-year longitudinal study of high school to college drinking and adjustment to college. At the time of high school data collection, the mean age of the participants was 18.4 years ($SD=0.35$), and the sample was comprised of 60.4% women compared with 54.8% women for the incoming freshman class from which the sample was drawn. The majority of the participants were White/Caucasian (full sample 53.6%, athlete 63.2%), followed by Asians (full sample 18.3%, athlete 8.3%), Hispanic (15.2%, athlete 16.3%), and multiracial or other ethnicity (total sample 12.9%, athlete 12.2%). Most of the sample was comprised of non-athletes (87%) who were female (58.6%).

Participants were initially recruited from a sample of 6,391 college-bound high school graduates who were attending a university orientation program or by mail during the summer prior to college matriculation. Volunteers completed a brief contact/consent form, which was used to determine eligibility for participation and to mail invitation letters to complete an Internet-based or paper-and-pencil survey assessing behaviors that occurred during the last three months of their senior year in high school. Eligible participants were first-time college admits, unmarried, and between the ages of 17 and 19 years, and a total of 2,985 were randomly assigned to complete annual assessments.¹ These participants will provide data semiannually for four consecutive years and comprise the current sample. Participants were paid \$30.00 for completing the high school survey. Recruitment efforts yielded completed surveys from 2,247 (73%) recent high school graduates, with 2,138 included in the current analyses.²

Measures

Measures were collected via Internet-based surveys on a secure server. Participants' data were collected, encrypted, and stored through DatStat, a research management service. The online survey included demographic measures of age and ethnicity.

Alcohol use—A modified version of the Daily Drinking Questionnaire [34], measured average alcohol consumption in terms of frequency (i.e., number of drinking days), quantity (i.e., number of drinks per drinking day), and week sum (i.e., number of drinks per week). The internal consistency for this study was 0.80 for frequency and 0.81 for quantity.

Sexual activity—Number of sexual partners (i.e., for oral, vaginal, and/or anal sex) was assessed for the last three months of high school with open-ended response options. Number of occasions of sex without protection against pregnancy and sexually transmitted diseases was used to assess unsafe sex practices. Seven response options ranged from 0 to >20 number of times during the last three months of high school.

Perceived risk—The likelihood of negative outcomes for a variety of behavioral risks was assessed with a nine-item measure that was derived from the Cognitive Appraisal of Risks questionnaire [30] and used the sentence stem "What is the likelihood some negative outcome

¹Not included in the current analyses were 698 participants who would complete a high school and Year 4 assessment and 804 participants who would complete only the Year 4 assessment.

²Not included in the current analyses were 109 participants who did not complete the athlete status question and/or reported drinking frequency with no quantity reported, or quantity reported but no frequency of drinking.

would result if you: [for example] had unprotected sex?; used illicit drugs?; drove after drinking?" Response options were 5-point scales ranging from 1=not at all likely to 5=very likely. The items were averaged, and the Cronbach's alpha was .92.

Athlete status—As part of a larger measure of how they spend their time, participants were asked to indicate the number of hours spent in competitive athletes. Based on an estimate provided by high school coaches at three separate schools, an individual was considered an athlete if he or she indicated spending ten or more hours per week in competitive athletics.

Goals and Analyses

The primary goals of this study were to: (1) assess whether high school athletes begin engaging in comparatively more alcohol use and sexual activity than non-athletes before entering the collegiate environment; (2) examine perceived risk as a mediator between sports participation and alcohol use, and between sports participation and sexual activity (i.e., number of sexual partners, instances of unprotected sex) during the last three months of senior year in high school. Following the procedures of Baron and Kenny [35], for a variable to mediate an association, three conditions must be met and were assessed. First, there must be a significant association between the predictor (sports participation) and outcome (alcohol use, number of sexual partners, or unsafe sex), as well as the predictor and the mediator (perceived risk). Next, the mediator and outcome must be significantly associated. Finally, when the outcome variable is regressed on both the predictor and mediator, the mediator must remain significant whereas the predictor must drop to non-significance (full mediation) or become less significantly associated with the outcome (partial mediation). Composite scores for the last three months of high school were calculated for ethnicity, alcohol use, number of sexual partners, instances of unprotected sex, and perceived risk for both athletes and non-athletes, separately by gender.

Because distributions indicated extreme non-normality, generalized linear modeling (GLM) was used to assess the associations among sports participation, perceived risk, alcohol use, and sexual activity.³ GLM allows for the use of better fitting distributions [36], and a gamma distribution and log link was selected when the outcome variables were perceived risk, quantity of alcohol consumed, and frequency of drinking episodes because the distributions were continuous, has a lower limit of zero, positively skewed, and curvilinearity was not hypothesized. Although a gamma distribution is not a perfect fit to the data because zero is undefined by the gamma distribution, the gamma distribution fits the current data better than a Gaussian distribution. A negative binomial distribution and log link was selected when the outcome variable was number of sexual partners and instances of unsafe sex in the past three months because the variables were count variables with integer values and heteroskedasticity, and the distribution had a high number of zero-values. GLM results are interpreted similarly to ordinary least squares regression; however, the use of z and chi-square tests are used instead of the corresponding t and f-tests, and a measure of association (i.e., r-square) is not available. Exponentiated betas were also included to provide incidence rate ratios (IRR) as estimates of effect size such that a rate ratio of 1.25 indicates a 25% increase in the mean of the outcome for every one unit change in the predictor.

Results

Table 1 presents the average quantity and frequency of alcohol use, number of sexual partners, frequency of unprotected sex, and perceived risk for athletes and non-athletes, separately by gender. For women, t-tests showed the frequency of drinking episodes was significantly greater for athletes than non-athletes, $F(1,1284)=8.80$, $p<.00$. Analyses also revealed a significant

³Ethnicity has been statistically controlled in all analyses.

difference between athletes and non-athletes on quantity of alcohol consumed per episode, $F(1,1280)=4.52, p<.00$, with female athletes drinking more than non-athletes. Similarly, females athletes had significantly more sexual partners, $F(1,1280)=6.15, p<.01$, and instances of unsafe sex, $F(1,277)=15.06, p<.02$ than non-athletes. Perceived risk was significantly lower for female athletes than non-athletes, $F(1, 1239)=5.43, p<.04$.

Analyses for men showed that athletes drank more frequently, $F(1,847)=6.44, p<.00$, and consumed more drinks per drinking occasion, $F(1,845)=10.93, p<.00$, than non-athletes. Male athletes also had significantly more sexual partners, $F(1,847)=12.26, p<.00$, more instances of unsafe sex, $F(1,847)=18.75, p<.02$, and lower perceived risk, $F(1,827)=2.71, p<.00$, than non-athletes.

Perceived Risk as a Mediator between Sports Participation and Alcohol Use

For women, sports participation (predictor variable) was positively associated with frequency of drinking episodes (outcome), $\beta=0.31, p<0.03$, IRR=1.36, and quantity of alcohol consumed per drinking occasion, $\beta=0.24, p<0.02$, IRR=1.28. Sports participation was negatively associated with perceived risk (mediator), $\beta=-0.06, p<0.02$, IRR=0.95. Perceived risk was negatively associated with drinking frequency ($\beta=-0.44, p<0.00$, IRR=0.64) and quantity of alcohol consumed ($\beta=-0.26, p<0.00$, IRR=0.77). When sports participation and perceived risk were entered into the same model, sports participation was no longer significantly associated with drinking frequency or quantity of alcohol consumed; however, perceived risk remained significantly associated with both drinking variables (frequency, $\beta=-0.44, p<0.00$, IRR=0.65; quantity, $\beta=-0.25, p<0.00$, IRR=0.78). Thus, perceived risk fully mediated the association between sports participation and alcohol use for women with 1 unit of increase in perceived risk leading to a decrease of 35% in the mean of drinking episodes and decrease of 22% in the mean of drinks per drinking episode. Results of these analyses are represented in Figure 1.

Separate analyses for men showed that sports participation was positively associated with frequency of drinking episodes ($\beta=0.39, p<0.03$, IRR=1.46) and quantity of alcohol consumed ($\beta=0.45, p<0.02$, IRR=1.57). Perceived risk was negatively associated with sports participation ($\beta=-0.12, p<0.00$, IRR=0.89), drinking frequency ($\beta=-0.51, p<0.00$, IRR=0.60), and quantity of alcohol consumed ($\beta=-0.39, p<0.00$, IRR=0.68). When the full mediational model was analyzed, sports participation was no longer significantly associated with drinking frequency or quantity of alcohol consumed, but perceived risk remained significantly associated with both drinking variables (frequency, $\beta=-0.50, p<0.00$, IRR=0.60; quantity, $\beta=-0.37, p<0.00$, IRR=0.69). Detailed results of these analyses are represented in Figure 2.

Perceived Risk as a Mediator between Sports Participation and Sexual Activity

In the mediation model for women, sports participation was significantly associated with number of sexual partners ($\beta=0.25, p<0.04$, IRR=1.28), and number of sexual partners was negatively associated with perceived risk ($\beta=-0.24, p<0.00$, IRR=0.79). As shown in figure 3, when including both sports participation and perceived risk in the same model, perceived risk fully mediated the association between sports participation and number of sexual partners, as sports participation was no longer significant in the model and perceived risk remained significantly associated with number of sexual partners for women, $\beta=-0.23, p<0.00$, IRR=0.79.

For women, sports participation and perceived risk were significantly associated with unsafe sex (sports participation, $\beta=0.45, p<0.00$, IRR=1.58; perceived risk, $\beta=-0.35, p<0.00$, IRR=0.70). In the full model, both sports participation and perceived risk remained significantly associated with unsafe sexual activity (sports participation, $\beta=0.35, p<0.03$, IRR=1.42; perceived risk, $\beta=-0.34, p<0.00$, IRR=0.71), but it should be noted that the sports

participation coefficient decreased from 0.45 to 0.35. The significance of this decrease was tested using the Sobel test and indicated partial mediation by perceived risk (Sobel test statistic = -2.95, $p < 0.00$). Detailed results are represented in Figure 3.

The analyses for men revealed different associations. First, sports participation was significantly associated with number of sexual partners ($\beta = 0.76$, $p < 0.00$, IRR = 2.13), and number of sexual partners was negatively associated with perceived risk ($\beta = -0.33$, $p < 0.00$, IRR = 0.72). In the full model, both sports participation and perceived risk remained significantly associated with number of sexual partners (sports participation, $\beta = 0.62$, $p < 0.00$, IRR = 1.86; perceived risk, $\beta = -0.29$, $p < 0.00$, IRR = 0.75). Although sports participation remained significant, the coefficient decreased from 0.76 to 0.62 (Sobel test statistic = 3.23, $p < 0.00$), thus, perceived risk partially mediated the association between sports participation and number of sexual partners for men (see Figure 4).

Sports participation and perceived risk were significantly associated with unsafe sex (sports participation, $\beta = 0.60$, $p < 0.00$, IRR = 1.81; perceived risk, $\beta = -0.25$, $p < 0.00$, IRR = 0.78). In the full model, both sports participation and perceived risk remained significantly associated with unsafe sexual activity (sports participation, $\beta = 0.50$, $p < 0.02$, IRR = 1.65; perceived risk, $\beta = -0.23$, $p < 0.00$, IRR = 0.80), but the sports participation coefficient decreased from 0.60 to 0.50. Again, a Sobel test was employed and indicated partial mediation by perceived risk (Sobel test statistic = 2.46, $p < 0.01$). Thus, perceived risk partially mediated the association between sports participation and unsafe sex. Detailed results are represented in Figure 4.

Discussion

The current study examined whether athletes begin drinking more often, drinking more heavily, and engaging in sexual activity more frequently than their non-athlete peers prior to college matriculation. In addition, perceived risk, or perceived likelihood of negative consequences, was assessed as a mediator between sports participation and alcohol use and sexual activity. Unlike other studies on athletes, a mediational model explored a possible mechanism by which athletes consume alcohol and engage in sexual activity at higher rates than non-athletes. Findings indicate that athletes do, in fact, drink alcohol more frequently, consume more alcohol when they drink, engage in sex with more partners, and engage in unsafe sex more frequently than non-athletes during the last three months of their senior year in high school. Perceived risk mediated the association between high school sports participation and high school alcohol use. In separate analyses for sexual activity, perceived risk fully mediated the association between sports participation and number of sexual partners and partially mediated the association between sports participation and unsafe sex for women, and for men, perceived risk partially mediated the association between sports participation and number of sexual partners and unsafe sex.

Whereas some previous research has shown sports participation to be a protective factor against alcohol use and sexual risk taking [1–4], these studies tended to focus on young athletes and did not distinguish between college bound and non-college bound athletes. The current findings on only college bound high school athletes, however, are consistent with results of other studies which have shown that athletes are at greater risk for substance use [13–15]. Furthermore, results provide evidence that athletes begin engaging in substance use prior to entering college, which supports Marcello and colleagues [37] speculation that athletes develop pro-usage attitudes before arriving at college. Although it is impossible to determine exactly when athletes begin drinking more than their peers, the current study narrows the gap between 16.5 years of age to 18.4 years of age, and this finding may suggest an optimal time period for early interventions and educational programs.

Perceived risk between athletes and non-athletes represents a new direction for understanding different patterns of behavioral risks. Although not assessed in the current study, lower perceived risk may be a result of special treatment and allowances, particularly in regard to punishment for unacceptable behaviors [21]. In addition, men had lower perceived risk than women, which may be explained by social factors. Research suggests female behavior is more closely monitored than male behavior [3], and subsequently, women may feel there are more social consequences for their actions, and thus hold higher perceptions of risk, than men.

The fact that perceived risk mediated athlete status and alcohol use is consistent with the literature on perceived risk. Gonzalez and Haney [32] suggested perceptions of risk as a potential mediating variable of substance use. Thus, these results provide support for this theory and are consistent with previous findings that perceived risk is associated with substance use [27,30]. Furthermore, the findings that perceived risk fully mediated (in women-number of sexual partners) and partially mediated (in men and women) athlete status and sexual activity may be explained by the different potential consequences experienced depending on the sexual activity by each gender. Specifically, sexual activity and unprotected sex for women can lead to pregnancy and possible negative connotations among peers, but sexual activity for men may have fewer negative consequences, as men cannot get pregnant and are often lauded for their sexual activity. As such, it is not surprising that perceived risk had different mediating roles between genders, particularly when the outcome was sexual activity.

Whereas researchers have extensively studied male athletes and sexual coercion, there is a paucity of research on athletes and unprotected sex. The finding that perceived risk partially mediated the association between sports participation and unprotected sex implies that other factors are influencing athletes' decisions about engaging in unsafe sex. Furthermore, the differences in number of unsafe sex occurrences could be accounted for by the differences in number of sexual partners. In other words, because athletes have more sexual partners to begin with, they have more opportunity for unsafe sex. Regardless, these findings warrant additional research on athletes and unsafe sexual practices.

The current findings have important implications for prevention, intervention, and educational programs for high school athletes. Given the fact that young athletes are already drinking more heavily and engaging in more sexual activity during their senior year in high school, primary prevention campaigns targeting athletes prior to their senior year may be effective in deterring behavioral risks. Educational campaigns for college freshman athletes may extend primary prevention efforts and help athletes recognize and understand the potential negative consequences associated with behavioral risks, like alcohol use and unsafe sexual practices. In addition to prevention and educational efforts, comprehensive intervention programs are needed which target a broad range of factors, such as social norms, residential selections, and the incongruity of drinking and athletic performance. It might also be helpful to assess high school and college athletic programs to determine whether athletes are given special treatment that could foster a sense of invincibility and thereby increased behavioral risks.

Limitations and Conclusions

A number of limitations must be considered when interpreting findings from this study. First, the classification of athlete status was based on the self-reported amount of time spent engaged in competitive sports. Thus it is not known whether the participants viewed themselves or were viewed by others as "athletes" nor is their specific sport known. Furthermore, data for the current study assessed only the last three months of high school, not the entire year, and as a result, some athletes' may have been in "off-season" while others may have been "in-season." Most high school sports teams require off-season practice and an athletics course, however, so it is unlikely that a large number of athletes were excluded from the current study. Due to small sample sizes, analyses by ethnicity were not conducted, but instead ethnicity was statistically

controlled in all analyses. Future studies should replicate findings in larger samples of minority and non-minority high school athletes as these findings would have important implications. Moreover, it should be noted that based on the current analyses, causation cannot be inferred. It is possible that low risk perception could actually lead a person to become an athlete and compete in sports that may cause injury. Thus, it is possible that risk perception is an exogenous variable that influences alcohol risk and sexual activity. Longitudinal assessments would allow prospective examination of athletic status and perceived risk on subsequent development and help determine whether perceived risk is a mediator or an exogenous variable. For the current sample, however, longitudinal analyses would confound the transition from high school to college with the change in status from high school to NCAA athlete. Future research should include longitudinal studies of younger high school athletes, for whom sports participation showed protective effect, and older high school athletes, for whom sports participation is a risk factor.

Despite limitations, the current study provides evidence that high school athletes have lower perceived risk, drink more heavily, have more sexual partners, and engage in unsafe sexual behaviors more frequently than non-athletes. In addition, perceived risk mediated the associations between athlete status and alcohol use and between athlete status and number of sexual partners. Based on these findings, future studies should further examine the associations between participation in different types of sports (e.g., football, basketball, baseball), perceived risk, alcohol use, and other behavioral risks (e.g., aggression, drinking and driving). Specifically, it will be important to assess the factors that influence perceived risk, such as special treatment or exceptions, and to include measures of self-identity as an “athlete.” With the growing body of literature and recent news stories (i.e., The Duke University Lacrosse team rape allegations; The University of Colorado-Boulder Football team sex scandal) showing athletes to be an at-risk group for alcohol misuse and other maladaptive behaviors, future research is needed to help design effective prevention and intervention programs to reduce athletes’ alcohol use, sexual activity, and related problems prior to beginning competitive collegiate athletics.

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Figure 1. Perceived Risk as a Mediator of the Association between High School Sports Participation and Alcohol Use in Women.

Figure 2.
Perceived Risk as a Mediator of the Association between High School Sports Participation and Alcohol Use in Men.

Figure 3.
Perceived Risk as a Mediator of the Association between High School Sports Participation and Sexual Activity in Women.

Figure 4. Perceived Risk as a Mediator of the Association between High School Sports Participation and Sexual Activity in Men.

Table 1
Average Weekly Drinking, Sexual Activity, and Perceived Risk in Athletes and Non-Athletes

	Men (Standard deviation)		Women (Standard deviation)	
	Athletes (n=116)	Non-athletes (n=733)	Athletes (n=164)	Non-athletes (n=1122)
Drinking frequency	0.71 (0.94)	0.47 (0.85)	0.61 (0.71)	0.43 (0.84)
Quantity of alcohol consumed	2.95 (3.05)	1.79 (2.66)	2.17 (2.21)	1.62 (2.03)
Number of sexual partners	1.01 (1.95)	0.47 (1.27)	0.63 (0.89)	0.47 (0.71)
Frequency of unsafe sex	0.36 (1.00)	0.19 (0.68)	0.42 (0.92)	0.27 (0.72)
Perceived Risk	3.15 (1.14)	3.55 (1.02)	3.77 (1.16)	3.95 (1.02)

Note. All means between athletes and non-athletes differ significantly with $p < .05$. Drinking frequency is a continuous measure from 0–7. Quantity of alcohol consumed is a continuous measure from 0–99. Number of sexual partners and frequency of unsafe sex is a continuous measure from 0– ∞ . Perceived risk variable ranges from 0=Not at all likely to 5=Very likely.