Transitions Into and Out of Intercollegiate Athletic Involvement and Risky Drinking

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ABSTRACT. Objective: Cross-sectional data show that college athletes consume more alcohol and experience more general alcohol-related problems than those not participating in athletics. To our knowledge, the current study is the first to use a longitudinal design to examine the extent to which the course of drinking and alcohol-related problems relates to involvement in intercollegiate athletics, including transitioning into and out of athletic involvement. **Method:** Participants were drawn from a sample of 3,720 college students from the Intensive Multivariate Prospective Alcohol College-Transitions Study who completed a survey every semester through their fourth year. Four groups were created based on athletic involvement status at baseline (freshman year) and follow-up (senior year): nonathlete, nonathlete (no reported athletic involvement at either time point), nonathlete, athlete (nonathlete at freshman year,

athlete at senior year), athlete, nonathlete (athlete at freshman year, nonathlete at senior year), and athlete, athlete (athlete at freshman year, athlete at senior year). **Results:** A series of repeated measures analyses were then conducted to test for developmental differences among the athlete groups involving alcohol consumption and alcohol-related problems. Although findings differed as a function of alcohol outcome and comparison among various groups with differing athletic involvement, the general pattern of results showed that individuals who were more athletically involved demonstrated sharper increases in problem drinking (i.e., heavy drinking, frequency of intoxication, alcohol-related problems) during the college years. **Conclusions:** These findings highlight the apparent risk associated with participation in intercollegiate athletics on college drinking. (*J. Stud. Alcohol Drugs*, 74, 21–29, 2013)

ALCOHOL USE AMONG COLLEGE STUDENTS is considered a significant public health concern because the majority of students consume alcohol and many engage in repeated, heavy use (Wechsler et al., 2002). For example, using data from 10,424 first-semester freshmen at 14 schools across the United States, White et al. (2006) found that 41% of men and 34% of women reported heavy drinking within the past 2 weeks, with a significant proportion reporting drinking well beyond the heavy episodic drinking threshold. Large, nationally representative studies, such as the National Epidemiologic Survey on Alcohol and Related Conditions, have reported that 20% of college students met criteria for alcohol abuse or dependence (Dawson et al., 2004). Heavy drinking college students (i.e., consuming five or more drinks; Dawson and Archer, 1993) are more likely to experience several alcohol-related problems, such as having unsafe sex, experiencing academic impairment, engaging in

an argument or fight, operating a car under the influence, or encountering problems with the authorities (Vik et al., 2000; Wechsler et al., 2000, 2002).

Although risky drinking is common among college students in general, several cross-sectional national studies suggest that problematic alcohol involvement appears to be especially elevated among college students participating in intercollegiate athletics. For both men and women, college athletes consume more alcohol and experience more general alcohol-related problems than those not participating in athletics (Leichliter et al., 1998; Nelson and Wechsler, 2001; Wechsler et al., 1997). For example, Leichliter et al. sampled more than 51,000 students (17% of whom reported involvement in athletics) and found that athletes reported more alcohol consumption per week than did nonathletes. Heavy drinking differences were also found as both male and female athletes reported more heavy drinking episodes than nonathletes (57%–61% vs. 43%–49% for men; 48%–50% vs. 36%–40% for women; Nelson and Wechsler, 2001; Wechsler et al., 1997). Further, college athletes were more likely than nonathletes to experience alcohol-related problems (e.g., engaging in arguments or fights, driving while intoxicated; Leichliter et al., 1998; Nelson and Wechsler, 2001). Specifically, athletes were more likely than nonathletes to encounter trouble with the police, experience impaired academic work, or be hurt or injured while drinking. The risk of increased alcohol consumption and alcohol-related problems among college athletes appears to be especially pronounced for athletes affiliated with

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fraternities or sororities (Meilman et al., 1999; Wechsler et al., 1997).

An important limitation of these cross-sectional studies that have shown intercollegiate athletes consume more alcohol, have more heavy drinking episodes, and have more negative alcohol-related consequences than nonathletes is that they cannot distinguish the longitudinal course of problematic alcohol involvement among individuals with varying degrees of athletic involvement (for a review, see Martens et al., 2006a, and Martens, 2012). Conversely, longitudinal designs tracking athletic involvement, alcohol use, and alcohol related-problems can illuminate the extent to which transitions into and out of athletics relate to problematic alcohol involvement. For example, individuals who engage in intercollegiate sports but later stop athletic involvement may not increase their drinking to the same extent as students who consistently engage in sports during the same period or as those who later become athletically involved.

However, to our knowledge, there have been no studies documenting the longitudinal course of alcohol use and alcohol-related problems as a function of athletic involvement. Using data from a cohort of college students assessed from the summer before their freshman year of college to their senior year of college, the current study examined the extent to which the course of drinking and alcohol-related problems related to involvement in intercollegiate athletics, including transitioning into and out of athletic involvement. We tested the following hypotheses: First, athletic involvement would be associated with risky drinking and alcohol-related problems. Second, individuals who are consistently engaged in athletics or become athletes later in college would show sharper increases in their drinking than those who are nonathletes or no longer athletically involved at senior year. Third, sex and fraternity/sorority status may moderate the relationship between athlete status and alcohol use.

Method

Participants and procedure

Participants for this study were drawn from a sample of 3,720 (88.0% of the original precollege sampling frame) college students from the Intensive Multivariate Prospective Alcohol College-Transitions Study (IMPACTS); for a detailed description of the sample, see Sher and Rutledge (2007). The IMPACTS is a longitudinal study that began in the summer of 2002. First-time college students who were about to enroll at a large, National Collegiate Athletic Association (NCAA) Division 1, midwestern university were recruited for participation and completed a paper-and-pencil questionnaire during the summer before their freshman year and subsequently completed online surveys every

semester through their fourth year. Across the waves used in the current study (freshman year, senior year), retention rates ranged from 55% to 69% (Wood et al., 2007). College dropouts ($n = 113$) and alcohol abstainers across all waves ($n = 154$) were excluded from all analyses.

Athletic involvement. At each wave, participants were asked how many hours were spent practicing or playing intercollegiate athletics “on a typical weekday/night (not weekend).” Response options ranged from “no time” to “more than 14 hours” per day. Individuals who reported spending more than 2 hours a day practicing or playing intercollegiate athletics during the fall and/or spring semester were considered to be athletically involved for the academic year. To minimize confusion regarding participation in intercollegiate sports with other, non-intercollegiate sports, participants also reported engagement in intramural athletics during the same portion of the questionnaire. Four-hundred sixty-nine participants (20.63% of participants who provided data) were athletically involved during their freshman year, and 211 (11.67% of participants who provided data) were athletically involved during their senior year.

Alcohol involvement. Three alcohol outcomes were assessed using a yearly average of both semesters at freshman year and again at senior year to account for both in- and off-season drinking because season status was unknown. Heavy drinking frequency (i.e., five or more drinks in a single sitting) during the past month was assessed by asking participants, “How many times in the past 30 days did you consume five or more drinks in a single sitting?” Response options were 0 (*did not consume five or more drinks in a single sitting*), 1 (*once during the past 30 days*), 2 (*two to three times in the past 30 days*), 3 (*once or twice a week*), 4 (*three to four times a week*), 5 (*five to six times a week*), 6 (*nearly every day*), and 7 (*every day*). Frequency of intoxication during the past month was assessed by asking participants, “How many times in the past 30 days did you get drunk (e.g., speech was slurred or unsteady on your feet) on alcohol?” Response options were 0 (*didn't get drunk in the past 30 days*), 1 (*once during the past 30 days*), 2 (*two to three times in the past 30 days*), 3 (*once or twice a week*), 4 (*three to four times a week*), 5 (*five to six times a week*), 6 (*nearly every day*), and 7 (*every day*). Additionally, a composite using 34 alcohol-related problems during the past year (e.g., “Gotten in trouble at work or school because of drinking”) drawn primarily from the Young Adult Alcohol Problem Screening Test (Hurlbut and Sher, 1992) was used. Internal consistency for alcohol-related problems was high at both time points ($\alpha > .94$).

Fraternity/sorority status. Individuals who reported “no” to the question “Are you a member of a fraternity or sorority?” at both semesters of their freshman and senior year were coded as 0; respondents who answered “yes” at both semesters of either their freshman or senior year (but not both years) were coded as 1; respondents who reported

“yes” at both semesters of their freshman and senior year were coded as 2.

Analytic procedure

Four groups were created based on athletic involvement status at baseline (freshman year) and follow-up (senior year): nonathlete, nonathlete (no reported athletic involvement at either time point, $n = 1,252$, 78.74% of participants who provided data, 90% White, 4.8% African American, 3.1% Asian); nonathlete, athlete (nonathlete at freshman year, athlete at senior year, $n = 70$, 4.40% of participants who provided data, 84.5% White, 8.5% African American, 5.6% Asian); athlete, nonathlete (athlete at freshman year, nonathlete at senior year, $n = 195$, 12.26% of participants who provided data, 91.8% White, 4.6% African American, 2.1% Asian); athlete, athlete (athlete at freshman year, athlete at senior year, $n = 73$, 4.59% of participants who provided data, 93.2% White, 2.7% African American, 4.1% Asian).

A series of 4 (pattern of athletic engagement) $\times$ 2 (fraternity/sorority status) $\times$ 2 (sex) $\times$ 2 (time of measurement) repeated-measures analyses of variance were then conducted (using SAS PROC GLM, SAS Institute Inc., Cary, NC) to compare developmental differences among the athletic groups involving alcohol consumption and alcohol-related problems. Mean changes in alcohol use and alcohol-related problems were compared among athletic groups between freshman and senior year with a priori contrasts (conducted by using the CONTRAST

statement in PROC GLM). Specifically, for all alcohol outcomes (i.e., heavy drinking, frequency of intoxication, alcohol-related problems), three planned contrasts were conducted comparing the following: (a) individuals with athletic involvement at either freshman and/or senior year versus individuals with no athletic involvement at both freshman and senior year (athlete vs. nonathlete [i.e., all other groups vs. nonathlete, nonathlete]); (b) individuals who were athletically involved at senior, but not freshman, year versus individuals who were athletically involved at freshman, but not senior, year (starters [nonathlete, athlete] vs. stoppers [athlete, nonathlete]); and (c) individuals who were athletically involved at both freshman and senior year versus individuals who were athletically involved either freshman or senior year but not both (consistent athletes [athlete, athlete] vs. inconsistent athletes [athlete, nonathlete or nonathlete, athlete]).

These contrasts tested the extent to which these groups showed differential patterns of change for the three alcohol outcomes (i.e., whether there were significant Time $\times$ Group interactions). We also examined whether these interactions were moderated by sex and fraternity/sorority status.

Results

Correlations among athlete status, fraternity/sorority status, sex, and alcohol outcomes are shown in Table 1. Notably, both freshman and senior year athlete status were positively correlated with all alcohol outcomes, although the effect size was small.

TABLE 1. Correlation coefficients and 95% confidence intervals among all measured variables

Variable	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. F athlete	—										
2. F heavy	.06*	—									
	[.01, .11]										
3. F intox.	.05*	.86**	—								
	[.01, .10]	[.85, .88]									
4. F problem	.05*	.70**	.74**	—							
	[.01, .10]	[.67, .73]	[.71, .76]								
5. F fraternity/ sorority	.12*	.18**	.22**	.15**	—						
	[.01, .21]	[.14, .23]	[.18, .27]	[.11, .20]							
6. S athlete	.55**	.04	.05	.01	.02	—					
	[.46, .64]	[-.01, .09]	[-.01, .10]	[-.03, .06]	[-.10, .14]						
7. S heavy	.09**	.62**	.57**	.46**	.17**	.11**	—				
	[.04, .14]	[.59, .65]	[.54, .61]	[.42, .50]	[.12, .21]	[.05, .16]					
8. S intox.	.08**	.56**	.60**	.46**	.21**	.13**	.86**	—			
	[.03, .13]	[.52, .59]	[.56, .63]	[.42, .50]	[.17, .25]	[.07, .18]	[.84, .88]				
9. S problem	.06*	.48**	.51**	.56**	.15**	.09**	.63**	.66**	—		
	[.01, .11]	[.43, .52]	[.47, .55]	[.51, .60]	[.10, .19]	[.03, .15]	[.60, .66]	[.63, .70]			
10. S fraternity/ sorority	.13*	.12**	.16**	.07**	.93**	.03	.16**	.20**	.11**	—	
	[.03, .23]	[.08, .17]	[.11, .20]	[.03, .12]	[.91, .95]	[-.09, .15]	[.12, .21]	[.15, .24]	[.06, .15]		
11. Sex	-.12*	-.17**	-.06**	.00	.28**	-.18*	-.26*	-.16**	-.11**	.14**	—
	[-.21, -.03]	[-.22, -.13]	[-.10, -.01]	[-.04, .05]	[.20, .36]	[-.28, -.07]	[-.31, -.22]	[-.2, -.11]	[-.15, -.06]	[.05, .22]	

Notes: Pearson correlations were computed between continuous variables, tetrachoric correlations were computed between dichotomous variables, and biserial correlations were computed between continuous and dichotomous variables. Athlete status was dichotomized where athlete = 1 and nonathlete = 0. Fraternity/sorority status was dichotomized where fraternity/sorority member = 1 and fraternity/sorority nonmember = 0. F = freshman year; S = senior year; athlete = athlete status; heavy = heavy alcohol use; intox. = frequency of intoxication; problem = alcohol-related problems.

* $p < .05$; ** $p < .01$.

FIGURE 1. Mean-level changes of alcohol outcomes for nonathletes and athletes (i.e., nonathlete, nonathlete vs. all other groups); $n = 1,590$

FIGURE 2. Mean-level changes of alcohol outcomes for those who start athletics (nonathlete, athlete) and stop athletics (athlete, nonathlete); $n = 265$

For each contrast discussed below, there was a significant main effect of time on all outcomes: heavy drinking, $F(1, 1581) = 35.22, p = .01$; frequency of intoxication, $F(1, 1582) = 20.60, p = .01$; and alcohol-related problems, $F(1, 1580) = 27.54, p = .01$. This suggests that all alcohol indices increase across time (Figures 1 and 2). However, depending on the specific contrast and the alcohol outcome, the main effect of time was qualified by athlete status (see below). Effect sizes for each contrast and alcohol outcome are also described below. By convention (Cohen, 1988), an effect size of .20 or below was considered a small effect, .50 a moderate effect, and .80 or more a large effect.

The main effect of athlete status was significant for heavy drinking and frequency of intoxication, $F(3, 1581) = 5.01, p = .01, d = 0.19$, and $F(3, 1582) = 5.18, p = .01, d = 0.19$, respectively, but not for alcohol-related problems, $F(3, 1580) = 1.76, p = .15, d = 0.11$, indicating that athletes had

higher overall levels of heavy drinking and frequency of intoxication across time than nonathletes.

Athletes (athlete, athlete; athlete, nonathlete; nonathlete, athlete) versus nonathletes (nonathlete, nonathlete)

For all outcomes, the simple effect for the Time $\times$ Group interaction was significant; heavy drinking, $F(1, 1581) = 8.55, p = .01, d = 0.15$; frequency of intoxication, $F(1, 1582) = 9.48, p = .01, d = 0.14$; and alcohol-related problems, $F(1, 1580) = 3.85, p = .049, d = 0.06$. As shown in Figure 1, individuals with athletic involvement at either freshman and/or senior year showed sharper increases in heavy drinking, frequency of intoxication, and alcohol-related problems between freshman and senior year than those with no athletic involvement. None of the contrasts were moderated by sex or fraternity/sorority status.

FIGURE 3. Mean-level changes of number of alcohol-related problems in the past year for consistent athletes (athlete, athlete) and inconsistent athletes (athlete, nonathlete or nonathlete, athlete); $n = 338$

Starters (nonathlete, athlete) versus stoppers (athlete, nonathlete)

For all outcomes, the simple effect for the Time $\times$ Group interaction was significant or approached significance, and effect sizes were almost identical; heavy drinking, $F(1, 1581) = 3.43, p = .06, d = 0.23$; frequency of intoxication, $F(1, 1582) = 4.19, p = .04, d = 0.26$; and alcohol-related problems, $F(1, 1580) = 3.63, p = .06, d = 0.24$. Individuals who were athletically involved at freshman but not senior year (athlete, nonathlete) had smaller increases in heavy drinking, frequency of intoxication, and alcohol-related problems than individuals who were athletically involved at senior but not freshman year (nonathlete, athlete) (Figure 2). None of the contrasts were moderated by sex or fraternity/sorority status.

Consistent athletes (athlete, athlete) versus inconsistent athletes (athlete, nonathlete; nonathlete, athlete)

With the exception of the alcohol-related problems contrast that was significant, $F(1, 1580) = 3.86, p = .049, d = 0.32$, all Time $\times$ Group interactions were nonsignificant; heavy drinking, $F(1, 1581) = 0.11, p = .74, d = 0.02$, and frequency of intoxication, $F(1, 1582) = 0.33, p = .56, d = 0.15$. Given that the test of whether the Time $\times$ Group interaction for alcohol-related problems was moderated by sex approached significance and had an effect size similar to our other statistically significant findings, $F(1, 1580) = 3.27, p = .07, d = 0.29$, changes in alcohol-related problems by consistent versus inconsistent athlete status were plotted as a function of sex (Figure 3). This figure showed that, for men, both consistent and inconsistent athletes had an increase in alcohol-related problems between freshman and senior year, and this increase was more pronounced for consistent athletes. For women, inconsistent athletes demonstrated a shallow decrease in alcohol-related problems, whereas consistent athletes increased in alcohol-related problems across time. Again, none of the contrasts were moderated by fraternity/sorority status.

Discussion

The present study contributes to the literature on alcohol use among college athletes. Although it has been shown that athletes consume more alcohol than their nonathlete peers (Leichliter et al., 1998; Nelson and Wechsler, 2001; Wechsler et al., 1997), the current study provides a descriptive analysis of alcohol consumption among athletes from a developmental perspective. Findings differed as a function of alcohol outcome and comparison among various groups with differing athletic involvement, but the general trend showed that individuals who were more athletically involved tended to show sharper increases in problem drinking (i.e.,

heavy drinking, frequency of intoxication, alcohol-related problems) during the college years. Implications of these findings are discussed below.

The overall pattern of athletes consuming more alcohol and experiencing increased problem drinking compared with nonathletes was consistent with prior research (Leichliter et al., 1998; Nelson and Wechsler, 2001; Wechsler et al., 1997). However, to our knowledge, the current study is the first to examine the impact of transitions into and out of athletics on alcohol outcomes. The findings have important implications for those who are involved in athletics during college, including those individuals who participate in athletics later in their collegiate career. For example, as seen in their freshman year, individuals who later became athletes (starters) engaged in a pattern of heavy drinking similar to those who were already athletes. By senior year (when individuals in this group have joined an athletic team), their alcohol consumption continued to increase; at this point, they consumed even more alcohol than consistent athletes. Findings also show that, by senior year, students who stop participating in intercollegiate athletics (stoppers) consumed less alcohol than consistent athletes. These findings highlight the apparent risk factor of participation in intercollegiate athletics on problem drinking.

There are various clinical implications of the findings. Specifically, alcohol use has been shown to damage central nervous system function, decrease motor skill, and affect behavior, which can result in impaired athletic performance (El-Sayed et al., 2005; Gutgesell and Canterbury, 1999; Shirreffs and Maughan, 2006). Findings suggest that individuals who are athletically involved are at risk for increases in problem drinking.

Further, because alcohol-related problems were shown to be more pronounced for consistent athletes than for inconsistent athletes, individuals who are athletically involved throughout their collegiate career may be at a greater risk for impaired performance because they have experienced more negative consequences associated with alcohol. Because problem alcohol use differs among athletes according to various transitions, it is possible that prevention and intervention efforts designed for athletes based on their current status (i.e., consistent athlete vs. becoming an athlete vs. stopping) may be more effective than a general program for athletes as a whole. For example, identifying as an athlete at freshman—but not senior—year of college appears to be a common occurrence among intercollegiate athletes because the athlete, nonathlete group (stoppers) comprised more than half the total sample of groups with athletic involvement. Although findings indicate that this group makes shallower increases in risky alcohol use, researchers may need to tailor specific alcohol interventions toward those who stop participation in intercollegiate athletics. This large proportion of students may experience unique challenges,

including loss of identity, when they cease to identify as an athlete later in their college years (Webb et al., 1998).

Additionally, prior studies have shown heavy drinking to be associated with numerous academic and personal problems. For example, heavy drinkers experience greater academic consequences, such as missing class or getting behind in school, and increased likelihood of alcohol-related legal and social problems (Engs, 1996; Wechsler et al., 2002). Given the current findings that those who do not participate in athletics at freshman year and later become athletes engage in increased heavy drinking, this group may be at risk for increased academic problems and the propensity to later develop an alcohol use disorder. Further, the pattern of alcohol use among individuals who are athletes for the duration of their collegiate career, compared with those who transition into and out of athletics, highlights the effect of consistent athletic involvement associated with problematic alcohol use. Although athletes affiliated with fraternities or sororities have been thought to be at an elevated risk for increased alcohol consumption and alcohol-related problems (Meilman et al., 1999; Wechsler et al., 1997), we did not find evidence that fraternity/sorority status moderated the relation between athletic involvement and alcohol outcomes (see Park et al., 2008, 2009, for more details regarding the relation between fraternity/sorority status and problematic alcohol involvement in this sample).

As noted in the *Analytic procedure* section (p. 23), we chose to focus our analyses on two time points (freshman year and senior year). Although effect sizes were small, they were similar among contrasts, and therefore we chose to include the nonsignificant “trend” findings. For example, in the starters-versus-stoppers contrast, effect sizes were relatively similar for all alcohol outcomes despite varying levels of significance. In addition to the analyses discussed and presented in this article, we also tested cross-lagged autoregressive models and conducted latent class analysis to further examine transitions in drinking in relation to transitions in athletic status using four—rather than two—assessment points. However, we chose not to include these analyses because they did not contribute additional significance to the current repeated-measures analyses. After adjusting for sex in all analyses, we found that most patterns were consistent across sex. However, the interaction between alcohol-related problems among inconsistent and consistent athletes approached statistical significance. These findings show that, at least for women, those who are consistently involved in athletics across the span of college are more likely to experience alcohol-related problems during their senior year than women who reported participating at only freshman or senior year.

Although mediational factors were not explored in this study, the relationship between alcohol use among athletes and nonathletes may be attributable to psychological and behavioral differences. For example, athletes experience

increased time constraints, are in an isolated environment on campus, and have a higher social status than nonathletes (Harvey, 1999; Heyman, 1986; Marcello et al., 1989; Parham, 1993). Sport-related factors including anxiety, pressure from teammates, and the culture of alcohol and athletes may be related to alcohol use (for a review, see Martens, 2012, and Martens et al., 2006a). Taken together, these differences may account for variations in problem drinking according to degree of athletic involvement. We encourage future researchers to explore these questions.

There are limitations to this study. First, the current sample is based on a large, NCAA Division 1 Midwest public university with a predominantly White sample and large fraternity/sorority system. Therefore, the generalizability of the current findings may be limited. Second, data were collected solely through the use of self-report measures, although such measures typically have good validity (Babor et al., 2000; Miller et al., 2002). Third, we were unable to distinguish athletes by type of sport. Prior findings have shown differences in alcohol use based on sport type (i.e., individual or team; Martens et al., 2006b; NCAA, 2001). Last, prior research has shown that athletes consume less alcohol and have fewer alcohol-related consequences during their competitive season (for a review, see Martens, 2012, and Martens et al., 2006a). Because the present study does not differentiate between athletes’ seasonal status, a yearly average was used to account for both in-season and off-season use and problems. Despite these limitations, the present study makes a valuable contribution to the literature on college athletes. Current findings extend previous research because the impact of transitions into and out of athletic involvement on problem drinking was examined using longitudinal data. It may also prove useful to provide education to athletic departments on the role of athletic transitions and corresponding alcohol use.

References

- Babor, T. F., Steinberg, K., Anton, R., & Del Boca, F. (2000). Talk is cheap: Measuring drinking outcomes in clinical trials. *Journal of Studies on Alcohol*, 61, 55–63.
- Cohen, J. (1988). *Statistical power analysis for the behavior sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Dawson, D. A., & Archer, L. D. (1993). Relative frequency of heavy drinking and the risk of alcohol dependence. *Addiction*, 88, 1509–1518.
- Dawson, D. A., Grant, B. F., Stinson, F. S., & Chou, P. S. (2004). Another look at heavy episodic drinking and alcohol use disorders among college and noncollege youth. *Journal of Studies on Alcohol*, 65, 477–488.
- El-Sayed, M. S., Ali, N., & El-Sayed Ali, Z. (2005). Interaction between alcohol and exercise: Physiological and haematological implications. *Sports Medicine*, 35, 257–269.
- Engs, R. C., Hanson, D. J., & Diebold, B. A. (1996). The drinking patterns and problems of a national sample of college students, 1994. *Journal of Alcohol and Drug Education*, 41, 13–33.
- Gutgesell, M., & Canterbury, R. (1999). Alcohol usage in sport and exercise. *Addiction Biology*, 4, 373–383.

- Harvey, S. J. (1999). Hegemonic masculinity, friendship, and group formation in an athletic subculture. *Journal of Men's Studies*, 8, 91–108.
- Heyman, S. R. (1986). Psychological problem patterns found with athletes. *Clinical Psychologist*, 39, 68–71.
- Hurlbut, S. C., & Sher, K. J. (1992). Assessing alcohol problems in college students. *Journal of American College Health*, 41, 49–58.
- Leichliter, J. S., Meilman, P. W., Presley, C. A., & Cashin, J. R. (1998). Alcohol use and related consequences among students with varying levels of involvement in college athletics. *Journal of American College Health*, 46, 257–262.
- Marcello, R. J., Danish, S. J., & Stolberg, A. L. (1989). An evaluation of strategies developed to prevent substance abuse among student-athletes. *The Sport Psychologist*, 3, 196–211.
- Martens, M. P. (2012). Alcohol interventions for college student athletes. In H. R. White & D. L. Rabiner (Eds.), *College drinking and drug use* (pp. 203–220). New York, NY: Guilford Press.
- Martens, M. P., Dams-O'Connor, K., & Beck, N. C. (2006a). A systematic review of college student-athlete drinking: Prevalence rates, sport-related factors, and interventions. *Journal of Substance Abuse Treatment*, 31, 305–316.
- Martens, M. P., Watson, J. C., II, & Beck, N. C. (2006b). Sport-type differences in alcohol use among intercollegiate athletes. *Journal of Applied Sport Psychology*, 18, 136–150.
- Meilman, P. W., Leichliter, J. S., & Presley, C. A. (1999). Greeks and athletes: Who drinks more? *Journal of American College Health*, 47, 187–190.
- Miller, E. T., Neal, D. J., Roberts, L. J., Baer, J. S., Cressler, S. O., Metrik, J., & Marlatt, G. A. (2002). Test-retest reliability of alcohol measures: Is there a difference between internet-based assessment and traditional methods? *Psychology of Addictive Behaviors*, 16, 56–63.
- National Collegiate Athletic Association. (2001). *NCAA study of substance use habits of college student-athletes*. Indianapolis, IN: Author.
- Nelson, T. F., & Wechsler, H. (2001). Alcohol and college athletes. *Medicine and Science in Sports and Exercise*, 33, 43–47.
- Parham, W. D. (1993). The intercollegiate athlete: A 1990s profile. *The Counseling Psychologist*, 21, 411–429.
- Park, A., Sher, K. J., & Krull, J. L. (2008). Risky drinking in college changes as fraternity/sorority affiliation changes: A person-environment perspective. *Psychology of Addictive Behaviors*, 22, 219–229.
- Park, A. E., Sher, K. J., Wood, P. K., & Krull, J. L. (2009). Dual mechanisms underlying accentuation of risky drinking via fraternity/sorority affiliation: The role of personality, peer norms, and alcohol availability. *Journal of Abnormal Psychology*, 118, 241–255.
- Sher, K. J., & Rutledge, P. C. (2007). Heavy drinking across the transition to college: Predicting first-semester heavy drinking from precollege variables. *Addictive Behaviors*, 32, 819–835.
- Shirreffs, S. M., & Maughan, R. J. (2006). The effect of alcohol on athletic performance. *Current Sports Medicine Reports*, 5, 192–196.
- Vik, P. W., Culbertson, K. A., & Sellers, K. (2000). Readiness to change drinking among heavy-drinking college students. *Journal of Studies on Alcohol*, 61, 674–680.
- Webb, W. M., Nasco, S. A., Riley, S., & Headrick, B. (1998). Athlete identity and reactions to retirement from sports. *Journal of Sport Behavior*, 21, 338–362.
- Wechsler, H., Davenport, A. E., Dowdall, G. W., Grossman, S. J., & Zanakos, S. I. (1997). Binge drinking, tobacco, and illicit drug use and involvement in college athletics: A survey of students at 140 American colleges. *Journal of American College Health*, 45, 195–200.
- Wechsler, H., Lee, J. E., Kuo, M., & Lee, H. (2000). College binge drinking in the 1990s: A continuing problem. Results of the Harvard School of Public Health 1999 College Alcohol Study. *Journal of American College Health*, 48, 199–210.
- Wechsler, H., Lee, J. E., Kuo, M., Seibring, M., Nelson, T. F., & Lee, H. (2002). Trends in college binge drinking during a period of increased prevention efforts: Findings from 4 Harvard School of Public Health College Alcohol Study surveys: 1993–2001. *Journal of American College Health*, 50, 203–217.
- White, A. M., Kraus, C. L., & Swartzwelder, H. S. (2006). Many college freshmen drink at levels far beyond the binge threshold. *Alcoholism: Clinical and Experimental Research*, 30, 1006–1010.
- Wood, P. K., Sher, K. J., & Rutledge, P. C. (2007). College student alcohol consumption, day of the week, and class schedule. *Alcoholism: Clinical and Experimental Research*, 31, 1195–1207.