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## Examining Drinking Patterns and High-Risk Drinking Environments Among College Athletes at Different Competition Levels

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### Abstract

This study examined drinking patterns of three different college student groups: (a) intercollegiate athletes, (b) intramural/club athletes, and (c) nonathletes. Additionally, we investigated whether a relationship exists between drinking setting and risk of increased drinking. We analyzed data on the athletic involvement, drinking behaviors, and drinking settings of 16,745 undergraduate students. The findings revealed that drinking patterns for intramural/club athletes remained relatively consistent at all quantity levels; however, intercollegiate athletes consumed alcohol in higher quantities. Further, intramural/club athletes drank in almost every drinking setting, whereas intercollegiate athletes were more limited. The drinking patterns and settings suggest a stronger social motivation for drinking among intramural/club athletes than among intercollegiate athletes and point to a need to specify competition level when studying college athletes.

### Keywords

college drinking; athletes; intramural and club sports; drinking environments

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## Introduction

Heavy drinking by college and university students remains a significant concern on campuses throughout the United States (Hingson, Zha, & Weitzman, 2009; Wechsler & Nelson, 2008). Over the past two decades, one subpopulation that has received considerable research attention is college student-athletes (Cadigan, Littlefield, Martens, & Sher, 2012; Leichliter, Meilman, Presley, & Cashin, 1998; Martens, Dams-O'Connor, & Beck, 2006; Nattiv & Puffer, 1991; Nelson & Wechsler, 2001; Turrisi, Mallett, Mastroleo, & Larimer, 2006; Wechsler, Davenport, Dowdall, Grossman, & Zanakos, 1997; Yusko, Buckman, White, & Pandina, 2008). Although the research goals of previous studies vary, the findings remain consistent: College student-athletes are at higher risk than their nonathlete peers for heavy drinking and alcohol-related problems.

Ongoing efforts to devise effective prevention strategies aimed at this population reveal not only the complexity of the public health problem but also the need for more discriminating research to inform those efforts. One valuable distinction can be made, for example, between intramural/club athletes (participants in on-campus, recreational sports organized by their college or university) and intercollegiate athletes (participants in National Collegiate Athletic Association competition), as they have very different experiences that could affect their alcohol use and related risks (Pinkerton, Hinz, & Barow, 1989; Selby, Weinstein, & Bird, 1990; Simiyu, 2010).

Intramural/club athletes may be former high school competitors who want to continue to self-identify as athletes and maintain that association, and intramural activities offer a relatively quick way for them to become part of a social group without having to commit to the demands of a varsity sport. Intramural programs are open to every member of the college campus and usually offer varying levels of competitiveness, and of competitors (e.g., men, women, or coed), and a range of sports from traditional (e.g., soccer and volleyball) to nontraditional (e.g., flag football, kickball). On the other hand, varsity athletes consistently have structured, mandatory times to interact with each other (e.g., practices, weight room workouts, away-game traveling, and meal times) that provide team-building situations. They are often recruited to their universities to participate in sports, and they normally make a strong commitment to the role of an athlete.

To date, two studies of drinking behavior have differentiated between competition levels among college athletes. Ward and Gryczynski (2007) examined alcohol consumption among students involved in recreational sports during college. They found that students who participated in recreational sport activities (i.e., nonintercollegiate athletics) reported a greater frequency and intensity of alcohol use than those who did not participate in recreational sports. To our knowledge, this was one of the first studies to clearly distinguish between intercollegiate and other athletes, and their findings suggest that organized, non-National Collegiate Athletic Association (i.e., nonintercollegiate) sports teams are an important group to examine for risky alcohol use. More recently, Andes, Poet, and McWilliams, (2012) analyzed college student survey data on the drinking patterns of intramural/club athletes compared with those identifying as varsity athletes. They found that

varsity athletes reported lower rates of high-risk drinking than club and intramural college athletes.

Our interest in examining the relationship of drinking setting to high-risk drinking among college students has been shared by other researchers. One study found that settings have unique effects on levels of students' alcohol use (Paschall & Saltz, 2007). Other researchers have found certain settings (e.g., bars, off-campus parties) to be positively associated with heavy college student drinking (Buettner, Khurana, & Slesnick, 2011; Clapp, Holmes, Reed, Freisthler, & Lange, 2007; Harford, Wechsler, & Muthen, 2003). However, the environmental influences examined to date focus mainly on alcohol availability and do not explore specific drinking contexts in depth. Also, very little research has investigated environment-related reasons why college athletes drink more than their nonathletic peers (Turrisi, Mastroleo, Mallett, Larimer, & Kilmer, 2007).

Prior studies indicate that applying a more comprehensive approach, such as a social ecological model, in the prevention of health-risk behaviors among college students is necessary for initial and sustainable change (DeJong, Larimer, Wood, & Hartman, 2009; Hingson & Howland, 2002; Saltz, 2011). According to the social ecological theory, multiple levels of influence (intrapersonal factors, interpersonal processes, institutional or organizational factors, community factors, and public policy) affect health behaviors with individual and environmental issues being important contributing factors (McLeroy, Bibeau, Steckler, & Glanz, 1988). This theory, which has been used for the study and prevention of heavy alcohol use among college students (e.g., Hansen, 1997), informed our approach to examine multiple factors (behavior, settings) influencing college athlete drinking. In doing so, findings from the study may highlight the need for sustainable multilevel prevention strategies aimed at reducing high-risk college athlete drinking.

Therefore, in an effort to fill gaps in the literature and broaden the understanding of college athlete drinking, the goals of the current study were (a) to compare drinking patterns of intercollegiate and intramural/club athletes to those of college students who do not participate in athletics and (b) to determine the relative frequency of athletes' participation in various high-risk drinking settings and the relative risk of specific contexts (e.g., fraternity or sorority parties, bars). Given the findings, however limited, on intramural athletes' drinking behaviors (Andes et al., 2012; Ward & Gryczynski, 2007), we hypothesized that intercollegiate athletes would drink less frequently compared with intramural/club and nonathletes. We also expected the relevance of drinking settings to differ among the three groups, hypothesizing participation in fewer drinking settings by intercollegiate athletes compared with intramural/club and nonathletes.

## Methods

### Participants and Procedures

We analyzed data obtained in 2009 and 2011 from students at 14 public universities in California who participated in a randomized controlled study of alcohol abuse prevention strategies (Paschall & Saltz, 2007). All procedures used in that study were approved by each university's institutional review board and were in compliance with APA ethical guidelines.

In addition, institutional review board approval was also given by the Pacific Institute for Research and Evaluation on July 16, 2001, and was renewed in subsequent years. The sample examined in the randomized controlled study consisted of 16,745 students, with respondent characteristics dichotomized, including age (under 21 vs. 21 or older), gender, race, and ethnicity (dummy variables for White, Black, and Hispanic), and membership in a fraternity or sorority.

## Measures

**Athletic status**—Students were asked if they participated on a university intercollegiate athletic team or an intramural (or club) athletic team.

## Drinking patterns

Drinking patterns were identified using responses from a series of items regarding students' reported drinking behavior. The first item asked about alcohol use over the past year. Using the approach of Gruenewald, Johnson, Light, Lipton, and Saltz (2003), frequent drinkers were defined as individuals who drank at least monthly and infrequent drinkers were defined as those who did not drink monthly but consumed alcohol at least once during the past year. Frequent drinkers were then asked to report on their drinking behavior for the previous month, and infrequent drinkers were asked the same series of questions for the period between the start of school and the date on which they completed the survey (Gruenewald et al., 2003).

Students reported the number of occasions on which they had consumed one or more, two or more, three or more, six or more, and nine or more drinks. Their responses were then scaled to a 28-day equivalent metric. The responses to these items provided a set of graduated frequencies for each level of drinking. These graduated drinking frequencies were converted to probabilities of continued drinking, and a best fit to these data was found using a descriptive log-logistic function (Gruenewald & Nephew, 1994). Differences were calculated for each estimated continued drinking function to obtain a drinking probability distribution: the proportion of occasions on which drinking at each level occurred (e.g., number of days when exactly three drinks were consumed). These differences were then weighted by the frequency of drinking to obtain drinking exposures: the number of occasions on which drinking at each level was expected to occur. Last, differences were calculated for the continued drinking functions to obtain estimates of drinking exposures: the expected number of occasions on which each respondent would consume one, two, three, or more drinks. Thus, for every student and drinking level, a specific rate of drinking was available.

## Drinking environments

Students were asked how many times since the beginning of the semester they had consumed some kind of alcoholic drink in each of the following six settings: a fraternity or sorority party, a residence hall party, a campus event (e.g., football game), an off-campus party, a bar or restaurant, and an outdoor setting (e.g., public park). Previous studies have identified these specific drinking settings as high risk for their association with heavy college drinking behavior (Buettner et al., 2011; Clapp et al., 2007; Harford et al., 2003).

## Data Analysis

We conducted three sets of analyses. First, we modeled alcohol consumption for all athletes (i.e., intercollegiate and intramural/club athletes) by matching student drinking settings to consumption levels and calculating the distribution of such levels across a fixed window of time (i.e., exposure; Gruenewald et al., 2003). To confirm prior published findings, we modeled drinking for all athletes compared with nonathletes using multivariate regression. Second, we separated all athletes into intercollegiate and intramural/club athletes and modeled drinking exposure for this categorical variable compared with nonathletes, stratified by age 21 (i.e., the legal drinking age). We used *t* tests to determine the probability that differences in drinking frequency at individual exposure levels were equal to 0, and a Wald test to determine the probability that the  $\beta$ -coefficients for the athlete status variables were equal to 0 in all equations (i.e., no difference between athletes and nonathletes). Third, using zero-inflated negative binomial models, we examined intercollegiate athlete, intramural/club athlete, and non-athlete participation in the six drinking settings to identify the frequency with which intercollegiate and intramural/club athletes drank in those locations compared with nonathletes. The negative binomial component of the models was adjusted for sex, age over 21, ethnicity, and Greek membership. The zero-inflated component, corrected for inflation by the total days drinking and the dispersion coefficient, is reported with the results.

## Results

### Descriptive Statistics

The majority of the sample was nonathletes (85.3%) while intramural/club athletes made up 11.8% and intercollegiate athletes were 2.9%. Among the participants, over half were female (58.2), nearly half were over the age of 21 (48.5%) and identified as nonHispanic White (47.1%). Over half (54.2%) reported consuming alcohol within the last 28 days, and respondents reported drinking an average of 3.4 days during the last 28 days. In both age groups (under 21 and 21 years or over), more intramural/club and intercollegiate athletes were current drinkers than nonathletes.

### Drinking Patterns and Drinking Settings

Among students 21 or older, intramural/club athletes were more likely to consume three or more drinks per drinking occasion compared with nonathletes ( $p < .05$ ). Intercollegiate athletes were significantly less likely to have one or two drinks on a drinking occasion than nonathletes and significantly more likely to consume six, seven, or eight drinks per occasion. Among students younger than 21, we found similar results: Intramural/club athletes were more likely to have three or more drinks per occasion than nonathletes, and intercollegiate athletes were more likely to have five or six drinks per occasion than nonathletes. Wald tests indicate that the estimates were significantly different for both athlete types compared with nonathletes ( $p < .05$ ).

Table 1 shows the results of the zero-inflated negative binomial models for drinking frequency in six drinking settings. Models were corrected for inflation by the number of days of drinking in the last 28 days and adjusted for sex, age (over 21), ethnicity, and Greek

membership. Intramural/club athletes drank more frequently than nonathletes ( $p = .01$ ) at fraternity and sorority parties, at on-campus parties, off-campus, at bars, and outdoors. Intercollegiate athletes drank more frequently than nonathletes ( $p = .01$ ) at Greek parties ( $p < .05$ ) and on-campus parties ( $p < .001$ ) but 35% less frequently outdoors (IRR = 0.65 [95% CI: 0.45, 0.93];  $p < .05$ ).

## Discussion

The purpose of this study was to contribute to the literature on college athlete drinking by examining the drinking patterns and behaviors of intercollegiate and intramural/club sport athletes separately. Previous literature has shown that both subpopulations of college athletes are at elevated risk for high-risk drinking (e.g., Andes et al., 2012; Martens et al., 2006; Ward & Gryczynski, 2007). However, most college drinking studies have focused on current use, which may miss a group of students who do not drink frequently but exhibit high-risk drinking patterns when they do drink.

Our analytical approach provided a more refined description of individual-level drinking behavior than basic quantity-frequency measures (Gruenewald et al., 2003). We not only identified drinking behavior but also determined its probability over time and in various settings. Therefore, we were able to better understand risky drinking behaviors of specific athletic groups (intramural/club vs. intercollegiate) rather than labeling all athletes as risky drinkers (Gruenewald et al., 2003). Our findings also clearly indicate that alcohol consumption is influenced at both the individual and environmental levels, supporting the use of a social ecological approach to prevent high-risk drinking among student athletes.

We found that intercollegiate athletes drink less frequently compared with intramural/club athletes but consume larger quantities when they do drink. Intramural/club athletes reported consistently consuming alcohol at all levels, from lower risk (e.g., 1–2 drinks per occasion) to much higher risk (e.g., 8–9 drinks per occasion). Our data suggest that while patterns of exposure may differ, both groups are at risk for intoxication and alcohol-related problems (e.g., driving under the influence, sexual victimization, intentional or unintentional injury, and death).

The differences in drinking patterns between the athlete groups might be explained by the characteristics of their respective sports programs. Intramural and club sports teams on college campuses rarely have the consistent practice times or other commitments of a varsity sport, which may allow them to engage in more social drinking experiences. Intercollegiate athletes have only a limited window of time to socialize, especially during the season, which may lead to an increased desire to maximize partying opportunities. These results suggest the importance of examining specific risks associated with different athlete groups and what characteristics may contribute to high-risk drinking behaviors.

The fact that intramural/club athletes in our study participated in more of the high-risk drinking settings supports the possibility that they have fewer time constraints than intercollegiate athletes and their motivation for sports participation may be more social than athletic (Artinger et al., 2006). Given that participation in high-risk drinking settings can

lead to increased risky behaviors (e.g., driving drunk or walking alone back to campus), our findings suggest that intramural/club athletes are at greater risk than their intercollegiate counterparts to develop dangerous drinking behaviors that can last beyond college.

Over half of our sample was under the age of 21, which when taken that into consideration along with our examination of high-risk drinking settings, supports colleges' concerns about underage drinking. Clearly, it is important not only for these settings to have appropriate policies and established systems (e.g., age identification, compliance checks, keg registration, and dram shop liability), but enforcement is also imperative.

Our findings also suggest that understanding the motivation for drinking (e.g., celebrating or commiserating after a game) among athlete groups is important. Martens, Pedersen, Smith, Stewart, and O'Brien (2011) found that sport-related positive reinforcement motives (e.g., drinking due to a win or good performance) and sport-related coping motives (e.g., drinking after a loss or bad performance) were significantly associated with alcohol use among intercollegiate athletes. Thus, it can be argued that intercollegiate athletes' drinking is closely tied to their athletic performance. In contrast, the social aspect of participation may be more important to intramural/club sports participants than the athletic aspect. Yet, if socializing plays a more significant role in intramural/club sport participation than in intercollegiate, then perhaps motives for alcohol use differ between the two groups. If so, it is highly important to understand the various motives in order to tailor college athlete drinking prevention efforts (e.g., healthy coping strategies vs. healthy social techniques).

Limitations relate to the generalizability of our findings to other institutions. Although this study comprised 14 universities, they were all located in one state, and caution must be used when considering our findings with regard to other geographical locations. In addition, intramural and club sports vary among institutions, in that some intramural sports may be as (or more) competitive than some club sports on other campuses. Likewise, some club sports might be as (or more) competitive than some intercollegiate teams. Future researchers should consider examining a more diverse sample of college institutions as well as exploring athletic identity and involvement in intramural and club sports separately.

This study contributes to the literature on college athlete drinking by identifying that intramural/club athletes have different drinking patterns compared with intercollegiate athletes and nonathlete peers, including greater participation in high-risk drinking settings. It is plausible, however, that club athletes and intramural athletes have different motivations for drinking and may warrant separate analyses. Differing characteristics of club sports include the travel, fundraising or significant dues, tryouts, and competition against other colleges. Also, club teams often have coaches and are generally more organized and supervised.

While the goal of college athletics is to enhance the participants' collegiate experience, athletes are clearly at increased risk for high-risk drinking and related problems. Furthermore, social interaction among athletes as a potential determinant of substance use and alcohol-related behaviors warrants further investigation, and our study also highlights



the importance of developing carefully targeted prevention efforts not only for intercollegiate athletes but also intramural/club athletes.

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## Biographies

**Miesha Marzell**, PhD, is an assistant professor in the Department of Community and Behavioral Health, College of Public Health at the University of Iowa. Her broad research interests are the etiology and prevention of alcohol and drug misuse among at-risk emerging adult and racial/ethnic minority populations. Her specific interests include the study of environmental and policy factors that can influence these behaviors. Dr. Marzell also studies the relationship between sports participation and substance abuse to inform prevention efforts.

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**Stefanie Moynihan** is a clinical psychology doctoral student at the University of Las Vegas, Nevada. She is interested in student-athlete wellness and resiliency within the athletic context.

**Paul J. Gruenewald**, PhD, is currently Scientific Director of the Prevention Research Center. His research interests focus upon studies of the social, economic, and physical availability of alcohol, alcohol use, and alcohol-related problems. Additional foci of his work include mathematical and statistical models of alcohol use and related problems, the development of evaluation methodologies appropriate to community-based evaluations of preventive interventions, and the environmental prevention of violence. He also directs the Spatial Systems Group, a coordinating center for work using Geographic Information Systems, Spatial Statistical Systems, and Spatial Dynamic Models. He has been a Principal or Co-Investigator on 20 funded research projects. Dr. Gruenewald is currently Principal



Investigator on three research projects funded by the National Institute on Alcohol Abuse and Alcoholism (NIAAA). In honor of his research achievements, Dr. Gruenewald received a Merit Award from NIAAA to support continued studies of alcohol outlets and violence.

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Results of Zero-Inflated Negative Binomial Models for Relationship Between Drinking Setting, Alcohol Consumption, and Athletic Group Membership.

**Table 1**

Drinking setting	Intramural/Club athletes ( <i>n</i> = 1,975)		Intercollegiate athletes ( <i>n</i> = 479)		Dispersion coefficient
	IRR	95% CI	IRR	95% CI	
Greek residence	1.45***	[1.25, 1.68]	1.34*	[1.00, 1.80]	4.74
Residence halls	0.97	[0.78, 1.20]	0.99	[0.65, 1.52]	10.61
On-campus parties	1.47***	[1.17, 1.85]	2.53***	[1.65, 3.87]	8.19
Off-campus parties	1.19***	[1.10, 1.28]	1.03	[0.81, 1.30]	1.50
Bars	1.34***	[1.18, 1.51]	1.03	[0.81, 1.30]	2.92
Outdoors	1.23*	[1.03, 1.46]	0.65*	[0.45, 0.93]	4.20

Note. Negative binomial models adjusted for sex, age over 21, ethnicity, and Greek status. IRR = Incidence Rate Ratio.

\* *p* .05.

\*\*\* *p* .01.