Risk of Marijuana Use in Male and Female College Student Athletes and Nonathletes*

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ABSTRACT. Objective: A large minority of collegiate athletes report past-year marijuana use even though there is a significant possibility of experiencing negative athlete-specific consequences related to performance, eligibility, and scholarship. The present study examined risk factors that can drive or curb marijuana use in college athletes and nonathletes. **Method:** Logistic regressions, performed separately for men and for women, assessed the relationship of past-year marijuana use to sensation seeking, negative mood, perceptions of peer marijuana use, motivations for marijuana use, and stress related to body image and academics in athletes (233 men, 156 women) and nonathletes (184 men, 313 women). Risk factors also were compared for male past-year marijuana users who reported using ($n = 26$) or not using ($n = 61$) the substance during their competitive season. **Results:** For athletes and nonathletes of both genders, being White, being past-year cigarette smokers, having higher sensation-seeking scores, and having exaggerated perceptions of student use norms were associated with past-year marijuana use. Enhancement motivations for use were higher among athletes compared with their same-gender nonathlete peers. In women, but not in men, greater body image stress and lower academic stress were associated with past-year marijuana use. Male athletes who continued using marijuana into their competitive season demonstrated a qualitatively different risk profile compared with athlete past-year users who reported no in-season use, including greater coping motivations for marijuana use. **Conclusions:** This preliminary study suggests that although the overall risk profile of college athletes and nonathletes is similar, athletes appear to be particularly motivated to use marijuana because of its enhancement or pleasurable properties. (*J. Stud. Alcohol Drugs, 72,* 586–591, 2011)

COLLEGE STUDENT ATHLETES USE MARIJUANA at an unexpectedly high rate. Aside from alcohol, marijuana is the most frequently used drug across all men's sports teams, with similar trends found among women's sports (National Collegiate Athletic Association [NCAA], 2006). Consistent with earlier studies of marijuana use among college athletes and nonathletes (Anderson et al., 1991; Page and Roland, 2004; Wechsler et al., 1997), we reported that one third of male and one quarter of female student athletes from an NCAA Division I school reported using marijuana at least once in the past year (Yusko et al., 2008). These prevalence rates were significantly lower than those reported by their same-gender nonathlete peers. Nonetheless, these rates were higher than expected, considering that athletes stand to lose more than nonathletes from marijuana use with respect to athletic eligibility status and performance impairment as a result of the physiological effects of marijuana smoking. These potential negative consequences are in addition to the social and legal consequences possible for all marijuana users.

This study compared the marijuana use risk profile of male and female college athletes with that of same-gender nonathlete peers. Sensation seeking (Simons et al., 2005), negative mood (e.g., anxiety, depression; Buckner et al., 2010), normative perceptions of marijuana use (Lewis and Clemens, 2008; McCabe, 2008), and enhancement and social motivations for marijuana use (Zvolensky et al., 2007) have been identified as risk factors associated with greater marijuana use among nonathlete young adult samples. Cigarette smoking also is a putative risk factor based on the complex interplay between tobacco and marijuana use in young adults (Agrawal et al., 2008; Coffey et al., 2003; Patton et al., 2005). We hypothesized that these risk factors would apply to college student athletes based on their status as students and the widespread use of marijuana among this age group (Johnston et al., 2006).

Athletes contend with many additional factors that may affect their decision to use marijuana. Because marijuana usually is smoked, the potential for cardiovascular and respiratory dysfunction is high (Ashton, 2001; Hall and Degenhardt, 2009). Smoking marijuana decreases alertness, lowers reaction time, and impairs memory (Ashton, 2001; Wadsworth et al., 2006). It accelerates muscle fatigue, thereby reducing exercise duration (Renaud and Cormier, 1986). Changes in appetite and food cravings because of marijuana use can undermine nutrition and affect body mass (Cota et al., 2003; Kirkham, 2009). Thus, smoking marijuana can have detrimental effects on athletic performance, and these negative effects should dissuade athletes from using marijuana.

The many athlete-specific factors that can drive or curb marijuana use among college athletes have received little attention. With this study, we sought to fill this knowledge gap by comparing a variety of putative risk factors related to marijuana use between athlete and nonathlete students who did or did not report past-year use of marijuana. Based on differences in male and female marijuana use patterns (LaBrie et al., 2009; Yusko et al., 2008) and gender differences in the salience of stress related to body image (Moore, 1993; Selby et al., 1990) and normative perceptions (LaBrie et al., 2009; McCabe, 2008), we examined marijuana use risk factors separately for men and for women. Information from this study may be valuable to university athletic departments and specialists who treat substance use disorders by providing insight into the specific needs of athletes in terms of prevention and/or treatment.

Method

Participants and procedures

The participants were 392 undergraduate student athletes (*M* [*SD*] = 19.9 [1.3] years; 60% male; 82% White) recruited from 17 teams, along with 504 nonathlete students (*M* = 20.0 [1.4] years; 37% male; 58% White). For a complete description, see Yusko et al. (2008). Athletes were invited to complete surveys before a mandatory alcohol-education seminar. Nonathletes were recruited from introductory psychology (*n* = 70) or communication (*n* = 452) classes. Each participant provided verbal assent after the voluntary nature of participation and the anonymity of responses were explained. This study was approved by the university's Institutional Review Board for the Protection of Human Subjects.

Measures

Dependent variables. Frequency of marijuana use in the past year and during the competitive athletic season were assessed using items (7-point scale) modified from the Rutgers Health and Human Development Project (Pandina et al., 1984) and the Harvard School of Public Health College Alcohol Study (Wechsler et al., 2002). To differentiate use groups, variables were dichotomized (0 = *no past-year use,* 1 = *any past-year use,* and, for athletes, 0 = *no in-season use,* 1 = *any in-season use*). To assess frequency of use, responses were condensed into four categories (infrequent = *less than once a month,* monthly = *about once a month* and *two or three times a month,* weekly = *once or twice a week* and *three or four times per week,* and daily = *every day or nearly every day*).

Risk factors. Past-year cigarette use was dichotomized (0 = *no past-year use,* 1 = *any past-year use*). Sensation seeking was measured as the total score (α = .88) from the nine-item scale developed by Schafer and colleagues (1994).

Current mood was measured with the Profile of Mood States Brief Form (McNair et al., 1992). Total scores from the Profile of Mood States subscales (tension-anxiety: α = .83; depression-dejection: α = .85; anger-hostility: α = .83; confusion-bewilderment: α = .72; vigor-activity: α = .86; and fatigue-inertia: α = .87) as well as the total mood disturbance score (α = .81) were assessed. Peer normative perceptions were assessed as two continuous variables: perceived percentage of college student athletes and nonathletes who "smoked marijuana at least once in the past year" (Johnston et al., 2004). Stress was measured by an 11-item scale developed by Selby and colleagues (1990). A body-image stress subscale (α = .87) was created from two items (*controlling your eating* and *controlling your weight*). An academic-stress subscale (α = .74) was created from three items (*meeting academic demands, academic competition,* and *maintaining your academic scholarship*). Motivations for marijuana use were assessed among students who reported ever using marijuana with four subscales from the Marijuana Motives Measure (Simons et al., 1998): coping (α = .82), conformity (α = .77), enhancement (α = .81), and expansion (α = .76).

Results

As previously reported (Yusko et al., 2008), the prevalence of past-year marijuana use was 50% in male nonathletes, 37% in male athletes, 48% in female nonathletes, and 25% in female athletes. Marijuana was used more frequently by male and female nonathletes compared with their same-gender athlete peers (Table 1; Fisher's exact test: *p*s < .05). The majority of male and female athletes who used marijuana in the past year reported using it less than monthly; conversely, nonathlete student use frequency was more evenly distributed across response options.

Logistic regressions were performed separately for men and for women to directly compare the risk profiles of athletes with those of nonathletes. Models included race (0 = *not White,* 1 = *White*) as a covariate and the following risk factors: past-year smoking status, body image and academic stress, sensation seeking, total mood disturbance, and normative perceptions of student (not athlete-specific) marijuana use. Effect sizes were calculated as the group mean difference divided by the standard deviation and distinguished at .2 (small), .5 (medium), and .8 (large) (Cohen, 1988).

In men, the main effects model showed that being White (*B* = 0.8, *SE* = 0.3, odds ratio [OR] = 2.14, 95% CI [1.19, 3.84]), past-year cigarette smoking (*B* = 2.0, *SE* = 0.3, OR = 7.15, CI [3.64, 14.05]), lower body-image stress (*B* = -0.1, *SE* = 0.1, OR = 0.87, CI [0.76, 0.99]), higher sensation seeking (*B* = 0.8, *SE* = 0.2, OR = 2.29, CI [1.47, 3.56]), and exaggerated perceptions of student use norms (*B* = 0.0, *SE* = 0.0, OR = 1.02, CI [1.01, 1.03]) were associated with past-year marijuana use. Sensation seeking demonstrated a medium effect size (.52) difference, and normative percep-

TABLE 1.   Risk profiles of male and female athletes and nonathletes who did or did not report past-year marijuana (MJ) use

	Males				Females			
	Athletes		Nonathletes		Athletes		Nonathletes	
Variable	Nonuser (n = 146)	User (n = 87)	Nonuser (n = 92)	User (n = 92)	Nonuser (n = 117)	User (n = 39)	Nonuser (n = 164)	User (n = 149)
Frequency of past-year MJ use, %								
Infrequent	–	66	–	30	–	85	–	48
Monthly	–	14	–	25	–	13	–	33
Weekly	–	17	–	19	–	0	–	11
Daily	–	3	–	26	–	3	–	7
Past-year cigarette smoking, %	3	23	12	46	3	26	14	37
Stress, M (SD)								
Body image	1.6 (2.1)	1.6 (2.0)	1.7 (1.8)	1.2 (1.7)	1.8 (1.9)	3.2 (2.6)	2.5 (2.2)	3.3 (2.5)
Academic	3.5 (2.2)	4.1 (2.8)	3.5 (2.2)	3.4 (2.2)	4.8 (2.2)	4.0 (1.8)	4.4 (2.3)	4.1 (2.1)
Sensation seeking, M (SD)	25.2 (4.8)	27.2 (5.3)	27.3 (6.0)	29.9 (5.4)	24.0 (4.8)	26.9 (5.1)	25.8 (4.8)	27.6 (5.2)
Current mood, M (SD)								
Anxiety	2.7 (3.7)	2.9 (3.6)	2.1 (2.9)	2.5 (3.7)	1.5 (2.3)	1.9 (2.5)	2.3 (3.0)	2.5 (3.5)
Anger	2.0 (3.1)	2.2 (3.1)	2.9 (3.4)	2.6 (3.4)	2.0 (2.8)	2.8 (2.9)	2.7 (3.4)	3.1 (3.7)
Vigor	6.2 (4.4)	6.6 (4.2)	5.8 (4.4)	6.7 (4.3)	5.7 (4.4)	4.7 (4.1)	4.4 (3.9)	5.0 (4.2)
Fatigue	5.7 (4.7)	6.7 (4.8)	5.1 (4.2)	5.4 (4.5)	6.3 (4.7)	8.4 (5.2)	6.4 (4.5)	7.1 (5.0)
Depression	1.7 (2.9)	2.0 (3.2)	2.3 (3.1)	2.2 (3.6)	1.8 (3.1)	1.2 (1.9)	2.5 (3.2)	2.8 (4.0)
Total mood disturbance, M (SD)	8.5 (13.8)	10.0 (13.6)	9.5 (12.9)	9.2 (15.1)	7.8 (12.1)	11.5 (12.6)	12.0 (13.1)	13.3 (16.4)
Perceptions, M (SD)[a]								
. . . of student MJ use	60.2 (23.5)	65.5 (23.2)	58.9 (26.0)	70.3 (21.7)	62.5 (21.5)	68.5 (22.7)	59.8 (22.4)	70.6 (20.9)
. . . of athlete MJ use	35.3 (24.5)	45.2 (27.4)	43.2 (28.1)	49.8 (27.0)	45.0 (24.9)	48.6 (24.1)	44.8 (26.7)	47.8 (28.3)
Motivations, M (SD)[b]								
Coping	0.7 (2.2)	2.1 (3.3)	1.4 (4.3)	5.5 (5.0)	0.5 (1.4)	1.6 (2.5)	1.3 (2.3)	3.7 (3.8)
Conformity	0.7 (1.5)	1.5 (2.3)	1.2 (3.6)	5.2 (4.9)	0.5 (1.1)	0.8 (1.7)	1.7 (2.7)	3.3 (3.4)
Enhancement	4.2 (5.3)	10.3 (6.1)	3.0 (4.6)	7.6 (4.6)	3.8 (4.6)	8.4 (6.5)	2.7 (3.8)	5.2 (3.5)
Expansion	0.7 (1.7)	3.3 (4.4)	1.1 (4.2)	4.6 (4.4)	0.9 (2.2)	1.6 (2.8)	1.4 (2.7)	2.9 (3.1)

Notes: [a]Perceived prevalence of MJ use (%); [b]individuals who reported never using marijuana did not complete these items; thus, the "nonuser" groups reflect male athletes (n = 35), male nonathletes (n = 23), female athletes (n = 41), and female nonathletes (n = 42) who reported having used marijuana in their lifetime but not in the past year; motivation scales were specific for marijuana use.

tions of student marijuana use demonstrated a small effect size (.35) difference; the body-image stress difference was negligible (effect size = -.14). Interaction terms were then included to assess differences between athletes and nonathletes in the influence of risk factors on past-year marijuana use. A significantly better model fit, $\chi^2(6) = 17.13$, $p < .05$, was observed. Athlete status moderated the relationship between normative misperceptions of general student marijuana use and actual marijuana use. Student norms influenced past-year marijuana use in nonathletes more than in athletes ($B = -0.0$, $SE = 0.0$, OR = 0.98, CI [0.96, 1.00]). The same pattern of results was noted in the main effects model when normative perception of athlete use rather than general student use was included (effect size = .34); however, the interaction model was no longer significant.

In women, the main effects model showed that being White ($B = 0.9$, $SE = 0.2$, OR = 2.54, CI [1.56, 4.14]), being a nonathlete ($B = -0.9$, $SE = 0.3$, OR = 0.43, CI [0.26, 0.70]), past-year cigarette smoking ($B = 1.3$, $SE = 0.3$, OR = 3.63, CI [2.05, 6.41]), greater body-image stress ($B = 0.2$, $SE = 0.1$, OR = 1.16, CI [1.05, 1.29]), lower academic stress ($B = -0.1$, $SE = 0.1$, OR = 0.89, CI [0.80, 0.99]), higher sensation

seeking ($B = 0.7$, $SE = 0.2$, OR = 1.93, CI [1.26, 2.959]), and exaggerated perceptions of student use norms ($B = 0.0$, $SE = 0.0$, OR = 1.02, CI [1.01, 1.03]) were associated with past-year marijuana use. Body-image stress (.48), academic stress (-.21), sensation seeking (.48), fatigue (.21), and normative perceptions of student use (.43) demonstrated small effect size differences. Inclusion of interaction terms significantly improved model fit, $\chi^2(6) = 14.97$, $p = .05$, but no individual interaction was significantly associated with past-year marijuana use. When normative perception of athlete use rather than general student use was included, norms were no longer associated with past-year marijuana use, and the interaction model was no longer significant.

Only individuals who reported lifetime marijuana use (58%) completed the motivations for marijuana use survey (Table 1). Thus, these data were analyzed separately using 2×2 analyses of variance. In all cases, motivation subscale scores were higher in past-year marijuana users compared with lifetime, non–past-year users, men: $Fs(1, 234) = 18.9$ (coping), 18.4 (conformity), 42.5 (enhancement), 24.0 (expansion), all $ps < .05$; women: $Fs(1, 269) = 15.5$ (coping), 5.3 (conformity), 35.4 (enhancement), and $F(1, 267) = 6.9$

(expansion), all ps < .05. Coping, $F(1, 234) = 10.5$, $p < .05$, and conformity, $F(1, 234) = 4.7$, $p < .05$, motivation subscale scores were significantly higher among male nonathletes compared with male athletes, whereas enhancement subscale scores were significantly lower for male nonathletes compared with athletes, $F(1, 234) = 5.8$, $p < .05$. Similarly in women, coping, $F(1, 269) = 10.3$, $p < .05$, conformity, $F(1, 269) = 20.1$, $p < .05$, and expansion, $F(1, 267) = 4.5$, $p < .05$, motivation subscale scores were significantly higher among nonathletes versus athletes, but enhancement subscale scores were significantly lower for nonathletes versus athletes, $F(1, 269) = 12.2$, $p < .05$.

We next explored whether past-year marjuana-using male athletes who used ($n = 26$, 30%) or did not use ($n = 61$) marijuana during their competitive season differed in terms of risk. These analyses were limited to male athletes, because only 7 of the 39 female athletes who reported past-year marijuana use reported in-season use. Male athletes who used marijuana during their competitive season, compared with those who did not, reported higher sensation seeking ($M = 3.3$ [0.5] vs. 3.0 [0.6], respectively), $t(83) = -2.63$, $p < .05$, effect size = .64; greater anxiety ($M = 4.3$ [4.1] vs. 2.3 [3.1]), $t(82) = -2.35$, $p < .05$, effect size = .53; greater fatigue ($M = 8.8$ [5.3] vs. 5.7 [4.3]), $t(81) = -2.81$, $p < .05$, effect size = .64; greater current negative mood ($M = 16.5$ [14.8] vs. 7.2 [12.1]), $t(81) = -3.00$, $p < .05$, effect size = .69; higher normative perceptions of athlete marijuana use ($M = 54.4$ [28.6] vs. 41.4 [26.2]), $t(84) = -2.03$, $p < .05$, effect size = .47; and higher coping ($M = 3.7$ [4.3] vs. 1.5 [2.6]), $t(84) = -2.92$, $p < .05$, effect size = .62; enhancement ($M = 12.9$ [5.6] vs. 9.1 [6.0]), $t(84) = -2.75$, $p < .05$, effect size = .65; and expansion ($M = 5.7$ [5.8] vs. 2.2 [3.1]), $t(84) = -3.66$, $p < .05$, effect size = .75, motivations-for-use subscales. Notably, in nearly all cases, a moderate effect size difference between in-season and non–in-season users was observed.

Discussion

For all individuals, marijuana use carries a high potential for negative consequences, particularly related to legal ramifications and health. Beyond this, athletes contend with the possibility of impairing their athletic performance and losing their eligibility to compete if they use marijuana. The present study provides preliminary evidence that both "general" and athlete-specific risk factors influence marijuana use among athletes. Marijuana use is less prevalent in athletes compared with their same-gender nonathlete peers (Yusko et al., 2008), and, in this study, athletes who reported past-year marijuana use appeared to use marijuana less frequently than nonathletes. Nevertheless, most of the same risk factors were linked to use. Being White, smoking cigarettes in the past year, having higher sensation-seeking scores, and misperceiving normative student marijuana use were associated with using

marijuana in the past year for male and female athletes and nonathletes.

There also were some interesting differences between athletes and nonathletes. Enhancement motivations (e.g., "because I like the feeling"; "because it's fun") were significantly higher in athletes than in nonathletes, whereas all other motivations were significantly lower. Among athletes, enhancement-motivation scores were three or more times higher than any other motivation score, indicating that using marijuana for recreational purposes is a student athlete's most important reason for use. Martens et al. (2005) found that, among athletes, drinking alcohol for its positive reinforcing effects was related to both greater alcohol consumption and greater negative personal consequences. Future studies should assess whether using marijuana for its enhancement effects is linked to heavier or more problematic marijuana use among collegiate athletes.

The relationship of stress to past-year marijuana use differed between men and women. In men, lower body-image stress was associated with past-year marijuana use; however, the negligible effect size of this association raises questions about its clinical utility. In women, on the other hand, higher body-image stress was associated with past-year marijuana use. It could be argued that experiencing stress related to body image should deter young adults from using marijuana, based on marijuana's well-known ability to directly stimulate appetite and contribute to overeating, sweet food preference, and altered food motivations (Kirkham, 2009). On the other hand, it could be argued that using marijuana promotes unhealthy eating, thereby increasing body-image stress. The present results in women tentatively support the latter relationship, but longitudinal studies are needed to clarify temporal order and causality. Nonetheless, prior research suggests that women (athletes and nonathletes) experience more stress related to their weight, body image, and eating behaviors than men (Moore, 1993; Selby et al., 1990). Furthermore, a link between poor body image and cigarette smoking, marijuana use, and depression in women has been noted (Crisp et al., 1999; Crow et al., 2006; Stice et al., 2000). Thus, the effect of body-image stress on substance use in women warrants more attention.

The relationship of academic stress to past-year marijuana use revealed a different pattern of results. Using marijuana in the past year was associated with lower academic stress in women but not in men. Marijuana use in adolescence has been linked to subsequent academic failure (Fergusson et al., 2003). Thus, it may be that experiencing some stress related to academic performance and success is protective against marijuana use, particularly in women. Again, these results warrant further research.

The perceived prevalence of marijuana use among athletes and among the general student body had different relationships to actual use in men and women. Perceived athlete use was associated with past-year marijuana use in men but

not in women. This lends indirect support to the work of LaBrie et al. (2009), who noted that the relationship between normative perceptions of athlete use and actual marijuana use was stronger for male than for female athletes. In addition, perceived student use was associated with actual use in both men and women; however, in men, this relationship was weaker among athletes than among nonathletes.

The present study also explored differences between male athletes who continued their marijuana use into their competitive season and those who did not. We speculated that in-season use would reflect a more chronic pattern of substance use, because the potential consequences of use would escalate during the competitive season and thus act as a more powerful deterrent. In-season users had higher sensation seeking; greater anxiety; and higher coping, enhancement, and expansion motivations for use compared with non–in-season users. Because of this study's cross-sectional design, causality cannot be addressed; yet these findings warrant further examination, particularly the combination of anxiety and coping motivations. Coping motivations for marijuana use have been linked to more negative consequences (Lee et al., 2009) and higher negative affect (Zvolensky et al., 2007). Although the small number of in-season users in this study limited our ability to explore the relationship between negative mood and coping motivations, it would be interesting to examine whether using marijuana to cope with negative mood results in a more chronic use pattern that hinders an athlete's ability to quit during the competitive season and thus compounds the risk of negative consequences.

The results of this preliminary study are limited by the use of retrospective, self-report, cross-sectional, and highly sensitive data. Not all athletic teams were represented because involvement in the study was dependent on coaches' consent. Furthermore, the sample comes from a single NCAA Division I university in the Northeast. Because the frequency of marijuana use was relatively low in this sample, a dichotomous variable was used. However, infrequent/ light marijuana users may differ in terms of risk and consequences compared with chronic/heavy users (Zvolensky et al., 2007). In general, the present sample was relatively low risk because most individual risk factor scores were modest compared with the possible maximal score. In addition, the observed statistical differences between past-year users and nonusers were often the result of modest mean differences and limited by small effect sizes. The moderate effect size differences related to the risk of in-season use and the qualitatively distinct risk profiles of male athletes in this study who maintained marijuana use into their competitive season versus those who did not suggest that a more complete assessment of in- and off-season substance use among athletes is needed. In conclusion, this study contributes to our understanding of the substance use activities and risk behaviors of college athletes and suggests that athletes who use marijuana during their competitive season may be an especially important target group for intervention.

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