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PARTICIPANTS' SPORTS CHARACTERISTICS RELATED TO HEAVY EPISODIC DRINKING AMONG FRENCH STUDENTS

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Running Head: sports characteristics and heavy episodic drinking

PARTICIPANTS' SPORTS CHARACTERISTICS RELATED TO HEAVY EPISODIC DRINKING AMONG FRENCH STUDENTS

Abstract:

Background: The relationships between involvement in sports and alcohol consumption appear to be complex in the alcohol literature. In this study we aimed to examine this link among French students, taking into account their sports characteristics. We also examined variations in alcohol use among sport sciences students between 2002 and 2006, and the difference in alcohol use and heavy episodic drinking among sport sciences, law and pharmacy students.

Method: *design:* repeated survey; cross-sectional study; *Setting:* self-questionnaire survey; *Participants:* French (south-east France) sport sciences (n=693), law (n=325) and pharmacy (n=338) students (females=58%).

Results: In 2002, 38% of the male sport sciences students reported repeated heavy episodic drinking, and this proportion has risen to 48% in 2006 ($p<0.05$). When compared to law and pharmacy students, female and male sport sciences students were less likely to report repeated heavy episodic drinking ($p<0.05$). Engaging in physical activity (whether or not it takes place within an institution) and practising martial art were negatively related to heavy episodic drinking ($p<0.05$). Other factors related to heavy episodic drinking were gender-specific: among males, practising sport in a formal context, team sports, and competitive participation at a departmental or regional level represented risk factors ($p<0.05$), while practising an individual sport was a protective factor among females ($p<0.05$).

Discussion: This study corroborated the importance to take into account the context of practice and the type of sport practised to examine the link between sport participation and alcohol consumption. The normative context of peer socialization among competitive and team sports participants seemed to play a role in alcohol use. Further studies are needed to confirm the role of this putative factor.

Keywords: University students; alcohol; heavy episodic drinking; physical activity; context of sport participation; repeated surveys.

INTRODUCTION

In France as in several others developed countries there is a long-term trend toward decreasing alcohol consumption (World Health Organization, 2000). Nevertheless, France is still among the European countries with Portugal, Luxembourg, Ireland, Hungary, the Czech Republic, Spain and Germany where the prevalence of alcohol use remains at high levels (Beck & Legleye, 2004). Moreover, despite this general trend, unsafe drinking has not declined among adolescents and young adults, including university students (Gill, 2002). Precisely, in the university students subpopulation, recent studies conducted in several countries revealed that these young adults have a very high prevalence of harmful drinking (e.g. Gill, 2002; Lorente, Peretti-Watel, Griffet, & Grélot, 2003; Wetherill & Fromme, 2007). Studying alcohol use among university students is important because the alcohol habits initiated during the first years of college are likely to persist during all years of higher education (Vik, Cellucci, & Ivers, 2003). As a result, a lot of studies have examined risk and protective factors for alcohol use among college students. Many of them have focused on the area of sport participation, indicating that athletes have higher rates of alcohol use than nonathletes (Leichliter, Meilman, Presley, & Cashin, 1998; Nelson & Wechsler, 2003; O'Brien, Blackie, & Hunter, 2005; Wechsler, Davenport, Dowdell, Grossman, & Zanakos, 1997). Given the increased risk for alcohol use, it seems clear that researchers must continue to examine alcohol consumption of college athletes. Recently, one study (Ford, 2007) examined variation in alcohol use among athletes on the basis of sport/team affiliation, showing that male hockey athletes and female soccer athletes were more likely to report heavy episodic drinking than the other athletes of the same sex. In France, two previous

studies targeted sport sciences students (Lorente *et al.*, 2003; Lorente & Grélot, 2003) to investigate gender differences in patterns of alcohol consumption, but without considering the role of the participants' sports characteristics. Since the relationships between involvement in sports and alcohol consumption appear to be complex, with certain nuances being associated with certain sports (Lorente, Souville, Griffet, & Grélot, 2004), we suggest that examining the participants' sports characteristics may help to understand the link between sport participation and alcohol consumption among young adults. Hence, in order to further characterize the alcohol consumption behaviours already observed among sport sciences students by Lorente *et al.* (2003) and Lorente and Grélot (2003), the first aim of this study was to address the variation in heavy episodic drinking among French sport sciences students on the basis of their sport participation. Heavy episodic drinking is used to refer to drinking over an evening or similar time span. In research literature, there is a certain consensus to operationally define heavy episodic drinking as the consumption of 5 or more alcoholic beverages in a sitting for both men and women (e.g. Naimi, Lipscomb, Brewer, & Gilbert, 2003). However, this definition can be slightly different across the studies, as it may also refer to the consumption of at least 5 alcoholic beverages in a sitting by men and 4 for women (Wechsler, Dowdall, Davenport, & Castillo, 1995), or at least 6 alcoholic beverages for both sexes (Nilsen, Holmqvist, Nordqvist, & Bendtsen, 2007). In this study, we opted to operationally define heavy episodic drinking as the consumption of 5 or more alcoholic beverages in a sitting for both men and women.

Recent studies (e.g. Beck, Legleye, Guilbert, & Peretti-Watel, 2005; Legleye, Rosilio, & Nahon, 2006) stressed complex changes in patterns of alcohol consumption in France, especially among young adults, and showed that the patterns of consumption of alcohol may

change quickly. For instance, the prevalence of regular use of alcohol (i.e. more than 10 times per month) in 18 years-old French men has increased from 16% to 21.2 % between 2000 and 2003. For these reasons, it appears important to perform repeated surveys. Hence the second aim of the present study was to measure variations in alcohol use and heavy episodic drinking among sport sciences students between 2002 and 2006.

Then, we wanted to address the variation in alcohol use and heavy episodic drinking among several groups of students on the basis of their academic disciplines (pharmacy, law, and sport sciences students). We examined the link between participants' sports characteristics and heavy episodic drinking, taking into account the type of sport practised, the competitive participation and the context of practice, i.e. within a club, within an informal context (with family, friends, or alone), or both. Results of such a study would help experts leading prevention and treatment programs to adapt their messages toward specific targets.

METHOD

Participants

This study was approved by the local university ethics committee, and was based on a self-reported questionnaire administered to a sample of sport sciences students from the University of Marseilles in 2002 (n=380) and 2006 (n=313), and in the same year (2006) to a sample of several academic disciplines students from the Southern France Universities in Montpellier and Aix-en-Provence: pharmacy students (n=338) and law students (n=325). Only second and third-year students were surveyed. First-year students were excluded

because they are considered not representative of the population, as two thirds of them fail end-of-year exams and stop studying in the field. Fourth-year students were also excluded because among the sport sciences students, some of them studied a course on addiction, which could change their attitude and representation toward alcohol use.

Procedure

The procedure used for this survey was identical from 2002 to 2006, and for sport sciences, law, and pharmacy students. In order to avoid responses bias such as under-reported or over-reported consumption for social norms reasons, it was made clear that the survey was anonymous and strictly confidential and that there were no “right or wrong” answers. Students were also free to refuse to answer the questionnaire. Approximately, 25 subjects were tested at each session, which lasted 20 min. Subjects were sat one per table, each table separated from the others by at least 2m in all directions. An experimenter was always present to ensure no communication between subjects. At the end of the session, the subjects placed their questionnaire in a common ballot box.

Material

The same self-reported questionnaire was used in 2002 and 2006 (see appendix in Lorente *et al.*, 2003). The first part characterized the population in terms of demographics (4 items). The second part included 4 items related to sport participation. Subjects were asked to mention if they practice any physical or sporting activity whether or not it takes part within an institution

(according to the definition given by Pate *et al.*, 1995), at least during one hour, once a week. Participants who reported doing physical activity had to specify the main type of sport or physical activity practised, and the context of practice: only in an informal context (i.e. with friends, family, or alone, but without being part of a club or an institution); only in a formal context (i.e. being registered in a club or an institution); both in a formal and informal context. Among the participants who reported practising only in a formal or both in a formal and informal context, we measured the competitive level. In the last part, we measured alcohol consumption (10 items). Excepted for the age at first episode of heavy drinking, we focused on binary outcomes: drinking wine, beer or spirits at least once a month, and reporting repeated heavy episodic drinking (i.e. having 5 or more drinks on a single occasion) at least 3 times during the prior 12 months.

Statistical analysis

Firstly, self-reported frequencies of alcohol use and heavy episodic drinking were compared in 2002 and 2006 among French sport sciences students, using Pearson's χ^2 (and Student's t-test to compare age at first episode of heavy drinking). Then a logistic model was used to investigate factors associated with heavy episodic drinking. Factors introduced in the analysis were survey year, age, main sport practised, context of practice, competitive level, and alcohol use.

Secondly, sports characteristics, self-reported frequencies of alcohol use and heavy episodic drinking in 2006 were compared among sport sciences, law, and pharmacy students using Pearson's χ^2 (and analyses of variance to compare age at first episode of heavy

drinking). Then we used a logistic model to investigate factors associated with repeated heavy episodic drinking, including age, physical activity, main sport or physical activity practised, context of practice, competitive level, and alcohol use.

For all logistic models, we computed univariate odds ratios (OR) for each factors, and adjusted odds ratios were computed for factors selected by a stepwise method (entry threshold $p < 0.15$). All analyses were performed for female and male students separately.

RESULTS

Sport sciences students' characteristics

Insert Table 1

Among sport sciences students involved in the survey in 2002 and in 2006, 13% (n=103) did not complete all the questions about alcohol consumption. Hence the analysis was based on data from 693 respondents. Table 1 provides the distribution of the population according to year of survey and sex, as well as the population's sports characteristics. Among males and females, there was no significant difference between students involved in the survey in 2002 and in 2006, regarding age and competitive involvement.

Sport sciences students' alcohol use and repeated heavy episodic drinking in 2002 and 2006.

Variations observed for male alcohol use were not significant for wine (44% in 2002 vs 36% in 2006, $p=0.067$), beer (58% vs 52%, $p=0.212$) and spirits (59% vs 58%, $p=0.778$), but male sport students were more likely to report at least 3 episodes of heavy drinking during the prior 12 months in 2006 (48%, vs 38% in 2002, $p=0.049$), and their mean age of first episode of heavy drinking has significantly decreased (15.8 vs 16.2, $p=0.038$). Among female sport sciences students, between 2002 and 2006, wine use (from 33% to 18%, $p=0.004$) and beer use (from 35% to 23%, $p=0.021$) decreased significantly, while spirits use (45% vs 42%, $p=0.293$), repeated heavy episodic drinking (from 27% vs 23%, $p=0.351$) and age at first episode of heavy drinking (16.5 vs 16.4, $p=0.655$) remained stable.

Insert Table 2

The logistic regressions confirmed the significant increase of repeated heavy episodic drinking for male sport students between 2002 and 2006 (see Table 2, adjusted OR=1.9 for 2006). Wine, beer and spirits use were all predictive of repeated heavy episodic drinking in univariate analysis. In multivariate analysis, the relationship between alcohol use and heavy episodic drinking was gender-specific. Among males, the adjusted OR was high for spirits use (8.9), smaller but significant for beer use (1.8), and negligible for wine use. Among females, adjusted OR were all significant and quite similar for wine (4.4), beer (3.5) and spirits use (5.3). Male students practising a team sport (other than soccer-football) were more likely to report repeated heavy episodic drinking (adjusted OR=1.5), while female students practising a martial art were less likely to do so (adjusted OR=0.2).

Sport sciences, law, and pharmacy students' sports characteristics

Insert Table 3

Since 14% (n=160) of the respondents did not complete all the questions about alcohol consumption, the analysis was based on data from 976 respondents. Table 3 provides the distribution of the population according to academic discipline and sex, as well as the students' sports characteristics. Among males and females, sport sciences students were more likely to practice a physical activity at least one hour, once a week ($p<0.05$), to practice both in formal and informal context ($p<0.05$), and were less likely to report no competitive participation ($p<0.05$).

Alcohol use and repeated heavy episodic drinking among sport sciences, law and pharmacy students

Among males, 36% of the sport sciences students reported drinking wine at least once a month, vs 58% of the law students and 46% of the pharmacy students. This difference was statistically significant ($p=0.004$). Other differences observed for male alcohol use were not significant for beer (52% vs 58% vs 59%, $p=0.41$) and for spirits (58% vs 64% vs 65%, $p=0.52$). Male sport sciences students were less likely to report at least 3 heavy drinking episodes during the prior 12 months in 2006 (48% vs 63% vs 58%, $p=0.047$). There was no significant differences in mean age of first episode of heavy drinking between the 3 groups of male students (15.8 vs 15.5 vs 16.1, $p=0.25$).

Among females, 18% of the sport sciences students reported drinking wine at least once a month, vs 28% of the law and 31% of the pharmacy students. This difference was statistically significant ($p=0.039$). Other differences observed for female alcohol use were not significant for beer (23% vs 19% vs 23%, $p=0.48$), and for spirits (42% vs 33% vs 32%, $p=0.41$). Female sport sciences students were less likely to report at least 3 heavy drinking episodes during the prior 12 months in 2006 (16%, vs 24% vs 27%, $p=0.035$). There was no significant differences in mean age of first episode of heavy drinking between the 3 groups of female students (16.4 vs 16.1 vs 16.6, $p=0.08$).

Insert Table 4

The logistic regressions confirmed the smaller propensity among male and female sport sciences students to report repeated heavy episodic drinking (see Table 4, adjusted OR=0.2 and 0.3 for males and females respectively). Among males and females, students practising a physical activity were less likely to report repeated heavy episodic drinking (adjusted OR=0.2 and 0.2), as well as students of both sexes practising martial art (adjusted OR=0.3 and 0.2). Others relationships between sport participation and heavy episodic drinking were gender-specific. Females practising individual sports were less likely to report heavy episodic drinking (adjusted OR=0.2). Among males, practising only in a formal context (adjusted OR=1.5), practising a team sport other than soccer-football (adj. OR=1.7), and competitive participation at a departmental or regional level (adjusted OR=1.8), were all related to repeated heavy episodic drinking.

The relationships between alcohol use and heavy episodic drinking were also gender-specific (Table 4). Among males, the adjusted OR was high for spirits use (12.1), smaller for beer use (1.7), and not significant for wine use. Among females, adjusted OR were all significant and quite similar for wine (4.9), beer (4.1) and spirits use (5.5).

DISCUSSION

The present study investigated the evolution of the pattern of alcohol consumption of sport sciences students from the University of Marseilles over a 4 years period. It also examined the relationships between sport practice and alcohol use and heavy episodic drinking among French students. Before discussing our results, we must acknowledge two limitations of the present study. First, although the sample was reasonably comprehensive in terms of gender, age, sport participation, and sport type, it was not completely representative of the French students population. However, the sporting characteristics of our sample were concordant with those found by previous studies in France. For instance, in our study 72% of law and pharmacy students of both sexes were involved in sporting activities, whether or not it took place within an institution. In their study conducted among young adults aged of 18.2, Lorente *et al.* (2004) found approximately the same proportion (76%) of respondents of both sexes being engaged in sporting activity. Moreover, we found among sport sciences students approximately the same proportion of participants being involved in competition at a departmental or regional level (59%) in comparison with that of sport sciences students (60%) involved in Lorente and Grélot (2003)' survey. Second, the fact that all the responses were based on self-reported measures requires cautious interpretations of our results, as what a

person says he or she does in terms of risk-behaviours may or may not conform to what he or she actually does. However, the procedure used for this survey in 2002 and in 2006 has proved itself in surveys investigating similar sensitive topics among young adults, as well as among elite athletes (Peretti-Watel, Guagliardo, Verger, Pruvost, Mignon, & Obadia, 2003; Peretti-Watel & Lorente, 2004). Moreover, studies exploring the validity of answers to questions about personal consumption of illicit substances have concluded that the self-completed questionnaire is a reliable tool for gathering information (e.g. Secades-Villa & Fernandez-Hermida, 2003).

Our results stressed the necessity of studying drinking behaviours for each gender separately, because predictors of heavy episodic drinking, and especially types of alcohol (wine, beer or spirits), were different for male and female students, as observed in France for the general population (Beck *et al.*, 2005). Even if male and female drinking behaviours are probably more similar among university students than among high-school pupils (Beck *et al.*, 2005), the campus-wide social norms that shape students' expectations and motives for alcohol use are certainly gender-specific.

The pattern of alcohol consumption of sport sciences students from the University of Marseilles has changed notably over a 4 years period. One of the most striking features of the present survey is that heavy episodic drinking was initiated earlier and became more frequent among males. To our knowledge, no study was available to compare these data to those of other researches in France, but such a result was in concordance with those of previous studies conducted in United Kingdom (Gill, 2002), New Zealand (Kypri, Langley, McGee, Saunders, & Williams, 2002), or United States (Wechsler *et al.*, 1997), finding that heavy episodic drinking is increasing among university students and sportspeople. However, we

must be cautious when comparing students from several countries regarding their alcohol consumption, as some cultural differences could potentially influence alcohol use and heavy episodic drinking. This may be particularly the case between American and French students, since there is a difference in the legality of drinking behaviour, which is 18 years in France as opposed to 21 in the United States. Moreover, as suggested by McAlaney and McMahon (2007) for United Kingdom students, French students may have a more permissive attitudes toward heavy episodic drinking than their American counterparts, since drinking is generally introduced within the home and at a young age.

The results of our study stressed the necessity to put sport sciences students' alcohol use into perspectives since, when compared with other students, they were less likely to report drinking wine at least once a month and repeated heavy episodic drinking. The difference found in alcohol use among sport sciences, law and pharmacy students may be due to several factors. First, there may be differences in social norms among various university schools. Another, and probably more important factor that could account much for the difference observed in drinking patterns among the three groups, may be that students involved in sport sciences are certainly more likely to be aware of health issues, and more focused on their physical well-being, health, and fitness. Further studies are needed to confirm theses hypotheses and to lead to new insight of research for adjusting prevention programs within university student populations.

Our results also corroborated the importance to take into account the context of practice and the type of sport practised to investigate the link between sport participation and alcohol consumption, as suggested by Peretti-Watel, Beck, and Legleye (2002). While engaging in physical activity, whether or not it takes place within an institution, represented a protective

factor, sport participation only in a formal context (i.e. within a club, an institution, or a federation), competitive participation at a departmental or a regional level, and practising team sports (other than soccer-football) were related to repeated heavy episodic drinking among males. A previous study had already shown that French young adults (whose mean age was 18.2) who practised in a formal context and at the regional level were more likely to report alcohol consumption (Lorente *et al.*, 2004).

Several interpretations may be proposed to explain why physical activity was negatively related to repeated heavy episodic drinking, while sport participation in a formal context, competitive participation and practising team sports were associated with heavy episodic drinking. It is possible that physical activity is a covariant of another variable we did not control for that reduces heavy episodic drinking propensity. Indeed, although cause and effect cannot be inferred, one can speculate that students being worried about their health and well-being are more likely to practice physical activity. In other words, students who practice physical or sporting activities may also tend to be focused on their well-being and health, and be at reduced risk of heavy episodic drinking. Indeed, physical activity is often presented as an effective source of psychological and social benefits that affect health (Dunn, Trivedi, and O'Neal, 2001; Sonstroem, 1984), and national surveys indicate a negative relationship between physical activity and consumption of harmful substances in France (French Health Education Committee, 1999).

The reason why the benefits involved by engaging in physical activity in an informal context appeared greater than those inherent to sport participation within a club is unclear, but we can speculate that sport participation within a club involves pressures of sport competition which lead athletes to use alcohol as a stress coping tool (Stainback, 1997; Tricker, Cook, &

McGuire, 1989) along with time, mental, and physical demands in terms of intense training. The reason for higher rates of heavy episodic drinking among team sports participants may be explained by the fact that team sports involve high levels of socialization with peers. Indeed, heavy alcohol use among young adults is often a product of normative social influences (Weitzman, Nelson, Lee, & Wechsler, 2003). In our survey, we wanted to examine the respondents' motives and preferred context for heavy episodic drinking, by mean of two open-ended questions. Unfortunately, only 24% and 25% of respondents answered these questions, and due to these low response rates we did not use these data in statistical analysis. Nevertheless, collected answers clearly showed that among team sport participants, heavy episodic drinking mainly takes place within the normative context of peer socialization and affiliation. Indeed, in 2006, most of team sport participants (58%) mentioned parties with team mates – before or/and after training or competition – as the preferred context for heavy episodic drinking, while 47% of the other respondents favoured the after-examinations parties. Previous studies (e.g. Leichliter *et al.*, 1998; Peretti-Watel *et al.*, 2002, Peretti-Watel *et al.*, 2003; O'Brien, Ali, Cotter, O'Shea, & Stannard, 2007) have suggested that team sport participation is related to significant pressure from team mates and coaches to drink together, in order to increase team cohesion and bonding (Leichliter *et al.*, 1998). Finally, we can speculate that the value of physical resistance and virility related to alcohol consumption might be highly enhanced within the context of certain team sports, e.g. rugby. In this vein, it is possible that being able to stand firm while drinking alcohol might be considered as a strong required quality for being part of the team, as much as being able to stand firm in the face of the opposite side while playing a match.

Individual sports and martial arts have been found to be negatively related to heavy episodic drinking in our study. These sports involve lower levels of socialization with peers in comparison with team sports. Other variables may be covariant of individual sport and martial arts and thus may be associated with lower risk of heavy episodic drinking. For instance, we can speculate that worrying about one's abilities to be very concentrated while practising, as well as about one's physical and mental well-being, may be inversely related to alcohol consumption.

The novelty of this article lies in its review of the relationship between sport and alcohol consumption within the context of French university students. Most other work in the area has been done in the United States, a country with quite a different drinking culture, particularly among young people. Further studies are needed to determine what factors are causing the observed associations between physical and sporting activities and decreased or increased risk of heavy episodic drinking among French students. We suppose that social and psychological factors related to sport experience (e.g. social integration, social support, concern about one's health and well-being, etc.) can mediate the risk of heavy episodic drinking. In this vein, it would be useful to have both quantitative and qualitative information about the motives for heavy episodic drinking and the context within which drinking behaviours generally occur, especially in the case of those athletes involved in team sports or in formal context of participation.

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