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## USAGE ET ABUS D'ALCOOL EN FILIERE STAPS, DE 2002 A 2013-16

### ALCOHOL USE AND INTOXICATION IN FRENCH SPORT UNIVERSITY STUDENTS, FROM 2002 TO 2013-16

**Auteurs : P. Peretti-Watel, C. Martha, F. Lorente, G. Doucende, V. Seror, L. Grélot**

#### RESUME

**Objectifs** : réaliser un suivi diachronique des usages et abus d'alcool parmi les étudiants de la filière STAPS depuis 2002, en prenant en compte le niveau de pratique et la discipline sportive. **Matériel et méthodes** : 905 étudiants de deuxième et troisième années ont rempli le même questionnaire déjà utilisé en 2002. **Résultats** : entre 2002 et 2013-16, les consommations de bière et les ivresses sont devenues plus fréquentes, en particulier parmi les filles, de sorte que les écarts entre sexes observés en 2002 se sont réduits, ce qu'illustre notamment l'évolution de l'âge à la première ivresse. L'usage d'alcool, le binge drinking et l'ivresse sont corrélés négativement avec le niveau de pratique, mais sont plus fréquents parmi les pratiquants d'un sport de glisse (pour les deux sexes) ou d'un sport collectif (hors football, et pour les garçons seulement). **Conclusions** : ces résultats sont d'autant plus importants qu'une partie de ces étudiants interagira avec des jeunes dans un futur proche. Nos résultats soulignent aussi la nécessité de mener sur ce sujet des analyses stratifiées par sexe. **Mots clés** : alcool, binge drinking, ivresse, étudiants, sport, France.

#### ABSTRACT

**Aims**: To monitor potential trends in patterns of alcohol consumption and intoxication in French sport science students since 2002; to investigate the relationship between competition level, type of sport and alcohol consumption and intoxication. **Material and Methods**: Second and third-year sport university students ( $n = 905$ ) completed the same anonymous self-report questionnaire used in 2002. **Results**: Between 2002 and 2013-16, among sport students, the frequencies of beer consumption and alcohol intoxication greatly increased, especially among females, and the gender differences observed in 2002 tended to reduce, as illustrated by the evolution of age at first intoxication. Alcohol use, binge drinking and intoxication were negatively correlated to the competition level. Practicing a sliding sport was correlated to drinking behaviors in both males and females, as well as team sports other than soccer but for males only. **Conclusions**: Such results raise concern, especially since these sport students are

likely to interact with youth in near future. Our results also corroborated the importance to investigate this topic for each gender separately.

**Key words:** alcohol, binge drinking, intoxication, students, sport, France.

## 1. INTRODUCTION

In the last two decades, there has been growing evidence that athletes consume alcohol more frequently and in larger quantities than their non-athlete counterparts, especially among high-school and university students (for literature reviews on this topic, see (1-5)). Sport participation had been shown to be positively associated with alcohol use (2) and this positive association was notably confirmed in a recent study conducted among French college students (6). This literature also shows strong gender differences: male athletes are more likely to engage in alcohol use, binge drinking and alcohol intoxication than female athletes (6-9), and drinking motives may also differ according to gender (10).

Such relationship between sport participation and alcohol use may seem ‘incongruous’ (11), as participating in sports is supposed to be a health enhancing activity whereas involvement in high-level sports also requires developing athletic abilities, in accordance with the deterrence hypothesis (12). Nevertheless, several theories have been proposed to explain the link between sport participation and drinking behaviors. These theories highlight the importance of the sporting context on drinking in relation with competitive levels and type of sports. For example, athletes may consider alcohol use as a coping strategy to alleviate competitive stress and anxiety; the sociability induced by participation in team sports may fuel alcohol use and abuse; and sports participation and alcohol use may be impelled by similar motives or values, such as sensation seeking for sliding sports (5, 12).

As regards alcohol consumption and intoxication among French sport science students, a previous study conducted in 2002 showed strong gender differences (9). Since then, replicate surveys had been conducted in 2013-16 and the aim of the present study was twofold: 1) to monitor potential trends in patterns of alcohol consumption and intoxication in French sport science students by comparing the data collected in 2002 and in 2013-16 ; 2) to investigate the relationship between competitive level, type of sport and alcohol consumption and intoxication.

## **2. MATERIAL & METHODS**

### ***2.1. Data collection***

We conducted a survey among university students from three sport sciences departments in southern France (Marseilles, Font-Romeu, and Gap). In order to reach a large sample size, we organized several sessions of data collection during tutorials between the fall 2013 and the fall 2016 semesters. At each session, it was made clear to students that they were free to refuse to participate, and that the survey was anonymous and strictly confidential, with no ‘right’ or ‘wrong’ answers. Each session lasted about 20 min. Participants sat one per table, each table separated from the others by at least 6 feet in all directions. An investigator was always present to ensure absence of communication between surveyed students. At the end of the session, questionnaires were placed in a ballot box. These procedures were identical to those used for the 2002 survey, and they were performed according to the French law on Human Care Guidelines, using protocols approved by the Human Care Committee at Aix-Marseille University.

### ***2.2. Questionnaire***

The self-reported questionnaire included 88 items characterizing the population in terms of demographics and sport practice (8 items), alcohol consumption and intoxication (14 items), and others substance use and abuse (66 items). It was the same questionnaire as in the 2002 survey, except for one additional item on binge drinking.

In the present study, we focused on the following items: gender, age, frequencies of alcohol consumption (never, less than once per month, 1 to 4 per month, 2 to 6 per week, every day, for beer, wine and spirits respectively); binge drinking (consuming at least five drinks at one time) and alcohol intoxication during the previous 12 months (never, 1 or 2, 3 to 5, 6 to 10, more than 10 times), age at first alcohol intoxication, main sport practiced and competitive level.

### ***2.3. Statistical analysis***

Answers to alcohol consumption-related items were merged into binary outcomes:  $\geq 2$  times per week versus less frequent for beer, wine, spirits;  $\geq 10$  times during the previous 12 months versus less frequent for binge drinking and intoxication. Regarding the main sport practiced, we encoded answers into 6 categories (as in (13)): soccer, other team sport (mainly rugby, handball, basketball), athletics, sliding sports (mainly skiing, sailing, windsurfing), combat sports (mainly boxing and martial arts), and other individual sports (tennis, swimming, gymnastics, etc.).

We first used  $\chi^2$  tests to compare the frequencies of alcohol use and intoxication (males versus females for each survey; 2002 versus 2013-16, for each gender) and a Student's t-test to compare mean age at first intoxication for male and female students. Regarding the relationship between competitive level, type of sport and alcohol consumption and intoxication, we focused on three binary outcomes: consuming either beer, wine or spirits  $\geq 2$  times per week; reporting at least 10 episodes of binge drinking during the previous 12 months; reporting at least 10 episodes of alcohol intoxication during the previous 12 months. We first used  $\chi^2$  tests, then we computed logistic regressions with a stepwise selection method (entry threshold  $p=0.1$ ), forcing age into each model. These analyses were performed for female and male students separately.

### **3. RESULTS**

All students who were present during the tutorials ( $n=1,268$ ) agreed to participate, but 6 questionnaires were excluded from analysis because either age or gender were not given or because of incomplete answers for alcohol-related items. First, in order to compare our results to those observed in 2002, we also restricted the sample to second- and third-year students ( $n=905$ ). In this sample, the mean age of respondents was  $20.0 \pm 1.5$  (mean  $\pm$  SD) years (*vs.*  $20.6 \pm 1.7$  on 2002); 34.1% were female (*vs.* 41.7% on 2002).

#### ***3.1. Alcohol consumption & alcohol intoxication, from 2002 to 2013-16***

Table 1 compares alcohol use and alcohol intoxication for male and female students, in 2002 and 2013-2016. In 2002, beer use, wine use, spirits use and alcohol intoxication were more frequent among male students when compared to their female counterparts. In 2013-16, this gender difference in alcohol use and intoxication remained significant, except for wine use. Regarding evolutions in alcohol use and intoxication from 2002 to 2013-2016, among male students, drinking beer at least two times per week became much more prevalent (19.5% in 2002, 30.7% in 2013-2016), as well as reporting at least 10 episodes of intoxication per year (from 19.2% to 34.1%), while wine use slightly decreased and spirits use remained stable. Among female students, we also observed dramatic increases in beer use and intoxication: in 2013-2016, 14.9% of female students reported drinking beer at least two times per week (versus 4.9% in 2002), and 17.8% reported at least 10 episodes of intoxication per year (versus 2.5% in 2002).

#### **Table 1.**

Figure 1 represents the percentages of subjects who had been intoxicated by gender and age, in 2002 and 2013-16 respectively. In 2002, we observed a strong gender difference: at age 16, half of male students had already experienced alcohol intoxication, versus about one third of female students, with a gap superior to 20 points at age 20. In 2013-16, sport students were more likely than in 2002 to report that they had already experienced alcohol intoxication, and they had it earlier, as the cumulative frequencies were higher at each age, for both males and females. In addition, this evolution was much more dramatic for female students: at age 16, almost 60% of those interviewed in 2013-2016 had already experienced intoxication, versus less than a third in 2002. As a result, the gap between male and female students narrowed substantially in 2013-2016, as the two corresponding curves are very close to each other. Regarding the mean age at first alcohol intoxication, the difference between male and female students was not statistically significant (15.8 versus 15.9,  $p=0.556$ ).

## Figure 1.

### *3.2. Type of sport, competitive level and alcohol use/intoxication.*

Among female students, those who were competing at a regional or a national level were more likely to report consuming alcohol at least twice a week than their international-level counterparts (27.2% and 26.8% respectively, with significant adjusted odds ratios (aOR), see Table 2), as well as those practicing mainly a sliding sport. Conversely, female students doing athletics were less likely to report such alcohol use, and they were also less likely to report at least ten episodes of binge drinking during the previous 12 months. Moreover, females practicing a sliding sport or a combat sport were more likely to report at least ten episodes of intoxication during the previous 12 months. Finally, after adjustment on other covariates, no significant relation was found between competitive level and either binge drinking or intoxication.

### **Table 2.**

Among male students of the 2013-16 population, after adjustment on other covariates, competitive participation at a regional level and practicing a team sport other than soccer were significantly related to both alcohol use (with respectively 42.9% and 44.9% of corresponding students reporting at least two episodes of alcohol use per week, see Table 3) and binge drinking (with respectively 66.7% and 72.1% of corresponding students reporting at least ten episodes of binge drinking during the previous 12 months). Regarding binge drinking, competing at an international level and doing athletics were significant protective factors (with aOR of 0.31 and 0.56 respectively), while practicing a sliding sport was another risk factor (aOR=1.65). Similarly, male students competing at an international level were less likely to report at least ten episodes of alcohol intoxication during the previous 12 months (16.2%, aOR=0.34), while those practicing a team sport other than soccer or a sliding sport were more likely to do so (respectively 50.0% and 39.4%, aOR=2.65 and 2.00).



### **Table 3.**

#### **4. DISCUSSION**

The present study monitored the evolution of the pattern of alcohol consumption among sport sciences students from southern France universities between 2002 and 2013-16. It also investigated the relationships between sport practice and alcohol consumption. Before discussing our results, we must acknowledge the main limitations of this study. First, the students sampled may not be representative of all French sport sciences students. Secondly, we used a self-reported questionnaire rather than objective measurement. Nevertheless, adolescents and young adults' self-reported drinking behaviors are considered quite reliable (14, 15).

According to previous studies conducted among large and national samples of French people aged 18 to 25, between 2005 and 2014, the prevalence of beer consumption, binge drinking and alcohol intoxication greatly increased, especially among college students and females, and as a result in this population males and females' drinking behaviors tend to get closer (16, 17). Our results are consistent with these trends, as between 2002 and 2013-16, among sport students, the frequencies of beer consumption and alcohol intoxication greatly increased, especially among females, and the gender differences observed in 2002 tended to reduce dramatically, as illustrated by the evolution of age at first intoxication. Nevertheless, the estimated frequencies were higher among sport students: for example, among French female college students, the prevalence of regular alcohol intoxication (at least 10 episodes per year) reached 2% in 2005, 7% in 2010 and 11% in 2014 (16), versus 2.5% in 2002 and 17.8% in 2013-16 among female sport students from southeastern universities. As for male students, this prevalence was found to remain stable between 2005 et 2014 (e.g. 13% in 2005 (16)) while it almost doubled in sport university students (19.2 in 2002, 34.1 in 2013-2016). Such results raise concern: beyond adverse health and social consequences of alcohol consumption, these sport students are likely

to interact with youth in near future, for example as physical education teachers or professional coaches.

Regarding competition level, the highest levels of alcohol use, binge drinking and intoxication were associated to regional and national level, while the lowest levels corresponded to international competitors, at least among male sport students. Previous studies found conflicting evidence on this point (7, 18). Such inverted U-shape relationship has been already observed (19), and it may reflect conflicting features. On the one hand, a higher competition level may induce more stress and be an incentive for drinking to cope with it, and high-level competitors may be more likely to consider drinking as a competition (trying to out-drink their peers) (20). On the other hand, at high competition level, the negative effect of alcohol use on athletic performance may become crippling, and young athletes may be more tightly controlled by their coach and their relatives.

Regarding the type of sport practiced, practicing a sliding sport was correlated to drinking behaviors in both female and male students. This result echoed previous studies which found a relationship between sliding sports, alcohol and cannabis use, among elite students-athletes trained in specialized public centers and among sport university students (21, 22). Both sliding sports participation and drug use may be impelled by sensation-seeking and express attachment to the same subculture (12). Moreover, among males only, team sports other than soccer were positively correlated to drinking behaviors. The relationship between team sports and drinking behavior is a well-documented one (13, 23-25), and in our study it should be noted that rugby was dominant among “other team sports” and the “third half-time” which takes place after the matches is a well-known tradition (26).

Finally, as the relationship between competition level, type of sport and drinking behaviors differed across gender, our results also corroborated the importance to investigate this topic for each gender separately.

## **5. ACKNOWLEDGEMENTS.**

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**Table 1. Self-report frequency of alcohol use and alcohol intoxication among sports science university students (southern France, 2002 & 2013-16).**

	2002		2013-16		Comparison of proportions **			
	Male (%) (n=395) <b>I</b>	Female (%) (n=282) <b>II</b>	Male (%) (n=596) <b>III</b>	Female (%) (n=309) <b>IV</b>	<b>I vs. II</b>	<b>III vs. IV</b>	<b>I vs. III</b>	<b>II vs. IV</b>
Alcohol regular use: $\geq 2$ times per week								
Beer	19.5	4.9	30.7	14.9	$<10^{-3}$	$<10^{-3}$	$<10^{-3}$	$<10^{-3}$
Wine	12.7	4.6	8.7	9.4	$<10^{-3}$	0.727	0.043	0.023
Spirits*	15.8	3.2	13.0	6.8	$<10^{-3}$	0.005	0.215	0.047
Alcohol intoxication: $\geq 10$ during the previous 12 months	19.2	2.5	34.1	17.8	$<10^{-3}$	$<10^{-3}$	$<10^{-3}$	$<10^{-3}$

\* Whisky, vodka, gin, pastis, etc. \*\* p-value for the  $\chi^2$  test.

**Table 2. Competitive level, type of sport and drinking behaviors among sports science university female students (southern France, 2013-16).**

	Alcohol use: ≥2 times per week*		Binge drinking: ≥10 (previous 12 months)		Alcohol intoxication: ≥10 (previous 12 months)	
	%**	aOR [CI90%] #	%	aOR	%	aOR
age	___	1.47 [1.24;1.75]	___	1.24 [1.07;1.44]	___	1.12 [0.95;1.33]
Competitive level:	<i>p=0.096</i>		<i>p=0.806</i>		<i>p=0.830</i>	
-departmental (ref.)	14.5	-1-	33.3	-1-	19.7	-1-
-regional	27.2	2.73 [1.50;4.94]	37.0	ns	18.5	ns
-national	26.8	2.16 [1.19;3.93]	37.8	ns	14.6	ns
-international	22.2	ns ##	27.8	ns	16.7	ns
Type of sport:	<i>p=0.162</i>		<i>p=0.004</i>		<i>p=0.096</i>	
-soccer	12.5	ns	12.5	ns	12.5	ns
-other team sports	22.7	ns	43.2	ns	15.9	ns
-athletics	4.0	0.15 [0.03;0.85]	4.0	0.07 [0.01;0.37]	4.0	ns
-sliding sports	31.7	1.97 [1.02;3.79]	46.3	ns	26.8	2.05 [1.07;3.94]
-combat sports	29.4	ns	47.1	ns	35.3	3.23 [1.33;7.87]
-other individual sports (ref.)	22.2	-1-	34.5	-1-	17.0	-1-

\* for either beer, wine or spirits.  
\*\* column percentages.  
#: adjusted odds ratios computed from dichotomous logistic regressions, confidence intervals at 90%.  
##: variable not selected by the stepwise method.

**Table 3. Competitive level, type of sport and drinking behaviors among sports science university male students (southern France, 2013-16).**

	Alcohol use: ≥2 times per week*		Binge drinking: ≥10 (previous 12 months)		Alcohol intoxication: ≥10 (previous 12 months)	
	%**	aOR [CI90%] #	%	aOR [CI90%]	%	aOR [CI90%]
age	—	1.03 [0.94;1.12]	—	0.93 [0.85;1.02]	—	0.92 [0.84;1.02]
Competitive level:	<i>p=0.033</i>		<i>p&lt;10<sup>-3</sup></i>		<i>p=0.014</i>	
-departmental (ref.)	29.8	-1-	47.9	-1-	30.3	-1-
-regional	42.9	1.47 [1.09;1.98]	66.7	1.65 [1.22;2.25]	34.8	ns
-national	36.6	ns	58.4	ns	41.6	ns
-international	27.0	ns ##	27.0	0.31 [0.16;0.61]	16.2	0.34 [0.16;0.73]
Type of sport:	<i>p=0.066</i>		<i>p&lt;10<sup>-3</sup></i>		<i>p&lt;10<sup>-3</sup></i>	
-soccer	30.8	ns	53.3	ns	24.3	ns
-other team sports	44.9	1.49 [1.06;2.08]	72.1	2.23 [1.54;3.23]	50.0	2.65 [1.88;3.72]
-athletics	24.4	ns	36.6	0.56 [0.32;0.99]	17.1	ns
-sliding sports	39.4	ns	57.7	1.65 [1.04;2.61]	39.4	2.00 [1.27;3.16]
-combat sports	40.9	ns	47.7	ns	34.1	ns
-other individual sports (ref.)	32.1	-1-	51.3	-1-	29.4	-1-

\* for either beer, wine or spirits.  
\*\* column percentages.  
#: adjusted odds ratios computed from dichotomous logistic regressions, confidence intervals at 90%.  
##: variable not selected by the stepwise method.



Figure 1. Gender difference in the cumulative frequencies of the age at first alcohol intoxication among sports science students (2002 & 2013-16).

