



# Use and Abuse of Alcohol in UK University Sport

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#### 2 EXECUTIVE SUMMARY

#### 2.1 Background

- 1) Previous evidence on the relationship between sport participation and alcohol consumption among students is ambiguous, with some studies reporting that students who take part in university sport drink less than their peers and other studies that they drink more. There has been a suggestion that involvement in sport can be a protection against hazardous drinking among students.
- 2) To investigate these issues, a survey was carried out in a purposive sample of 826 students from 7 HE and 2 FE institutions, with a range of geographical locations in England. Institutions also differed in their commitment to sport. Although the sample was not intended to be representative of the student population in the UK, it was roughly comparable in age and gender breakdown but contained a slightly higher proportion of students from a Black ethnic background.

#### 2.2 Method

- 3) Students were selected from a range of degree courses and completed a survey questionnaire at the beginning or end of lectures.
- 4) The instrument used to measure alcohol consumption and related behaviour was the *Alcohol Use Disorders Identification Test* (AUDIT). In addition to socio-demographic information, other instruments were included in the questionnaire to throw light on the nature of the relationship between sport participation and alcohol consumption.

#### 2.3 Findings

5) Mean score on the AUDIT in the overall sample was 9.5. This is higher than the cutpoint for the designation of an alcohol use disorder. 61% of the sample was classified as having an alcohol use disorder by the AUDIT, rising to 68% when students who had never drunk or tasted alcohol, mainly for religious reasons, were excluded from the analysis.

- 6) According to the AUDIT, 39% of the overall sample was classified as "low-risk drinkers", 41% as "hazardous drinkers", 11% as "harmful drinkers" and 9% as showing "probable dependence".
- In terms of how often students drank, the largest proportion (39%) reported doing so 2-3 times per week. On a typical drinking occasion, 26% said they drank only 1-2 drinks but 21% drank 7-9 drinks and 20% drank 10 drinks or more. Over a third of students (35%) engaged in 'binge drinking' (6 or more drinks on one occasion) on a weekly basis. Although comparisons with previous British studies are difficult, this suggests heavier drinking among students now than in the past. It is not clear whether students in England drink more than their age-group peers in the general population.
- 8) There were large and highly significant differences in AUDIT scores between the institutions taking part in the survey, with a range of means from 4 to 14.
- 9) There was no significant difference between the mean AUDIT scores of men and women and no difference between men and women in the proportions falling into AUDIT risk categories, although men drank significantly larger quantities on single occasions. Nevertheless, this evidence suggests that the "gender convergence hypothesis" regarding alcohol consumption applies to students in England.
  - 10) Compared with students who did not play university sport, those who did showed a significantly higher mean AUDIT score and a higher proportion classified as having an alcohol use disorder. They also reported drinking more frequently and in larger typical quantities, and binge-drank more often.
- 11) Contrary to expectations, there were no significant differences in AUDIT scores according to the competitive level of sport played.

- 12) Students who took part in team sports showed a higher mean AUDIT score than those who took part in individual sports, with the highest scores associated with traditional team sports involving 11 or more per side (e.g., rugby, football and hockey). 84.5% of students who played team sports were classified as having an alcohol use disorder.
- 13) 1<sup>st</sup> year students showed a significantly higher mean AUDIT score than 3<sup>rd</sup> year students, who in turn showed a significantly higher mean score than 2<sup>nd</sup> year students. When 'never drinkers' were excluded from the analysis, there was no longer a significant difference between 2<sup>nd</sup> and 3<sup>rd</sup> year students.
- 14) Mean AUDIT for students on sport-based courses was significantly higher than for those on non-sports-based courses, a difference that was maintained when 'never drinkers' were excluded from the analysis.
- 15) Students living on-campus had a higher mean AUDIT score than those living off-campus, who in turn had a higher mean score than those living with family.
- 16) In the overall sample, there was a modest but significant negative correlation between AUDIT total score and student age, with older students tending to show lower AUDIT scores.
- 17) In a logistic regression analysis, sport participation was not an independent predictor of an alcohol use disorder when other background variables were taken into account. The strongest predictors of an alcohol use disorder were the institution attended, age and term-time living arrangements.
- 18) In a further logistic regression analysis, significant predictors of sport participation were the institution attended, age, type of degree course, year of study and term-time living arrangements.
- 19) Students playing sports were significantly more likely to identify with the athlete role as measured by the *Athletic Identity Measurement Scale* (AIMS) than students not

- playing sports but the correlation between AIMS and AUDIT total score was low and not significant.
- 20) The sample as a whole was low on readiness to change drinking behaviour as measured by the *Readiness to Change Questionnaire* (RCQ) and students playing sport were not more ready to change than those not playing sport.
- 21) Over half of students in the hazardous drinking category (59%) were in the Precontemplation stage and therefore apparently not concerned about their drinking. Even at the highest level of risk (probable dependence), nearly 30% were unconcerned about their drinking and over 50% were still contemplating change. Among those classified as having an alcohol use disorder, 51% were in the Precontemplation stage, 27% were in the Contemplation stage and 22% were in the Action stage.
- 22) In terms of alcohol outcome expectancies, as measured by the *Drinking Expectancy Questionnaire* (DEQ), in the overall sample the highest subscale scores were for Sexual Enhancement, Assertion and Tension Reduction. Correlations between AUDIT total scores and DEQ total and subscale scores were significant, with large effect sizes for the DEQ total score and for the Assertion and Dependence subscales. However, there was very little difference between sport and non-sport participants on subscales or total score from the DEQ.
- When degrees of misperception of drinking norms were calculated, misperceptions of quantity of drinking and frequency of drunkenness tended to decrease with age. There were low but significant correlations between AUDIT total score and degree of misperception of frequency of drinking and for quantity of drinking but these were probably due to chance.

#### 2.4 Conclusions

24) Alcohol consumption and alcohol use disorders in this sample were very high. Assuming that the figures recorded here reflect drinking behaviour in the student population in England, this is a cause for grave concern. Central government, local authorities and university and college authorities should take urgent measures to restrict the easy availability of cheap alcohol to students.

- 25) The lack of difference between genders in proportions showing alcohol use disorders is especially alarming in view of women's greater vulnerability to the damaging effects of heavy drinking. Particular attention should be paid to measures aimed at reducing alcohol consumption among female students.
- 26) A particular risk factor for the development of alcohol use disorders seems to be the 1<sup>st</sup> year of student life combined with on-campus accommodation. University and college authorities should develop policies aimed at reducing drinking among 1<sup>st</sup> year students living in halls of residence.
- 27) There is an urgent need for the wide implementation of brief interventions, treatment and treatment referral mechanisms among students with alcohol use disorders and who are ready to change drinking behaviour. Internet-based brief interventions should be targeted at students drinking at hazardous levels, face-to-face brief motivational counselling at students showing harmful drinking and the offer of treatment on-campus or referral to treatment off-campus for those showing probable dependence.
- 28) In the present sample, students playing sport showed clearly higher levels of alcohol consumption and alcohol use disorders than those not playing sport and there was no evidence to support the suggestion that sport participation by students can protect against hazardous drinking. Instead, sport participation may be a risk factor for the development of alcohol use disorders.
- 29) Research is needed to find effective ways of breaking the link between sport participation and heavy drinking by students.
- 30) A hypothesis based on the present findings is that heavier drinking among students who take part in sport is not the result of sport participation *per se* but is related to other demographic and background variables associated with both heavier drinking and sport participation (e.g. attendance at heavier drinking universities, younger age and oncampus term-time accommodation). This hypothesis should be tested in further research.

#### 3 BACKGROUND

Alcohol abuse is a leading global cause of mortality and morbidity and is ranked above tobacco in terms of Disability Adjusted Life Years (Rehm et al., 2009). Heavy episodic drinking is particularly harmful (Rehm et al., 2003). Negative consequences of heavy alcohol consumption include harmful behaviours such as drink-driving (Wilsnack, Wilsnack & Klassen, 1984), unplanned sexual activity and increased violence (Newbury-Birch White & Kamali, 2000; Ross & DeJong, 2008), drug use and increased risk of injury (Ross & DeJong, 2008). In addition, excessive alcohol consumption has been shown to be causally related to conditions such as hypertension, stroke and liver disease (Corrao, Bagnardi, Zambon & Le Vecchia, 2004). For women in particular, high alcohol consumption levels have been found to be related to obstetric and gynaecological problems (Wilsnack et al., 1984) and alcohol-dependent women have been found to have increased likelihood of osteoporosis (Hernandez-Avila et al., 1991).

#### 3.1 At risk groups: Students

Within the sub-population in the UK, young people have been found to be a particular cause for concern in terms of excessive alcohol consumption. High levels of intoxication and binge drinking have been reported in UK teenagers and these levels have been found to be higher than those reported for European teenagers (Miller & Plant, 2001; Smart and Ogborne, 2000). Similar findings have been reported across studies. Whilst there is a concern regarding levels of teenage drinking, the 18-24 age group has been specifically highlighted as a cause for concern. This age group has been identified as showing the highest rates of alcohol use and problem drinking (Kandel & Logan, 1984).

Little data exists on alcohol consumption patterns of 18-24 year olds in the UK. However, within the sub-population of 18-24 year olds, UK university students have been identified as being of particular concern in relation to excessive consumption of alcohol (Webb, Ashton, Kelly & Kamali, 1996). Several studies also imply a possible relationship between drinking and poor academic performance (see Gill, 2002).

The majority of university students drink alcohol (Webb, Ashton, Kelly & Kamali, 1997), with over half classified as moderate or heavy drinkers (Wechsler, Dowdall, Davenport & Castillo, 1995a). Research into student drinking both in the USA and UK has

found that university students drink alcohol on average above the 'sensible limits' recommended by government and health authorities (Webb et al., 1996), with two in every five university students found to be binge drinkers (Wechsler, Davenport, Dowdall, Moeykens & Castillo, 1994).

According to Ross and DeJong (2008), the start of university tends to coincide with the start of, or increase in levels of, alcohol consumption. Aertgeerts and Buntinx (2002) found that in Belgium, 14.2% of the first year students in their survey could be classified as suffering from alcohol abuse and dependence, whilst 3.6% were alcohol dependent. Importantly, those students who reported drinking above recommended limits at the start of their course were highly likely to still be drinking at those levels in their final year of study.

Whilst it is known that students tend to consume relatively high levels of alcohol, little is known about subsets within the student population who may be at particular risk of heavy alcohol consumption. Previous studies in the UK (Collier and Beales, 1989) have identified some student groups, specifically medical and dental students, who have particularly high drinking levels compared to their non-student counterparts. However, these students have not been compared to students on other degree courses and there are therefore grounds for further investigation of the impact of degree course upon consumption. Other key variables that have been found to have an impact on levels of student alcohol consumption include sport participation, gender, year of study and accommodation (on versus off campus)

#### 3.2 Student athletes

One key variable that has been looked at in the US and New Zealand, but not yet in the UK, is the impact of participation in university sport on alcohol consumption. The relationship between university sport involvement and alcohol has been described as ambiguous (Miller, Wilbourne & Hettema, 2003). Some studies have indicated low levels of alcohol consumption among students involved in university sport (Anderson Albrecht, McKeag, Hough & McGrew, 1991; Donato et al., 1994), whilst others have indicated that students involved in university sport drink excessively (Evans, Weinberg & Jackson, 1992; Leichliter, Meilman, Presley & Cashin, 1998; Miller, Wilbourne et al., 2003; Nattiv & Puffer, 1991; O'Brien, Blackie & Hunter, 2005).

It has been suggested that high motivation towards physical fitness, linked to identification with athletic prowess, places limits on alcohol consumption. In addition some sports clubs and teams have strict rules against drinking (Bower & Martin, 1999). Due to findings such as those described above, it has been suggested that encouragement to undertake substance-free extracurricular activities, such as team-based sports, may serve as an effective intervention to reduce university student hazardous drinking behaviour (Murphy, Correia, Colby & Vuchinich, 2005; Polymerou, 2007).

However, as the majority of studies, including the National Collegiate Athletic Association (NCAA) survey of student athletes (Green, Uryasz, Petr & Bray, 2001), have indicated that students involved in university sport actually drink excessively and drink more than their non-sporting student peers (Evans et al., 1992; Leichliter et al., 1998; Miller, Wilbourne et al., 2003; Nattiv & Puffer, 1991; O'Brien et al., 2005; O'Brien, Hunter, Kypri & Ali, 2008), university athletes have been highlighted as an at risk group. Even students competing only in organised recreational sports have been found to drink more than those students who do not participate in university based sport (Ward & Grycznski, 2007).

In particular, student athletes have been found to exhibit high levels of binge drinking (O'Brien et al. 2008), and to binge drink at levels that are higher than those found in students who do not participate in university sport (Doumas, Turrisi & Wright, 2006). The number of student athletes reporting that they drink 10 or more drinks in one sitting has significantly increased between 1989 and 2005 (Thompson & Sherman, 2007). Findings such as these have led to student athletes being identified as a 'high risk' group in the USA (Ford, 2007; Slutske, 2005). There is currently no UK data to compare with these findings. However, research by Sparkes, Partington and Brown (2007) has identified binge drinking to be an integral part of university team sport culture in the UK.

In the US it is not currently clear whether university sport promotes or protects against student hazardous drinking. In the UK this issue has yet to be addressed. Thombs (2000) has suggested that the ambiguity may stem from the fact that, while athletes may not exceed non-athletes in terms of *frequency* of drinking, they do exceed them in the *quantity* of alcohol ingested at each drinking session.

US and New Zealand research into student athletes and their drinking has looked at a range of potential factors that might influence the relationship. Key factors identified to date include sport type and level of involvement. In terms of the impact of sport type, Ford (2007) found that female soccer players and male hockey and baseball players drank more than participants in other sports, and that runners of both sexes drank the least when compared with other sports. It is possible that these findings are reflective of the social element associated with team sports. A study by O'Brien and Lyons (2000) reported that alcohol consumption is intertwined with the social aspects of sport participation. In relation to this, it has also been reported that athletes have more friends and place more importance on socialising than non-athletes (Nelson & Wechsler, 2001).

If a relationship between student drinking and sport participation exists, it would be useful to explore the nature of this relationship more closely. One possibility is that the relationship might be moderated by the degree to which the student identifies with the athlete role. It may be that high motivation towards physical fitness, suggested by identification with athletic prowess, places limits on alcohol consumption.

Leichliter et al. (1998) suggested that the more involved an athlete was in their sport, the heavier their levels of consumption. This finding is supported by the fact that those athletes most heavily involved in their teams (e.g. team captains) were found to evidence the heaviest alcohol use. In addition, Nelson and Wechsler (2003) reported that those students who had a strong interest in sport had the highest rates of binge drinking. Miller, Hoffman et al. (2003) completed a study of 600 New York adolescents and found that self identified 'jocks' were more likely to engage in problem drinking than their non-jock counterparts. They recommended that beliefs, values and behavioural dispositions associated with the 'jock' identity need to be examined more closely. The Athletic Identity Measurement Scale (AIMS) developed by Brewer, Van Raalte and Linder (1993) is one tool that assesses the level to which a person identifies with the athlete role. This tool has not previously been used in exploring student athlete drinking behaviour.

Further explanations for the increased consumption levels associated with university sport participation include the potential risk-taking personality that may be required to be a successful university athlete (Martens, Dams-O'Connor & Beck, 2006; O'Brien & Lyons, 2000). In relation to this, it has been reported that there is a 'work hard, play hard' mentality

associated with sport participation that may encourage drinking to excess (Leichliter et al., 1998). Garry & Morrissey, (2000) in a survey conducted in the USA with middle school pupils, found that those on sports teams were more likely to engage in risk taking behaviour including consumption of alcohol. Finally it has been suggested that the high rates of alcohol consumption among student athletes may be reflective of their use of alcohol to cope with both performance and academic pressures (Leichliter et al., 1998).

Having identified students as a whole as an at risk group in terms of alcohol consumption, with the possibility of student athletes being particularly at risk, it is important to further explore the relationship between university sport participation and drinking. Knowledge of the underpinning factors associated with student drinking may help to shape effective interventions, more specifically interventions that can be directly tailored to student athletes.

#### 3.3 Gender

The majority of studies identify that in general males drink more alcohol than females (Nolen-Hoeksema, 2004; Wilsnack, Vogeltanz, Wilsnack & Harris, 2000). Such findings would suggest that males are a key 'at-risk group'. However, research has indicated that the gender gap is decreasing (Bloomfield, Gmel, Neve & Mustonen, 2001; McPherson, Casswell & Pledger, 2004). In fact Granville-Chapman, Yu and White (2001) found no differences in alcohol consumption levels of second year male and female students in the UK.

Some studies have even suggested that female students have higher rates of consumption and binge drinking than male students (Pickard, Bates, Dorian, Greig & Saint, 2000; Underwood & Fox, 2000). Further studies have indicated that whilst male students tend to drink more frequently and consume more than females (Nolen-Hoeksema, 2004; Wilsnack et al., 2000); the risk of dependence is greater for females (Bradley, Boyd-Wickizer, Powell & Burman, 1998).

Within the 18-24 age group female students have been identified as a specific cause for concern, particularly since it is believed that the drinking habits of female students are underestimated (Gill, 2002; Wechsler, Dowdall, Davenport & Rimm, 1995b). Whilst men may still be drinking more than women, it must also be remembered that women can be at equal risk with men with less consumption, since they are less proficient than men in

metabolising alcohol (Wechsler et al., 1995b). Preliminary findings to date provide grounds for considering UK female university students as a potential 'at risk' group that require further investigation.

#### 3.4 Year of Study & Accommodation

There is some debate in the literature regarding typical patterns of alcohol consumption as a student progresses through university. Newbury-Birch, Lowry and Kamali (2002) found no overall change in the mean alcohol consumption levels of UK dental students from second to final year. However, in the same study, medical students were found to demonstrate an increase from their second to their final year. In contrast, Bewick et al. (2008a), also looking at UK students, reported that first year students drank at the highest levels. Similarly, Engs and Hanson (1988) found that older students tended to drink less frequently and more in moderation than younger students.

Factors such as relocation and transition, reduction in parental authority/distance from parents (White & Jackson, 2004), and the significance attributed to alcohol in relation to the social aspects of university culture (Ross & Dejong, 2008) may partially explain why some studies have found heightened levels of consumption in first year students (White & Jackson, 2004). In addition it has been noted that first year students tend to live on campus (Kypri, Langley, McGee, Saunders & Williams, 2002). According to Kypri et al. (2002) the environment engendered by living in campus based accommodation may promote increases in alcohol intake. Campus social events (Kypri et al., 2002), close proximity to peers (Kuntsche, Rehm & Gmel, 2004) and easy access to cheap alcohol (Ross & DeJong, 2008; Weitzman, Nelson & Wechsler, 2003) are all factors that have been put forward to explain the relationship between living in campus accommodation and increased alcohol consumption.

Explanation for lower levels of drinking in the final year has centred upon increasing responsibility, greater concern and motivation for and importance placed on coursework and grades and growing thoughts about future careers (Bewick et al., 2008a; Steinman, 2003; White & Jackson, 2004). Explanations for higher levels of alcohol consumption in final year students focus upon the stress associated with the completion of the final stages of a degree. Newbury-Birch, Walshaw, and Kamali (2001) in a study of medical students found that the students increased their drinking from their second year to the final year to one year after

PRHO (pre-registration House Officer). One of the main reasons given for this increase in consumption was the stress experienced during the final year and during the first year post qualification.

#### 3.5 Why do students drink?

#### 3.5.1 Alcohol expectancies

A variable that might mediate the relationship between student status and heavy drinking is that of alcohol expectancies. According to alcohol expectancy theory (Goldman, Del Boca, & Darkes, 1999; Jones, Corbin & Fromme, 2001), beliefs about the effects of alcohol (i.e. alcohol expectancies) are formed at an early age and influence decisions to drink throughout the lifetime. It is likely that certain kinds of alcohol expectancies are implicated in the heavy drinking evidenced by university students.

For example, Oei and Jardim (2007) found in a group of Caucasian students that there was an expectation that alcohol would reduce tension and increase confidence and sexual interest. Other positive expectancies found in student samples include the belief that alcohol relieves tension and makes socialising easier (Park, 2004), positive enhancement motives (Cooper, Frone, Russell & Mudar, 1995), drinking to cope (Martens, Cox, Beck & Heppner, 2003) and drinking to forget personal disappointment (Cutter & O'Farrell, 1984). In terms of negative expectancies, a relationship has been reported between alcohol consumption and drinking to escape (Greenfield, Harford & Tam, 2009).

#### 3.5.2 *Normative beliefs and misperceptions*

In recent research on student drinking a topic that has attracted much attention is that of normative beliefs created by an individual's perceptions of another's behaviour (Borsari & Carey, 2001). Research has shown that university students typically misperceive peer norms by overestimating the amount of alcohol consumed by fellow students (McAlaney & McMahon, 2007; Perkins, 2007). In particular, as the social gap widens from the individual (closest friend, average student of the same age, average person of the same age), the higher they perceived alcohol intake to be.

The overestimation of the consumption levels of others has been found to be associated with increased alcohol consumption and increased incidence of alcohol-related problems (Neighbors, Lee, Lewis, Fossos & Larimer, 2007). As explained by McAlaney &

McMahon (2007), if individuals perceive that everybody else drinks more than they do, they may use this to rationalise their own personal alcohol consumption and therefore increase their intake accordingly.

It has been suggested that level of misperception is associated with personal alcohol consumption, with those who drink the most showing the greatest degree of misperception (McAlaney & McMahon, 2007; Perkins, 2007). Conversely, misperception has been found to decrease with age. This indicates that as students mature they have a greater understanding and awareness of the true drinking behaviour of others and possibly a reduced need to justify their own drinking behaviour (McAlaney & McMahon, 2007).

It is clear that like drinking expectancies, normative beliefs have a key role to play in the prediction of student drinking behaviour (McAlaney & McMahon, 2007). As such there is a need to look further at the normative beliefs of students in the UK. McAlaney and McMahon also suggest that normative-belief interventions would make a useful contribution to intervention design. In relation to alcohol intervention and behaviour change a further key concept to consider is students' readiness to change their drinking behaviour.

#### 3.6 Students' readiness to change their drinking behaviour

When investigating the extent of hazardous and harmful drinking in a student sample, it is important to ascertain whether or not heavy drinking students are concerned about their drinking and whether or not they have tried to limit drinking because of these concerns. This may be done by reference to the concept of stages of change as part of the Transtheoretical Model developed by Prochaska and DiClemente (1986) and by using one of the instruments that has been developed to measure this construct such as the Readiness to Change Questionnaire (RCQ) by Heather and Rollnick (2000).

The stages of change are an attempt to describe the stages through which a person moves in an intentional effort to resolve an addictive disorder. Each stage represents a set of specific tasks the person needs to address to make progress. From "pre-contemplation" through "contemplation" and "action" to "maintenance", the person is assumed to pass from one stage to the next, with the "relapser" re-entering the cycle at either the pre-contemplation or contemplation stages (see Prochaska & DiClemente, 1986). The Readiness to Change Questionnaire does not ask directly about readiness to receive an intervention but it does ask

about the respondent's willingness to change their drinking behaviour, which has important implications for interventions aimed at reducing drinking.

There have not been any studies of readiness to change drinking behaviour among UK university students but there have been several such studies in the USA (Caldwell, 2002; Capone & Wood, 2009; McNally, Palfai & Kahler, 2001; Shealy, Murphy, Borsari & Correla, 2007; Vik, Culbertson & Sellers, 2000). Both Caldwell (2002) and Vik et al. (2000) found that even in heavy drinking students there was a lack of interest in changing drinking behaviour.

#### 3.7 The Current Study

Having briefly reviewed the literature on student drinking, it is clear that there is a need for further investigation into the alcohol consumption patterns of UK university students. Much of the research on student based samples has been carried out in the US, where the culture and indeed the drinking age are different to the UK. The most recent wide ranging study of UK student drinking was completed by Webb in 1996, whilst other UK based studies have focused on specific groups of students, as opposed to the general student population (Collier & Beales, 1989; File, Mabbutt & Shaffer, 1994; Newbury-Birch et al., 2002; Underwood & Fox, 2000).

Significantly none of the studies carried out into drinking patterns in UK university students have investigated the relationship between involvement in university sport and student drinking. The current study therefore aimed to investigate the relationship between participation in university sport and alcohol consumption. In exploring this relationship information was also gathered regarding factors that might moderate this relationship.

#### 4 METHOD

#### 4.1 Sample

A purposive sample of university (Higher Education: 7 institutions) and Further education (FE: 2 institutions) students was selected to give a range of participation in sport, types of degree course, British Universities Sport Association (BUSA) rankings and geographical locations both by area within England and in terms of proximity to city centres etc.. Commitment to sport was determined by the institution's final position in the preceding (2006/2007 season) year's BUSA championship table. The original intention was to recruit from HE institutions only. However, one university experienced problems in gaining ethical approval for the study and was forced to withdraw. This meant that it was necessary to recruit from 2 FE colleges to try to achieve the requisite number of participants (see power analysis below).

At each institution participants were recruited from both science-based and arts-based degree courses using the Joint Academic Coding System (JACS). JACS is a subject classification used by UCAS, the organisation responsible for the university application process, to code courses by the subjects from which they are comprised. Each main subject area is given a code, i.e., a letter of the alphabet. A course can thus be described by the letter codes for the subjects contained within the course. In the current study, courses from the five most popular subject areas were targeted. These were: subjects allied to medicine (B), biological sciences (C), social studies (L), business and administrative law (N) and creative arts and design (W). Thus any course containing those letters was targeted.

Given the specific interest in comparing students studying sport- and non-sport-based degree subjects, at institutions where sports science was available as an undergraduate course, this was the targeted science-based course. However, to reduce bias, institutions where sports science was not an undergraduate course option were included and, where there was no sport science course, an alternative biological science course or a subject allied with medicine was chosen.

A list of potential partner institutions was created based upon the agreed selection criteria and a key contact person at each institution was identified. Each was contacted via an email which provided information regarding the nature and scope of the project. The role of

the contact person was outlined with the key aspect being to act as a facilitator to the data collection. Thus the contact person's main remit was to negotiate access to students on selected courses at their institution and to support the research assistant in administering the questionnaire battery on site. The contact person was also asked to assist in the process of gaining ethical approval at their institution by advising on institutional ethics procedures and acting as a point of contact for the ethics approval process.

Once each key contact person agreed to assist the project, they were sent a letter detailing the study protocol and, using this information, they worked with the research team to gain ethical approval at their institution. Once the project had gained ethical approval the research assistant and the key contact person collaborated to arrange a data collection session at that institution. The main phase of the data collection took place between October 13<sup>th</sup> 2008 and May 20<sup>th</sup> 2009.

#### 4.2 Power analysis

The main comparison of interest was between students taking part in university sport and those not taking part and it was aimed to recruit 300 students in the former category and 500 in the latter. For a comparison between the means of two independent samples and a two-tailed test with  $\dot{\alpha}=0.05$ , these sample sizes would give 90% power to detect an effect size of d=0.2 (G\*Power 3.0.10), conventionally regarded as a small effect size. Two-tailed tests were appropriate because there are reasons to believe that the difference in alcohol consumption means between sport and non-sport students could be in either direction (see below).

Power to detect differences between groups relating to subsidiary analyses could be less than that for the main comparison, depending on the numbers recruited in each of the relevant groups and the nature of the comparison involved (e.g. team vs. individual sport participants, male vs. female students, year of degree course, levels of sports participation, etc.).

#### 4.3 <u>Testing procedure</u>

Once ethical approval had been confirmed and courses selected, participants were given a questionnaire booklet to complete which was handed out either at the start or end of a lecture. This particular protocol has been found by previous research (Pickard et al., 2000; Webb et

al., 1996; 1997) to yield the best response rates. While it was not recorded how many potential students in the selected lectures did not participate, from the 837 who did and returned questionnaires, only 11 questionnaires were not sufficiently completed to be included in the study, thus giving a sample size of 826. We were not able to account for students who did not attend the lectures at which the questionnaire battery was completed. It is possible that these students had higher levels of alcohol consumption than those who did attend and that their alcohol consumption was related to their non-attendance at lectures (Gill, 2002).

Testing took place over a full academic year. The aim was to collect data regarding typical drinking behaviour. For this reason care was taken to ensure that key times when drinking would likely be increased (e.g. freshers' week) or reduced (e.g. exam periods) were avoided in data collection.

#### 4.4 Questionnaire booklet

The booklet consisted of the following questionnaires (for the questionnaire booklet in full, see Appendix 1):

- Participant information sheet (detachable). The survey was not anonymous as each participant provided their name on the informed consent form.
- Consent form (detachable).
- Demographics form. This included: sex, age, degree course, year of study, sports teams
  played for, highest level of competition, recent injury, membership of other university
  clubs and societies, ethnicity, accommodation, whether they had ever drunk alcohol,
  whether or not they were currently abstinent from alcohol and, if so, reasons for being
  abstinent.
- Alcohol Use Disorders Identification Test (AUDIT) –a widely used screening tool for the detection of alcohol use disorders (Saunders, Aasland, Babor, de la Fuente & Grant, 1993; Babor, Higgins-Biddle, Saunders & Monteiro, 2001). The AUDIT has previously been used on student populations. For example Kokotailo et al. (2004) used the AUDIT to identify high-risk drinking, as opposed to alcohol dependency and found that the

AUDIT had "reasonable psychometric properties" when used with a college student sample (Kokotailo et al., 2004). It has also been found that the AUDIT is better at identifying current alcohol dependence in college students than several other measures (Clements, 1998). The validity and reliability of the AUDIT has been established by many studies (Reinert & Allen, 2007). For example, one study compared scores on the AUDIT when embedded in a primary health questionnaire to the AUDIT as a single scale completed at a later time point (Daeppen, Yersin, Landry, Pé coud & Decrey, 2000). It was found that 84.2% of participants with a score over 8, indicative of hazardous drinking (Conigrave, Hall & Saunders, 1995, Reinert & Allen, 2002), had an identical score 6 weeks later (Daeppen et al., 2000). The AUDIT had a Cronbach's alpha of 0.83 and the test re-test score was r0.81 (Daeppen et al., 2000). Because women are more vulnerable to the damaging effects of heavy alcohol consumption, a lower cut-point of 7 has been suggested for an indication of an alcohol use disorder among women (Bradley et al., 1998). In addition to a designation of an alcohol use disorder, the AUDIT may also be used to indicate degrees of alcohol-related risk or problem, via hazardous drinking, harmful drinking and probable dependence (Babor, Higgins-Biddle, Saunders & Monteiro, 2001).

Athletic Identity Measurement Scale (AIMS) – a measure of how strongly participants identify with the athlete role (Brewer et al., 1993). Respondents are asked to indicate on a 7-point Likert scale the extent to which they agree or disagree with statements in relation to their participation in sport, from strongly disagree to strongly agree. Total scores can range from 10 to 70, and in the current study 10 was used to indicate highest identification with the athlete role and 70 to indicate lowest. The validity and reliability of AIMS was tested by Brewer et al. (1993) who established a Cronbach alpha of 0.93 and a test re-test reliability co-efficient of 0.89, when the questionnaire was handed out twice over a 14 day period. This study also found AIMS to be a more consistent measure than other recognized tools used to measure athletic identity such as, the Perceived Importance Profile and the Physical Self-Perception Profile (Brewer et al., 1993). More recently Lamont-Mills and Christensen (2006) recruited participants from a student population in order to examine differences in athletic identity between elite participants, recreational participants and non-participants in sport and found further evidence for validity and

- reliability. The AIMS is therefore a suitably reliable and valid measure of athletic identity in this student sample.
- Drinking Expectancy Questionnaire (DEQ) identifies what the participant seeks to gain from drinking. DEQ subscales are: assertion, affective change, dependence, sexual enhancement, cognitive change and tension reduction (Young & Knight, 1989). The DEQ was developed by Young and Knight (1989) to measure the expectations an individual has of outcomes from drinking alcohol. An advantage of using this particular tool is that it is able to determine both the positive and negative outcomes of alcohol consumption, where previous measures such as the Alcohol Expectancy Questionnaire (Brown, Christensen & Goldman, 1987) were only able to measure positive outcomes. The initial version of the DEQ examined the following 9 expected outcomes of alcohol consumption; assertiveness, affective change, sexual enhancement, socialization, relaxation, cognitive change, aggression, dependence and carelessness. Respondents checked 80 questions using a 5-point Likert Scale measuring the extent to which they agreed or disagreed (1=strongly disagree to 5=strongly agree) with statements regarding their beliefs about drinking. The higher the score obtained, the stronger the alcohol expectancies of the individual. Young and Knight (1989) tested the DEQ both on a sample of college students and a sample of the community and established high Cronbach alphas for each of the expected outcomes. The mean Cronbach alpha for the student sample was 0.73 and the study was able to conclude that all of the factors showed reliability apart from aggression. The consistency in the Cronbach alpha scores obtained by Young and Knight (1989) therefore show the reliability and validity of the DEQ and its suitability for use in this investigation which will examine the drinking expectations of a student sample.
- Normative belief measure records how much alcohol the respondent believes others drink in comparison to their own drinking (McAlaney & McMahon, 2007). Normative beliefs have been widely used in the USA to test the perceptions of alcohol consumption in American student samples, based on Bandura's (1986) social cognitive theory that observing the behaviour of others influences own behaviour. Borsari and Carey (2006) reviewed several studies examining American college drinking and found that the greater the perceptions of other's drinking levels, the greater an individual's own alcohol consumption. The normative belief measure has also been used outside the USA to

examine perceptions of drinking levels in student populations by Kypri and Langley (2003) in New Zealand and McAlaney and McMahon (2007) in the UK. The results from these studies replicated those found in the USA, showing that the majority of students perceive the amount of alcohol they consume to be lower than other students. There was also found to be a strong association between an individual's drinking level and their misperception of the drinking levels of those closest to them. The measure used in our study was taken from the work of McAlaney and McMahon (2007) who asked students at the University of Paisley about perceptions of drinking frequency, drinking quantity and frequency of intoxication applied to (i) 'your closest friends', (ii) 'the average student of your age' and (iii) 'the average person your age in the UK' (see Appendix 1).

Readiness to Change Questionnaire (RCQ) – measures the stage of change the respondent has reached in terms of changing drinking behaviour (Heather & Rollnick, 2000) and is based on Prochaska and DiClemente's (1986) Transtheoretical Model. The RCQ was developed by Rollnick, Heather, Gold & Hall (1992) as a 12-item tool to identify the stage of change reached by an individual who consumes excessive amounts of alcohol. It was designed to be quick and easy for use by health professionals within medical and other public health settings. It allows allocation to three stages of change, Precontemplation, Contemplation and Action, each represented by four items. response to each statement the individual indicates on a 5-point scale the extent to which they disagree or agree. The responses to each stage of change are then summed and the highest summed score establishes the stage of change. When two scale scores are calculated as being equal, the scale farthest along the change continuum represents the subject's Stage of Change Designation (Rollnick et al., 1992). Internal consistency for the RCQ was established by Heather, Rollnick & Bell (1993) who calculated Cronbach's alpha coefficients for each of the 4-item scales: Precontemplation = 0.73, Contemplation = 0.80, Action = 0.85. The RCQ then underwent further testing at two different timepoints on excessive drinkers on hospital wards. The following alpha coefficients showing satisfactory reliability; Precontemplation = 0.82, Contemplation = 0.86, Action = 0.78. Product-moment coefficients were also calculated among the three stages and there was an orderly movement between one stage of change and another, confirming an aspect of the construct validity of the RCQ. Heather et al. (1993) also compared responses to the RCQ with responses to questions asked at screening point relating to the subject's drinking behaviour and health. The relationships between the responses were found to be highly statistically significant, strengthening confidence in the tool (Rollnick et al., 1992).

• Participant debrief form (detachable).

Once the settings for the administration of the questionnaire booklet had been selected for the study, a short pilot test was conducted to establish the average length of time it took to complete the booklet and also to ensure that the questionnaires were in an appropriate order. It was determined that on average it would take participants 15 minutes to complete the full questionnaire battery.

#### 4.5 Ethics approval

Ethical approval was granted by Northumbria University. Additional ethical approval from each recruited institution was also obtained as needed.

#### 4.6 Statistical analysis

All questionnaire data were inputted into SPSS (V.16) for analysis. Because of the large number of tests that were run in addition to the main comparisons and the danger of spuriously significant results from multiple comparisons, it was decided to adopt a more conservative 1% level to indicate significance rather than the conventional 5% level.

Because of marked negative skewness of key variables in the analysis (AUDIT total score – see below) and the absence of any transformation that would render this variable approximately normal, non-parametric statistics were used throughout. Differences between groups on continuous variables were examined by the Mann-Whitney U-test in the case of two groups or the Kruskal-Wallis analysis of variance by ranks in the case of more than two groups. Relationships between categorical variables were examined by chi-square tests.

A logistic regression analysis was run in an attempt to predict alcohol use disorder status from the AUDIT from background variables and full details of this are given below.

#### 5 RESULTS

#### 5.1 <u>Sample characteristics</u>

Table 5-1 gives demographic and other background details of the sample. In total 826 participants were recruited from seven HE and two FE institutions, and represented a variety of demographic backgrounds. (Owing to small numbers, the two FE colleges were combined in the analysis). Mean age was 22.5 (SD = 6.17, range 18-56), the majority of the sample was of white ethnic origin (71.3%) and 60.3% were female. Participants' involvement in sport was also recorded, with 22.1% (N = 182) competing either individually or on a university sports team. The level at which they competed (i.e. intra-mural, national etc.) and their current injury status were also recorded by the demographic questionnaire (see Appendix 1).

Table 5-1: Demographic and other background details of sample

Gender	Age	Ethnicity	Accommodation	Degree subject	Year of study	Participates in sport?	Highest level of competition	injury?
Male = 39.7% (n=327)	Mean = 22.5 (SD=6.17)	White = 71.3% (n=588)	On-campus= 22.6% (n=185)	Sport = 41.2% (n=340)	1 <sup>st</sup> year = 48.8% (n=402)	Yes = 22.1% (n=182)	Intramural = 22.4% (n=32)	No = 73.5% (n=108)
Female = 60.3% (n=497)	Min=18, Max=56	Black = 14.5% (n=120)	Off-campus = 25.6% (n=210)	Non-sport = 58.8% (n=485)	2 <sup>nd</sup> year = 34.3% (n=283)	No = 77.9% (n=643)	BUSA= 53.1% (n=76)	Currently = 5.4% (n=8)
		Asian = 7.6% (n=63)	Family = 37.8% (n=310)		3 <sup>rd</sup> year = 16.9% (n=139)		National = 21.7% (n=31)	Recently = 21.1% (n=31)
		Mixed = 3.4% (n=28)	Other = 14.0% (n=115)				International = 2.8% (n=4)	•
		Chinese = 0.6% (n=5)						
		Other = 2.5% (n=21)						

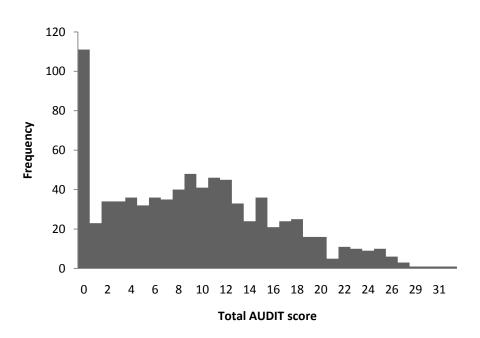
The sample size of 826 was larger than the number required by a power analysis (= 800, see above) but the split between the number of students who participate in sport and those who do not (i.e., 300/500) was not achieved due to only 182 in the former category. However, as will be seen, differences in drinking behaviour between these two groups were large and highly significant and lack of power is clearly not an issue in these comparisons.

#### **5.2 AUDIT scores**

#### 5.2.1 Overall sample

AUDIT total scores were missing for 12 participants. Mean AUDIT score in the non-missing overall sample (N=814) was 9.45 (SD=7.03, range 0-34). This is higher than the cut-point score of 8+ for men or 7+ for women for a designation of hazardous drinking (Bradley et al., 1998). 60.9% of the overall sample scored positive for hazardous drinking on the AUDIT.

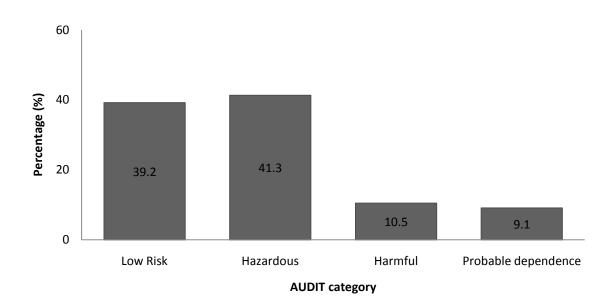
The distribution of AUDIT total scores in the overall sample is shown in Figure 5-1. The distribution was bimodal, with one modal value of zero representing those who were 'never drinkers' or current abstainers. Among those who drank, the mode was 9 units, representing 48 (5.9%) of non-missing respondents. Because the distribution of AUDIT total scores was clearly non-normal and in the absence of any transformation that would render it normal, non-parametric statistics were used in all analyses involving this variable.



**Figure 5-1 : Distribution for total AUDIT scores** 

AUDIT scores can also be summarised into the following risk categories: low risk drinkers = 0-6 for women, 0-7 for men; hazardous drinkers = 7-15 for women and 8-15 for men; harmful drinkers = 16-19; probable dependence = 20+ (Babor, Higgins-Biddle, Saunders & Monteiro, 2001). Frequencies in the overall sample for each of these risk categories were: Low risk = 318 (39.2% of non-missing respondents); Hazardous drinkers = 335 (41.3%); Harmful drinkers = 85 (10.5%); Probable dependence = 74 (9.1%) (see Figure 5-2).

Figure 5-2: Percentage of students in the overall sample in the four AUDIT risk categories



Q1 in the AUDIT questionnaire records frequency of drinking. Responses to Q1 in the overall sample (missing data = 0) are summarised in Table 5-2. It will be seen from Table 5-2 that the modal response to this question in the overall sample was "2 to 3 times a week" (N= 318, 38.5%). 54 participants (6.5%) reported drinking "4 or more times a week".

Q2 in the AUDIT questionnaire measures quantity of alcohol consumption (standard drinks) on a typical day. Responses to Q2 in the overall sample (missing data = 2) are shown in Table 5-3. The modal quantity was 7-9 drinks (N= 176, 21.4%). 165 (20.0%) participants reported drinking 10+ drinks on a typical day.

Q3 in the AUDIT questionnaire records frequency of "binge" drinking (i.e., 6+ standard drinks on one occasion). Responses to Q3 in the overall sample (missing data = 2) are shown in Table 5-4. The modal response here was "weekly" (N= 286, 34.7%). 20 participants (2.4%) reported binge drinking "daily or almost daily".

Table 5-2: Percentage of students in the overall sample responding to each of the AUDIT Q1 frequency of drinking categories

Q1 AUDIT Categories	Percentage (%)
Never	14.3
Monthly or less	14.2
2-4 times a month	26.5
2-3 times a week	38.5
4 or more times a week	6.5

Table 5-3: Percentage of students in the overall sample responding to each of the AUDIT Q2 quantity of alcohol consumption categories

Q2 AUDIT Categories	Percentage (%)		
1 or 2	25.7		
3 or 4	16.9		
5 or 6	16.0		
7 to 9	21.4		
10 or more	20.0		

Table 5-4: Percentage of students in the overall sample responding to each of the AUDIT Q3 frequency of binge drinking categories

Q3 AUDIT Categories	Percentage (%)		
Never	23.1		
Less than monthly	18.9		
Monthly	20.9		
Weekly	34.7		
Daily or almost daily	2.4		

#### 5.2.2 Differences between institutions

There were large and highly significant differences in mean AUDIT scores between the eight institutions taking part in the survey (Kruskal-Wallis,  $\chi^2 = 211.95$ , p < 0.0005). Means ranged from 4.00 (SD = 5.91) to 14.07 (SD = 5.83), with a spread of means between these extremes. Because these differences might confound relationships between other independent variables and AUDIT score, institution was entered in a logistic regression analysis aiming to predict AUDIT positive cases (see below).

#### 5.2.3 'Never drinkers'

In the demographic questionnaire students were asked two separate questions related to alcohol abstinence (see Appendix 1). The first asked whether they had ever tasted/drunk alcohol in the past and the second asked, if they had drunk alcohol at some point in their life and if they were currently abstaining from alcohol.

Of the students surveyed (N=823, missing = 3), 81 had never tasted/drunk alcohol, amounting to almost 10% of the sample. Religion was the most common reason for never having tasted/drunk alcohol and, of these students, more were female (N=48, 59.3%) than male (N=33, 40.7%). Only six of these students were involved in university sport (7.4%), most were in their  $2^{nd}$  year of study (65.4%), lived with family (69.2%) and studied on an arts-based degree course (69.1%).

In addition, another 77 students who had tasted/drunk alcohol at some point in the past were currently abstaining from alcohol/teetotal. This makes a total of 158 students who had either never drunk alcohol or were currently teetotal, amounting to 19% of the sample, marginally higher than was reported by Gill (2002) in a review of surveys of student drinking in the UK over the previous 25 years.

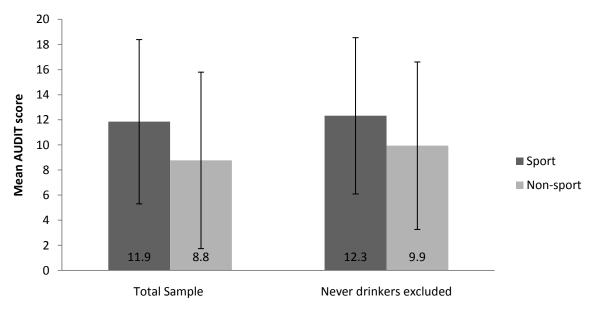
While it is important to report rates of abstinence and acknowledge the existence of non-drinkers within the sample, the aim of this study was to investigate the impact of sports participation on alcohol consumption patterns and behaviours. It can be argued that, for the students who had never drank alcohol, mainly for religious reasons, alcohol consumption was not an available behaviour and to include these students might therefore distort relationships between alcohol consumption, sports participation and other variables of interest. For this reason, the decision was made to run some additional analyses in which students who had never tasted/drunk alcohol were excluded as a form of sensitivity analysis to check whether the inclusion of this group was affecting the results. These analyses were therefore based on the 745 students who stated that they had drunk alcohol at some time in the past, including those who were currently abstaining.

When 'never drinkers' were excluded, mean AUDIT score increased to 10.51 (SD = 6.63, range 0-34, missing data = 12). 67.8% of the non-missing sample was positive on the AUDIT compared with 60.9% in the full sample. Percentages in the reduced sample falling into AUDIT risk categories were as follows: Low risk = 32.2%; Hazardous = 46.0%; Harmful = 11.7%; Probable dependence = 10.2%.

#### 5.2.4 Sport participation

The overall sample was divided into students who stated that they participated in university sport (N= 182, 22.1% of non-missing cases) and those who stated they did not (N= 643, 77.9%) (missing data = 1). Students who participated in sport had a mean AUDIT score of 11.85 (SD = 6.54) compared to 8.77 (SD = 7.03) for those who did not. The difference between means was highly significant (Mann-Whitney, Z = -5.54, p < 0.0005.) When 'never drinkers' were excluded from the analysis, sports participants continued to score significantly higher on the AUDIT (Mann-Whitney, Z = -4.50, p < 0.0005) (see Figure 5-3).

Figure 5-3: Comparison of sport and non-sport mean AUDIT scores when participants who have never drunk alcohol were included and excluded from the sample



Sample including and excluding never drinkers

In terms of AUDIT risk categories, Figure 5-4 shows percentages of sport participants/ non-sport participants falling into each of four categories. There was a highly significant association between sports participation and level of risk ( $\chi^2 = 34.50$ , df = 3, p < 0.0005) (see Figure 5-4), with those who participate in sport more likely to be classified as hazardous, harmful and probably dependent drinkers. A much higher proportion of those who participated in sport (79.6%) were classified as hazardous drinkers or beyond than those who did not participate in sport (54.5%).

Tables 5-5, 5-6 and 5-7 show responses to AUDIT Q1-3 for sport participants and non-sport participants. It will be seen, first, that sport participants were more frequent drinkers, with over three-fifths drinking at least twice a week compared with roughly two-fifths of non-sport participants. Although typical quantities of alcohol consumed were high among many non-sport participants, with 18% self-reporting 10+ units per day, drinking in the sport participants groups was even higher, with over half (57%) reporting that they typically drank more than 6 units per occasion. Similarly, over half of sport participants

(53%) reported that they binge-drank at least weekly compared with just under a third of the non-sport participants.

Figure 5-4: Percentage of participants in each AUDIT category \* sport participation

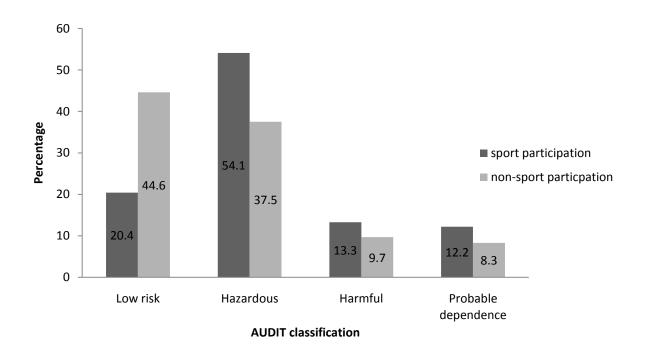


Table 5-5: Percentage of sport and non-sport participants in the sample responding to each of the AUDIT Q1 frequency of drinking categories

Sport	Non-sport
participants (%)	participants (%)
7.1	16.3
8.2	15.9
23.1	27.5
53.3	34.2
8.2	6.1
	participants (%) 7.1 8.2 23.1 53.3

Table 5-6: Percentage of sport and non-sport participants responding to each of the AUDIT Q2 quantity of drinking categories

Q2 AUDIT	Sport	Non -sport
Categories	participants (%)	participants (%)
1 or 2	11.5	29.8
3 or 4	14.3	17.6
5 or 6	17.6	15.6
7 to 9	28.6	19.3
10 or more	28.0	17.6

Table 5-7: Percentage of sport and non-sport participants responding to each of the AUDIT Q3 frequency of binge drinking categories

Q3 AUDIT	Sport	Non-sport
Categories	participants (%)	participants (%)
Never	11.5	26.4
Less than monthly	13.2	20.6
Monthly	22.0	20.6
Weekly	50.0	30.3
Daily or almost daily	3.3	2.2

Mann-Whitney analyses revealed that there were highly significant differences between sport and non- sport participants in their responses to Q1 (Z = -5.22, p < 0.0005), Q2 (Z = -5.60, p < 0.0005) and Q3 (Z = -5.79, p < 0.0005) of the AUDIT, with sport participants scoring higher on all questions than non-sport participants. These differences were still found to be significant when 'never drinkers' were excluded from the analyses Q1 (Z = -4.13, p < 0.0005), Q2 (Z = -4.52, p < 0.0005) and Q3 (Z = -4.79, p < 0.0005).

Students who participated in sport were further divided into four levels of competition: Intramural, N=32 (22.4%); BUSA, N=76 (53.1%); National, N=31 (21.7%); International, N=4 (2.8%). (Missing data = 39 - these may have been students who played sport but not at University.) For purposes of analysis, the last two categories were combined into National/International (N=35, 24.5%). Means and SDs of AUDIT total scores for these 3 groups are shown in Table 5-8. The differences between these means were not significant (Kruskal-Wallis,  $\chi^2=2.73$ , df = 2, p = 0.26).

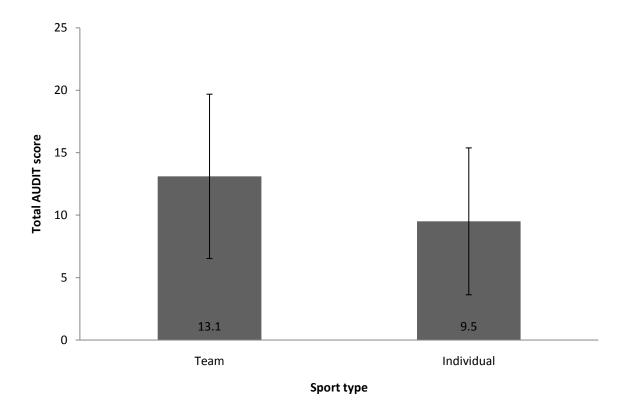
Table 5-8: Mean (SD) for Total AUDIT score \* Highest Level of Competition

2		
Highest level	Mean	SD
of competition		
Intramural	11.9	6.8
BUSA	13.0	6.3
National/International	10.7	6.7

There were no significant differences in responses to Q1 (Kruskal-Wallis  $\chi^2$  = 3.91, df = 2, p = 0.141), Q2 (Kruskal-Wallis,  $\chi^2$  = 5.68, df = 2, P = 0.058) and Q3 (Kruskal-Wallis,  $\chi^2$  = 6.41, df = 2, p=0.040) between the three competitive levels.

Sport participants were further distinguished as team and individual sport athletes based on what they identified as their main sport. Figure 5-5 displays the means and standard deviations of AUDIT total scores for those involved in team sports (n = 103) and those involved in individual sports (n = 44).

Figure 5-5: Mean (SD) Total AUDIT Score \* Sport Type



A Mann-Whitney test revealed that there was a significant difference between the team and individual sports athletes, with those in team sports showing significantly higher total AUDIT scores than individual sport athletes (Z = -3.15, p = 0.002). Figure 5-6 shows percentages of team and individual sports athletes categorised as low risk, hazardous, harmful and probably dependent from the AUDIT. The association between type of sport played (team vs. individual) and level of AUDIT risk failed to meet the pre-set level of statistical significance (Kruskal-Wallis,  $\chi^2 = 9.889$ , df = 3, p = 0.020).

With regard to specific sports, mean AUDIT total scores for a limited range of sports are shown in Figure 5-7. Only sports that were cited as a main sport by 10 or more students are shown in Figure 5-7. It appears that the highest AUDIT scores are associated with traditional team sports involving teams of 11 or more per side (i.e., rugby, football and hockey).

Of those students who said they participate in sport (N = 147), 108 (73.5%) stated that they did not have an injury, 8 (5.4%) that they had a current injury and 31 (21.1%) that they had had a recent injury. For the purposes of analysis, the last two categories were combined.

When this was done, there was no significant difference in AUDIT total score between those without an injury (M = 12.01, SD = 6.36) and those who had a current or recent injury (M = 12.05, SD = 7.16) (Mann-Whitney, Z = -0.14, p = 0.885).

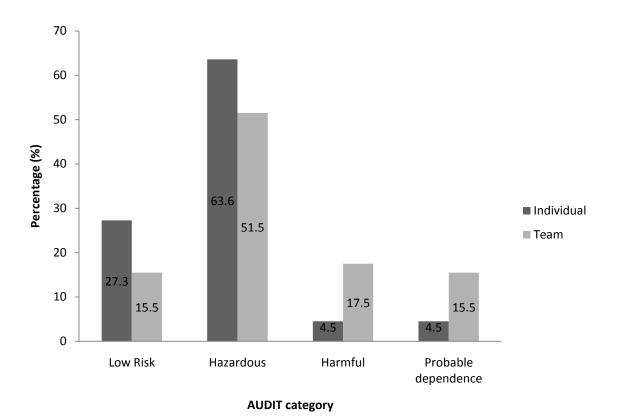


Figure 5-6: Percentage of Students in each AUDIT category \* Sport Type

### 5.2.5 Gender

No significant difference was found between AUDIT score of male (mean = 10.01, SD = 7.25) and female (9.07, SD = 6.86) students (Mann-Whitney, Z = -1.71, p = 0.088). When 'never drinkers' were excluded, AUDIT score for male students was 11.18 (SD = 6.77, N = 286) and for female students 10.05 (SD = 6.51, N = 443). This difference failed to reach the predetermined criterion for statistical significance (Mann-Whitney, Z = -2.18, p = 0.029). There was also no difference between men and women in the proportions falling into AUDIT risk categories ( $\chi^2 = 2.16$ , df = 3, p = 0.54). (see Figure 8).

Figure 5-7: Total AUDIT score \* Sport Type

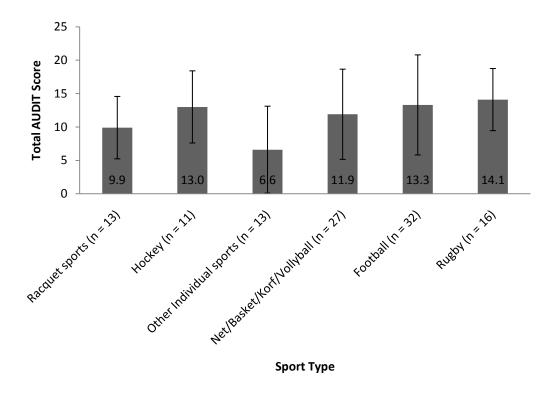
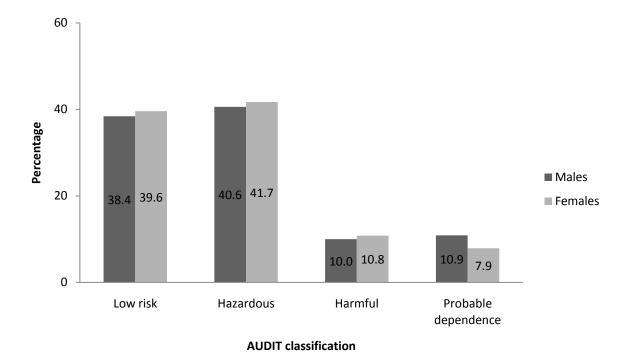


Figure 5-8: Percentage of students in each AUDIT category \* Sex



There were no significant differences in responses to Q1 (Z = -0.473, p = 0.636) and Q3 (z = -1.792, p = 0.073) between males and females. There was however a significant difference between males and females in responses to Q2 (Z = -3.856, p < 0.0005), with males drinking significantly more than females on a typical day when they drank alcohol. When 'never drinkers' were removed from the analyses, it was found that there were no significant differences between males and females on Q1 (Z = -0.41, p = 0.682) and Q3 (Z = -2.064, p = 0.039) but still a significant difference between males and females for responses to Q2 (Z = -4.34, p < 0.0005) (see Tables 5-9, 5-10 & 5-11).

Table 5-9: Percentage of male and female students in the sample responding to each of the AUDIT Q1 frequency of drinking categories

Q1 AUDIT	Males	Females
Categories		
Never	15.0	13.9
Monthly or less	14.7	13.9
2-4 times a month	26.9	26.4
2-3 times a week	35.8	40.0
4 or more times a week	7.6	5.8

Table 5-10: Percentage of male and female students in the sample responding to each of the AUDIT Q2 quantity of alcohol consumption categories

Q2 AUDIT	Males	Females
Categories		
1 or 2	21.8	28.4
3 or 4	16.3	17.3
5 or 6	12.3	18.5
7 to 9	22.7	20.6
10 or more	27.0	15.1

Table 5-11: Percentage of male and female students responding to each of the AUDIT

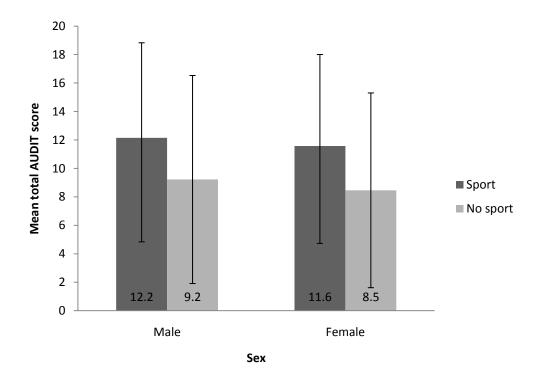
Q3 frequency of binge drinking categories

Q3 AUDIT	Males	Females
Categories		
Never	21.8	24.0
Less than monthly	16.6	20.6
Monthly	20.9	21.0
Weekly	38.0	32.3
Daily or almost daily	2.8	2.2

Among sport participants, male students (mean = 12.15, SD = 6.67, N = 86) and female students (mean = 11.57, SD = 6.43, N = 95) showed no significant difference in their AUDIT scores (Mann-Whitney, Z = -0.622, p = 0.534). Among non-sport participants, male students (mean = 9.22, SD = 7.31, N = 234) and female students (mean = 8.46, SD = 6.84, N

= 396) also showed no significant difference in their AUDIT scores (Mann-Whitney, Z = -1.103, p = 0.207) (see Figure 5-9). However, the significantly higher AUDIT total scores for sport participants compared to non- sport participants was maintained when genders were examined separately (males, Mann-Whitney, Z = -3.49, p < 0.0005; females, Z = -4.21, p < 0.0005).

Figure 5-9: Mean total AUDIT scores for male and female students participating in university sport and those not involved in university sport



#### 5.2.6 Year of study

Table 5-1 shows that 402 students in the sample (48.8%) were in their  $1^{st}$  year of study, 283 (34.3%) were in their  $2^{nd}$  year and 139 (16.8%) were in their  $3^{rd}$  year (missing = 2). (A few students had repeated a year and were therefore in their 4th year at university. These students were grouped with  $3^{rd}$  year students.) Mean total AUDIT scores for each year are shown in Table 5-10 where it will be seen that the highest mean score was shown by 1st year students, followed by 3rd year and then  $2^{nd}$  year. These differences were highly significant (Kruskal-Wallis,  $\chi^2 = 65.37$ , df = 2, p < 0.0005). In pairwise comparisons,  $1^{st}$  year students showed significantly higher AUDIT scores than  $3^{rd}$  year students (Mann-Whitney, Z = -2.95, df = 1, p

= 0.003), who in turn showed significantly higher scores than  $2^{nd}$  year students (Mann-Whitney, Z = -3.92, df = 1, p < 0.0005).

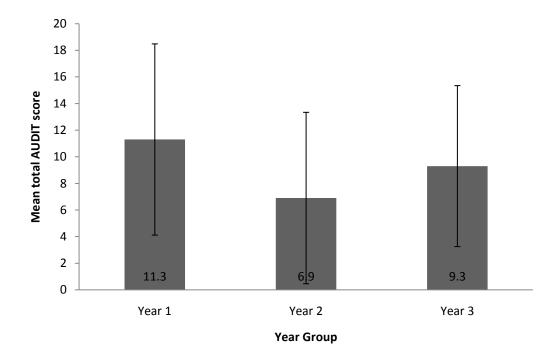


Figure 5-10: Mean total AUDIT scores \* Year group

When 'never drinkers' were excluded from the analysis, year of study continued to show significant differences on AUDIT scores (Kruskal-Wallis,  $\chi^2 = 41.0$ , p < 0.0005). In pairwise comparisons,  $1^{st}$  year students continued to show higher AUDIT scores than  $3^{rd}$  year students (Mann-Whitney, z = -3.45, p = 0.001). However, there was no longer a significant difference between  $2^{nd}$  and  $3^{rd}$  year students (Mann-Whitney, z = -1.91, p = 0.056). This variation from the results in the overall sample is no doubt due to the relatively large number of  $2^{nd}$  year students who were 'never drinkers' (see above).

### 5.2.7 Type of degree course

Table 5-1 shows that 340 (41.2%) students were studying a sports-based course and 485 (58.8%) a non-sports based (missing = 1). Mean total AUDIT scores for each type of course are shown in Figure 5-11 where it will be seen that the highest AUDIT scores were shown by students on sports based courses. This difference was highly significant (Mann-Whitney, Z=5.18, p<0.0005).

Degree type

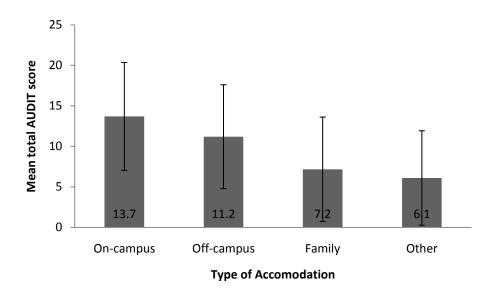
Figure 5-11: Mean total AUDIT scores \* Degree type

When 'never drinkers' were excluded from the analysis, type of course continued to show a significant difference on AUDIT scores (Mann-Whitney, Z = -3.82, p<0.0005).

#### 5.2.8 Student accommodation

Table 5-1 gives percentages of students in the overall sample living in different types of accommodation during term-time: 22.6% lived on-campus; 25.6% lived off-campus; 37.8% lived with their family; and 14.0% lived in other types of accommodation (e.g., home owners, living with partners) (missing = 1). Term-time accommodation was found to have a significant effect on AUDIT scores (Kruskal-Wallis,  $\chi^2 = 143.19$ , df = 3, p < 0.0005), with students living on-campus scoring highest (see Figure 5-12). In pairwise comparisons, students living on-campus had a higher mean AUDIT score than those living off-campus (Mann-Whitney, z = -4.01, p < 0.0005), who in turn had a higher mean AUDIT score than those living with family (Mann-Whitney, z = -6.92, p < 0.0005). However, students living with their family did not obtain a higher AUDIT score than those living in 'other' accommodation (Mann-Whitney, z = -1.26, p = 0.208).

Figure 5-12: Mean total AUDIT score \* Accommodation

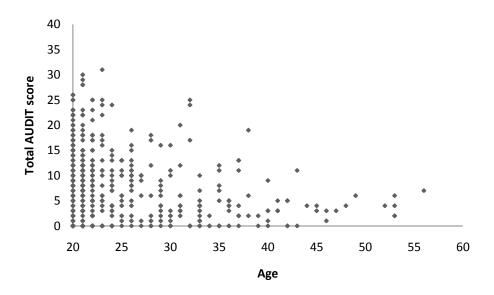


When 'never drinkers' were excluded, type of accommodation continued to show significant differences on AUDIT scores (Kruskal-Wallis,  $\chi^2$  = 106.74, df = 3, p < 0.0005). In pairwise comparisons, students living on-campus continued to show a higher mean AUDIT score than those living off-campus (Mann-Whitney, z = -4.05, p < 0.0005), who in turn had a higher mean AUDIT score than those living with family (Mann-Whitney, z = -4.87, p < 0.0005). On this occasion, students living with their family also obtained a higher AUDIT score than those living in 'other' accommodation (Mann-Whitney, z = -2.67, p = 0.008). This difference from the results in the overall sample probably occurred because of the high number of 'never drinkers' who lived with their families.

### 5.2.9 Age

In the overall sample, there was a significant negative correlation between AUDIT total score and student age (rho = -0.357, p < 0.0005.) Thus, as students got older, AUDIT score tended to decrease. The relationship between age and AUDIT score is shown in Figure 5-13. The correlation between these two variables remained significant when 'never drinkers' were excluded from the analysis (rho = -0.337, p < 0.0005).

Figure 5-13: Scatter plot showing the AUDIT scores against the ages of the sample population



### 5.2.10 Predictors of AUDIT risk status

Logistic regression analysis (LRA) was used to predict positive status on AUDIT risk categories (i.e. alcohol use disorders) from stable background characteristics of students in the overall sample. The specific aim of the analysis was to determine whether sport participation predicted AUDIT risk status when the effects of other background characteristics had been taken into account. Logistic regression was chosen for this purpose rather than multiple regression with AUDIT continuous score as the dependent variable because of the non-normal distribution of AUDIT scores and because the prediction of the presence/absence of an alcohol use disorder (i.e., hazardous, harmful or probably dependent drinking) was of interest in its own right. Independent variables in the analysis were confined to stable student characteristics present before testing was conducted.

In a first analysis, the dependent variable was hazardous (including harmful and possibly dependent) drinking versus non-hazardous (i.e., low-risk) drinking. Predictor variables were those showing significant univariate relationships with AUDIT total score: sport participation, university, age, year of study, type of degree course and term-time living arrangements. In a forward stepwise hierarchical model, sport participation was entered first followed by the other variables in a single block. (Dummy variables were created for nominal variables with more than two categories, i.e., university, year of study and term-time living

arrangements.) Overall the model significantly predicted AUDIT category status ( $\chi^2$  = 262.75, df = 16, p < 0.0005) with 75.9% correct identifications. The total variance accounted for by the model was 38% (Nagelkerke R<sup>2</sup>). The Hosmer and Lemeshow test was not significant ( $\chi^2$  = 11.03, df = 8, p = 0.200), indicating a satisfactory goodness of fit.

The results of this analysis are shown in Table 5-12. It will be seen there that sport participation was not an independent predictor of an alcohol use disorders when other background variables were added to the model. Significant predictors were university, age and living arrangements. When 'never drinkers' were excluded from the analysis, the main finding of the analysis did not change, i.e., sport participation was not an independent predictor of hazardous drinking status.

Two further LRAs were run to predict variables derived from the AUDIT indicating more severe alcohol-related risk and harm: (i) harmful (including probable dependence) drinking versus non-harmful drinking; and (ii) probable dependence versus non-dependence. In neither of these analyses did sport participation emerge as an independent predictor of AUDIT risk category.

In any attempt to explicate the above finding (i.e., that, despite a strong univariate relationship with AUDIT total score and AUDIT risk categories, sport participation did not predict hazardous drinking status when the effects of background variables were taken into account) a further LRA was run to predict sport participation from these background variables. Thus, in this analysis, sport participation was the dependent variable and university, age, year of study, type of degree course and term-time living arrangements were independent variables entered into the model in a single block. Overall the model significantly predicted sport participation ( $\chi^2 = 192.29$ , df = 15, p < 0.0005) with 81.6% correct identifications. The total variance accounted for by the model was 32% (Nagelkerke R<sup>2</sup>). The results are shown in Table 5-13. Significant predictors of sport participation were the university attended, age, type of degree course (sport vs. non-sport), year of study and term-time living arrangements.

Table 5-12: Final regression model for prediction of AUDIT positive status from background variables

# Variables in the Equation

		В	S.E.	Wald	df	Sig.	Exp(B)
Step 1	University			40.715	7	.000	
	University(1)	.132	1.096	.015	1	.904	1.141
	University(2)	1.471	1.197	1.510	1	.219	4.354
	University(3)	1.931	1.140	2.869	1	.090	6.894
	University(4)	1.717	1.136	2.286	1	.131	5.568
	University(5)	2.290	1.098	4.350	1	.037	9.876
	University(6)	1.858	1.114	2.782	1	.095	6.408
	University(7)	900	1.274	.498	1	.480	.407
	age	084	.042	3.997	1	.046	.919
	degree.2(1)	2.072	.289	51.399	1	.000	7.942
	Yrstudy			7.984	2	.018	
	Yrstudy(1)	-1.851	.655	7.980	1	.005	.157
	Yrstudy(2)	-1.203	.644	3.485	1	.062	.300
	Living			12.237	3	.007	
	Living(1)	.014	.531	.001	1	.979	1.014
	Living(2)	.904	.550	2.697	1	.101	2.469
	Living(3)	.667	.535	1.551	1	.213	1.948
	Constant	-1.007	1.671	.363	1	.547	.365

Table 5-13: Final regression model for prediction of sport participation from background variables

	-	В	S.E.	Wald	df	Sig.	Exp(B)
Step 1	University			40.715	7	.000	ii.
	University(1)	.132	1.096	.015	1	.904	1.141
	University(2)	1.471	1.197	1.510	1	.219	4.354
	University(3)	1.931	1.140	2.869	1	.090	6.894
	University(4)	1.717	1.136	2.286	1	.131	5.568
	University(5)	2.290	1.098	4.350	1	.037	9.876
	University(6)	1.858	1.114	2.782	1	.095	6.408
	University(7)	900	1.274	.498	1	.480	.407
	age	084	.042	3.997	1	.046	.919
	degree(1)	2.072	.289	51.399	1	.000	7.942
	Yrstudy			7.984	2	.018	
	Yrstudy(1)	-1.851	.655	7.980	1	.005	.157
	Yrstudy(2)	-1.203	.644	3.485	1	.062	.300
	Living			12.237	3	.007	
	Living(1)	.014	.531	.001	1	.979	1.014
	Living(2)	.904	.550	2.697	1	.101	2.469
	Living(3)	.667	.535	1.551	1	.213	1.948
	Constant	-1.007	1.671	.363	1	.547	.365

# 5.3 Athletic Identity Measurement Scale (AIMS)

Mean score in the overall sample on the AIMS was 45.53 (SD = 16.92, range 10-70) where 10 was the lowest possible score and 70 the highest and with lower scores indicating greater athletic identification (missing = 9). The distribution of scores is shown in Figure 5-14. It will be seen there that the most frequent score was the maximum score of 70. As expected, students who participated in sport were significantly more likely to identify with the athlete

role than students not participating in sport (mean 32.69 vs. 49.13, Mann-Whitney, z=-11.48, p<0.0005). There were also significant differences on AIMS score between different levels of sport competition (Kruskal-Wallis,  $\chi^2=9.34$ , df = 2, p = 0.009), with national/international (mean = 28.83) and BUSA (30.86) athletes showing greater identification with the athlete role than those playing intramural sport (36.41).

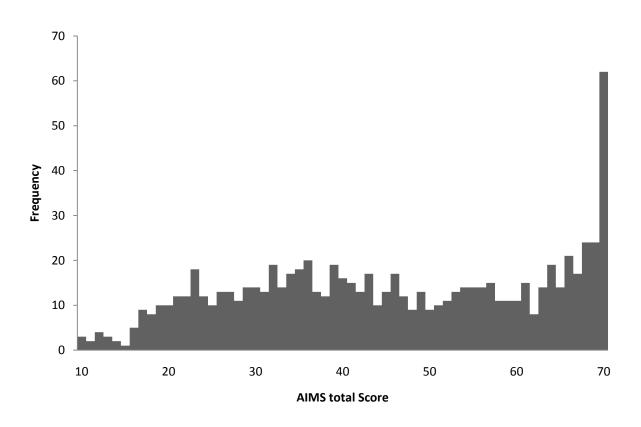


Figure 5-14: Distribution of total AIMS scores

The correlation between AIMS and AUDIT total scores was not significant (rho = -0.065, p = 0.064), although this correlation was in the direction that would be expected from the association between sports participation and AUDIT score.

## **5.4** Readiness to Change Questionnaire (RCQ)

Responses to the RCQ were analysed both by continuous readiness scores (Action plus Contemplation minus Precontemplation subscale scores— see Heather & Rollnick, 2000) or by allocation to one of the three stages of change (Action, Contemplation or Precontemplation). A large number of respondents (104) were missing for these variables. This occurred in the great majority of cases because the items in the RCQ were meaningless to students who had never drunk (see Appendix 1) and were not answered by these students. Mean RCQ score in the overall sample was -5.02 (SD = 8.14, range = -24-21, N = 722). This indicates that the sample as a whole tended to be low on readiness to change drinking behaviour. The distribution of RCQ scores is shown in Figure 5-15. Spearman's rho between RCQ continuous score and AUDIT total score in the overall sample was 0.42 (p < 0.005).

In the overall sample, male students scored significantly higher (M = -4.12, SD = 8.04) than female students (M = -5.62, SD=8.04) on the RCQ continuous measure (Mann-Whitney, Z = -2.68, p = 0.007). Students on sports based courses scored higher (M = -4.50, SD = 8.26) than students on non-sports based courses (M = -5.34, SD = 8.07) but the difference in RCQ means across degree subjects was not significant (Mann-Whitney, z = -1.29, p = 0.197). Students in the 1<sup>st</sup> year of study showed a higher mean RCQ score (M= -4.16, SD = 8.31) than those in the 2<sup>nd</sup> year (M = -6.14, SD = 8.53) and those in the 3<sup>rd</sup> year (M= -5.73, SD = 6.00) but these differences failed to reach the pre-set level of statistical significance (Kruskal-Wallis,  $\chi^2$  7.65, df = 2, p = 0.022). Finally, students who participated in sport scored higher on the RCQ (M = -4.19 SD = 8.33) than students who did not participate in sport (M = -5.28, SD = 8.08), although this difference was not significant (Mann-Whitney, Z = -1.41, p = 0.160). This lack of significant difference remained when 'never drinkers' were excluded from the analysis (Mann-Whitney, Z = -1.54, p = 0.125).

In the overall sample, 425 respondents (58.9% of the non-missing sample) were classified as in the Precontemplation stage of change, 141 (19.5%) as in the Contemplation stage and 156 (21.6%) in the Action stage. Means and SDs of AUDIT total scores for each of these groups are shown in Table 5-14. There was a highly significant difference between these mean scores (Kruskal-Wallis,  $\chi^2$ = 92.2, df= 2, p < 0.0005). In pairwise comparisons, the Precontemplation group obtained a significantly lower AUDIT mean score than the

Contemplation group (Mann-Whitney, Z = -9.58, p < 0.0005) which obtained a significantly higher mean score than the Action group (Mann-Whitney, Z = -5.39, p < 0.0005). The higher mean score in the Contemplation group than in the Action group can be explained by assuming that some of those in Action had already taken steps to reduce their drinking. In support of this conjecture, 29 (50%) of those students who said they were currently teetotal were in the Action stage of change.

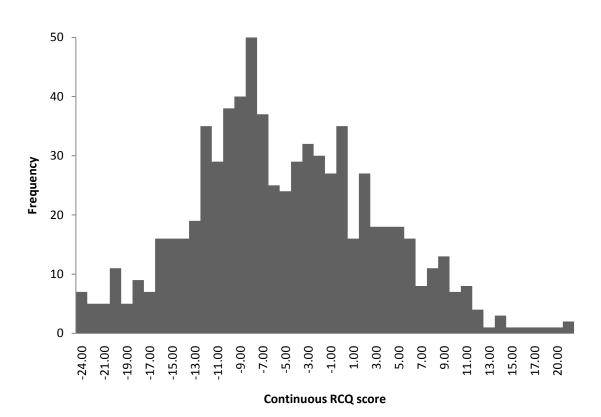


Figure 5-15: Distribution of RCQ scores for the student sample

Table 5-14: Mean (SD) Total AUDIT scores \* Stage of Change

Stage of change	Total AUDIT score
Precontemplation	9.0 (5.7)
Contemplation	15.5 (6.7)

Table 5-15 shows the relationship between RCQ variables and AUDIT levels of risk (i.e., low-risk drinking, hazardous, harmful and probable dependence). Table 5-15 gives mean and SDs of AUDIT total scores for each risk category as well as percentages in each risk category falling into each of the three stages of change.

Table 5-15 shows that readiness to change is strongly related to AUDIT risk category, with readiness to change increasing as risk increases. There were highly significant differences between AUDIT risk categories on the RCQ continuous score (Kruskal-Wallis,  $\chi 2 = 123$ , 62, df = 3, p < 0.0005) and a highly significant association between AUDIT risk category and stage of change ( $\chi 2 = 1043E2$ , df = 6, p < 0.0005). However, over half of those in the hazardous drinking category (59%) were in the precontemplation stage and therefore apparently not concerned about their drinking. Even at the highest level of risk where the AUDIT classification is "probable dependence", nearly 30% were unconcerned about their drinking and over 50% were still contemplating change. Aggregating the percentages in Table 5-15, of those students who scored positive on the AUDIT (i.e., including hazardous, harmful and probable dependence), 51.3% were in the Precontemplation stage, 26.9% were in the Contemplation stage and 21.8% were in the Action stage. It is interesting that nearly 20% of those in the AUDIT low-risk category were in the Action stage of change, suggesting that, as noted above, some heavy drinking students had already cut down on their drinking or abstained.

Table 5-15: Mean (SD RCQ Continuous Scores for AUDIT Risk Categories and Percentages of the Sample in each Stage of Change category

	Low	Hazardous	Harmful	Probable
	Risk			Dependence
RCQ				
Continuous Score	-9.4 (7.4)	-4.6 (7.3)	-1.6 (7.6)	1.6 (7.9)
(Mean/SD)				
Precontemplation	77.0%	58.7%	42.9%	28.4%
Contemplation	3.2%	20.1%	32.1%	51.4%
Action	19.8%	21.3%	25.0%	20.3%

## 5.5 <u>Drinking Expectancy Questionnaire</u>

A large number of respondents were missing on the DEQ (missing = 192). The majority of these were students who had either never drunk or tasted alcohol or who were currently teetotal and therefore found the items in the DEQ difficult or impossible to answer.

Table 5-16 shows mean and standard deviations of total DEQ score plus six DEQ subscale scores for the overall sample (N=634) and for sport and non-sport participants. The table shows that the highest elevations among subscales in the overall sample are for Sexual Enhancement, Assertion and Tension reduction.

Table 5-16 also shows that means for sport and non-sport participants were very similar. None of these differences was statistically significant. The only difference that approached significance was that for the Assertion subscale (Mann-Whitney, Z = -2.025, p = 0.043), with the former having slightly higher alcohol expectancies on this measure.

Table 5-16: Mean (SD) Total and Subscale DEQ scores for the whole sample and for sport and non-sport participants

	Total DEQ	Assertion	Affective	Dependence	Sexual	Cognitive	Tension
			Change		Enhancement	Change	Reduction
Total Sample	15.4 (2.6)	3.3 (0.8)	2.0 (0.6)	2.0 (0.7)	3.4 (0.6)	2.0 (0.7)	2.7 (0.9)
Sport	15.5 (2.7)	3.4 (0.8)	2.0 (0.6)	2.0 (0.7)	3.4 (0.7)	2.0 (0.7)	2.6 (0.8)
Non-Sport	15.4 (2.4)	3.3 (0.8)	2.0 (0.6)	1.8 (0.7)	3.4 (0.6)	2.0 (0.7)	2.7 (0.9)

Correlations (Spearman's rhos) between AUDIT total scores and DEQ total and subscale scores are shown in Table 5-17. All these correlations were significant at the 1% level of statistical significance (2-tailed). The highest correlations, equivalent to a large effect size, were for the DEQ total score and for the Assertion and Dependence subscales.

Table 5-17: Spearman Correlation between Total AUDIT scores and Total and subscale DEQ Scores

	Total DEQ	Assertion	Affective	Dependence	Sexual	Cognitive	Tension
a <del></del>			Change		Enhancement	Change	Reduction
Total AUDIT	0.562	0.519	0.180	0.540	0.279	0.213	0.321
Score							

## 5.6 Normative beliefs

Table 5-18 shows means and standard deviations of aspects of students' personal alcohol consumption behaviours and their perception of those behaviours in others. (For the purposes of this analysis, following McAlaney and McMahon (2007), the response options for each item in the Normative Belief Measure of the questionnaire (see Appendix 1) were assumed to represent interval-level scales ranging from 1-9.) The table shows that students tended to perceive others as drinking more frequently, drinking more on a night out and drinking enough to get drunk more often than they did themselves. These perceptions of drinking in others increased in magnitude from 'your closest friends' to 'an average student your age' before decreasing slightly for 'the average person your age in the UK'. These results are very similar to those reported by McAlaney & McMahon (2007) for students at the University of Paisley, Scotland.

Table 5-18: Mean (SD) of perceived personal consumption of others on three normative belief measures

	Perceived personal consumption	Perceived consumption in close friends	Percieved consumption in other students	
Alcohol Consumption	e real contractions and a green sea with			
Measure				
Frequency of drinking permonth	4.6 (2.1)	5.6 (1.8)	6.7 (1.3)	6.4 (1.2)
No.of drinks on night out	4.2 (2.0)	4.9 (1.8)	5.4 (1.7)	5.1 (1.6)
Frequency of drunkenness days per month	3.6 (2.1)	4.8 (1.9)	5.9 (1.5)	5.6 (1.5)

Table 5-19 reports correlations (Spearman's rho) between students' self-reports of their own consumption and their perception of the alcohol consumption of others according to the three measurement items. These correlations show a very similar pattern to those reported by McAlaney and McMahon (2007) and indicate that perceptions of alcohol consumption in closest friends are most strongly related to personal behaviour, with

perceptions of fellow students' consumption less so and perceptions of consumption by people of the same age in the general population less closely related still.

Table 5-19: Spearman correlation between students' self reports of their alcohol consumption and perception of the alcohol consumption of others according to measurement items

	Closestfriends	Average student your age	Average person your age in the UK	
Alcohol				
Consumption				
Measure				
Frequency of drinking per month	0.658	0.274	-0.003	
No.of drinks on night out	0.743	0.609	0.466	
Frequency of drunkenness 0.683		0.379	0.175	

The next stage in the analysis concerns the extent to which students' perceptions of others' drinking are correct or incorrect (i.e., the degree of misperception). This was done by comparing students' reports of their own consumption with their perceptions of the drinking of other students at the same university. The assumption is that the means of students' self-reports at each institution equate to the actual norms for students at that institution. Thus the difference between students' perceptions of their fellow students' drinking and the actual norms for student drinking calculated as above gives a measure of the degree of misperception of normative drinking for each student.

When this was done, the three misperception variables thus formed (i.e., for the three measurement items of frequency of drinking, quantity of drinking and frequency of drunkenness) were compared between male and female students. The difference between degree of misperception between men and women approached but did not reach significance

for two of these variables (frequency of drinking, Z = -2.33, p = 0.020; frequency of drunkenness, Z = -2.01, p = 0.045), with mean showing greater misperception in both cases.

The difference between genders for the other variable (quantity of drinking, Z = -0.28, p = 0.780) was not significant. Correlations were calculated between age and the three misperception variables. Two of these correlations were significant but low (quantity of drinking, rho = -0.159, p < 0.0005; frequency of drunkenness, rho = -0.113, p = 0.002), with misperception tending to decrease with age. The other correlation was not significant (frequency of drinking, rho = -0.044, p = 0.792).

Degree of misperception was also compared between sport and non-sport participants. Again, two of these differences approached significance (frequency of drinking, Z = -2.25, p = 0.024; quantity of drinking, Z = -1.86, p = 0.063), with sport participants showing greater misperception for frequency of drinking but lesser misperception for quantity of drinking. The other difference was not significant (frequency of drunkenness, Z = -1.32, p = 0.187).

Finally, correlations were run between the three misperception variables and AUDIT total score. These correlation were low but significant for frequency of drinking (rho = -0.18, p < 0.005) and for quantity of drinking (rho = 0.21, p < 0.005) but not significant for frequency of drunkenness (rho = -0.07, p = 0.071). For quantity of drinking AUDIT total score increased as degree of misperception increased but for frequency of drinking it decreased as degree of misperception increased. The pattern and size of these correlations did not meaningfully change when 'never drinkers' were excluded from the analysis.

## 5.7 **Summary of findings**

- 1. Mean AUDIT score in the overall sample was 9.5, which is higher than the cut-point for the designation of an alcohol use disorder. 60.9% of the sample was classified as having an alcohol use disorder by the AUDIT.
- 2. The overall sample was also classified into the following AUDIT risk categories: Low risk drinkers = 39.2%; Hazardous drinkers = 41.3%; Harmful drinkers = 10.5%; Probable dependence = 9.1%.
- 3. In terms of how often students drank, the largest proportion (39%) reported doing so 2-3 times per week. On a typical drinking occasion, 26% said they drank only 1-2 drinks but 21% drank 7-9 drinks and 20% drank 10 drinks or more. Over a third of students (35%) engaged in 'binge drinking' (6 or more drinks on one occasion) on a weekly basis.
- 4. There were large and highly significant differences in mean AUDIT scores between the nine institutions taking part in the survey.
- 5. When students who had never drunk or tasted alcohol, mainly on religious grounds, were excluded from the sample, mean AUDIT score increased to 10.5 and 67.8% were classified as having an alcohol use disorder.
- 6. There was a highly significant difference on AUDIT scores between students who participated in university sport and those who did not, with sport participants having a higher mean AUDIT score (11.9) than non-participants (8.8). A higher proportion of those on a sports team (79.6%) were classified as having an alcohol use disorder than those not on a sports team (55.5%).
- 7. Compared with students not participating in university sport, sport participants drank more frequently and in larger typical quantities, and binge-drank more often.
- 8. Among sport participants, there were no significant differences in AUDIT scores according to the level of sport played.

- 9. Students who took part in team sports showed a higher mean AUDIT score (13.1) than those who took part in individual sports (9.5), with the highest scores associated with traditional team sports involving teams of 11 or more per side (i.e., rugby, football and hockey). 84.5% of students who played team sports were classified as having an alcohol use disorder.
- 10. There was no significant difference in AUDIT scores between students who reported a current or recent injury and those without an injury.
- 11. No significant difference was found between the mean AUDIT score of male (10.0) and female (9.1) students and this conclusion did not change when 'never drinkers' were excluded from the analysis. There was also no difference between men and women in the proportions falling into AUDIT risk categories.
- 12. Although they did not differ in frequency of drinking or frequency of binge drinking, men drank significantly larger amounts on a typical drinking occasion than women.
- 13. Among sport participants and among non-sport participants, male and female students showed no significant difference in their AUDIT scores. However, the significantly higher AUDIT total scores for sport participants compared to non-participants were maintained when each gender was examined separately.
- 14. 1<sup>st</sup> year students showed a significantly higher mean AUDIT score (11.3) than 3<sup>rd</sup> year students (9.3), who in turn showed a significantly higher mean score than 2<sup>nd</sup> year students (6.9). When 'never drinkers' were excluded from the analysis, there was no longer a significant difference between 2<sup>nd</sup> and 3<sup>rd</sup> year students.
- 15. In terms of type of degree course, mean AUDIT for students on sports based courses (10.9) was significantly higher than that for students on non-sports based courses (8.4). This significant difference was maintained when 'never drinkers' were excluded from the analysis.
- 16. Students living on-campus had a higher mean AUDIT score (13.7) than those living off-campus (11.2), who in turn had a higher mean score than those living with family (7.2). In the overall sample, students living with their family did not obtain a higher

- mean AUDIT score than those living in 'other' accommodation but, when 'never drinkers' were excluded from the analysis, they did show a higher mean score.
- 17. In the overall sample, there was a significant negative correlation between AUDIT total score and student age (-0.357), with older students tending to show lower AUDIT scores.
- 18. In a logistic regression analysis, sport participation was not an independent predictor of an alcohol use disorder when other background variables were added to the model. The strongest predictors in the model were the institution attended, age and living arrangements. When 'never drinkers' were excluded from the analysis, the main finding of the analysis did not change.
- 19. In a further logistic regression analysis, significant predictors of sport participation were the institution attended, age, type of degree course, year of study and term-time living arrangements.
- 20. Students who participated in university sport were significantly more likely to identify with the athlete role (as measured by the AIMS) than students who did not participate in university sport but the correlation between AIMS and AUDIT total scores was not significant.
- 21. The sample as a whole was low on readiness to change drinking behaviour and students who participated in university sport were not more ready to change than those who did not participate in university sport.
- 22. 58.9% of the overall sample were classified in the Precontemplation stage of change, 19.5% in the Contemplation stage and 21.6% in the Action stage. The Precontemplation group showed a significantly lower mean AUDIT score than the Contemplation group which obtained a significantly higher mean score than the Action group. The higher mean AUDIT score in the Contemplation group than in the Action group can be explained by assuming that some of those in Action had already taken steps to reduce their drinking.
- 23. Over half of students in the hazardous drinking category (59%) were in the precontemplation stage and therefore apparently not concerned about their drinking.

Even at the highest level of risk (probable dependence), nearly 30% were unconcerned about their drinking and over 50% were still contemplating change. Among those classified as having an alcohol use disorder, 51.3% were in the Precontemplation stage, 26.9% were in the Contemplation stage and 21.8% were in the Action stage.

- 24. In the overall sample, the highest elevations among subscales from the DEQ were for Sexual Enhancement, Assertion and Tension Reduction.
- 25. There was very little difference between sport and non-sport participants on subscales or total score from the DEQ.
- 26. Correlations between AUDIT total scores and DEQ total and subscale scores were significant, with the highest correlations, equivalent to a large effect size, for the DEQ total score and for the Assertion and Dependence subscales.
- 27. In the overall sample, students tended to perceive others as drinking more frequently, drinking more on a night out and drinking enough to get drunk more often than they did themselves. These perceptions of drinking in others increased in magnitude from 'your closest friends' to 'an average student your age' before decreasing slightly for 'the average person your age in the UK'.
- 28. When degrees of misperception of drinking norms were calculated, there were non-significant trends for men to show greater misperception of frequency of drinking and frequency of drunkenness than women. Misperceptions of quantity of drinking and frequency of drunkenness tended to decrease with age.
- 29. There were non-significant tendencies for sport participants to show greater misperception of frequency of drinking than non-sport participants but lesser misperception of quantity of drinking.
- 30. There were low but significant correlations between AUDIT total score and degree of misperception of frequency of drinking (-0.18) and for quantity of drinking (0.21). For quantity of drinking AUDIT total score increased as degree of misperception increased but for frequency of drinking it decreased as degree of misperception increased.

## 6 DISCUSSION

The aim of this study was to explore the relationship between sport participation and alcohol consumption among students in England. In the course of doing so, however, much valuable information was acquired about the current drinking habits of students in general. For this reason, discussion of the findings reported above will be divided into two parts. First, the implications of the findings on the drinking behaviour of students in general will be commented on. Secondly, the more specific issue that was the initial focus of the study – the relationship between drinking behaviour and sports participation among students – will be addressed.

## 6.1 <u>Drinking among students in general</u>

### 6.1.1 Representativeness of the sample

It was pointed out in the Method section of this report (p.17) that the sample of students collected in this survey was a purposive sample designed to throw light on the issue of the relationship between sports participation and drinking behaviour while, at the same time, including a spread of geographical locations and student demographics. For this reason, it cannot be claimed that the sample was representative of the student population in English universities. The need to include two FE colleges to make up the sample to the required number increased this lack of true representativeness.

That being clearly established, it is relevant to compare characteristics of the sample obtained here with the characteristics of students at universities and FE colleges in England for the most comparable period for which data are available. Unfortunately, summary statistics were available only for students at universities in the UK, not specifically for England. The latest published information was obtained from the Higher Education Statistics Agency (2010) for the academic year 2007-08 and from the Office for National Statistics (2004) for the academic year 2001-02, the most recent year for which data on FE students were available. Of the students who volunteered to take part in the study, 39.7% were male and 60.3% were female. Students at HE institutions in the UK are also predominantly female (57.3% cf. 42.7% male). The same is true for FE institutions, with 58.5% female students and 41.5% male students. Thus our sample is roughly representative of the UK student population in terms of gender breakdown. As in the current sample, the UK student HE population is

predominantly white but Figure 6-1 below illustrates that the current sample has slightly greater ethnic diversity, as shown by the lower percentage of White students (71.3%) and higher percentage of black students (14.5%) when compared to the HE student population in the UK as a whole. With regard to age, the majority of both the present sample and the UK university student population fall into the age group of 20 years and below (Figure 6-2).

Figure 6-1: Percentage of UK University Population vs. Present Sample

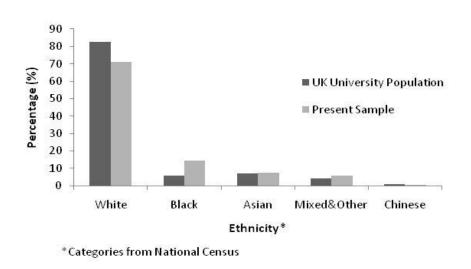
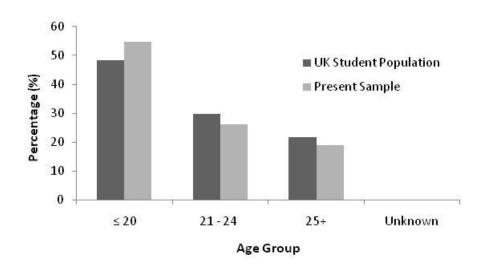


Figure 6-2: Percentage Age Group of UK Student Population vs. Present Sample



### 6.1.2 Differences between participating institutions

In interpreting the present findings, it should be borne in mind that there were large and highly significant differences in mean AUDIT scores between the universities and colleges taking part in the survey. Means on the AUDIT ranged from 4.00 to 14.07, with a spread of means between these extremes. One curious aspect of this range of AUDIT scores was the fact that the mean AUDIT for the combined FE colleges was the lowest among the institutions taking part. This could be due to the fact that a greater proportion of these students lived with family during term-time (63.6%) than was true of the HE students (35.9%), with very few FE students living in student accommodation, either on- or off-campus (5.4%). It is therefore possible that parental influence, as opposed to peer influence, was greater in FE students and that lower consumption occurred because of parental disapproval of heavy drinking (Miller & Plant, 2010).

The differences between institutions on AUDIT were accounted for where appropriate in the analysis and should not therefore affect the validity of the findings reported. However, in considering the implications for policy and practice of the levels of drinking behaviour and alcohol-related harm calculated for the whole sample, the wide variation on the measures between institutions should be kept in mind.

Another possible source of bias arises from the fact that, as stated in the Method section above (p.19), we were not able to account for students who did not attend the lectures at which the research questionnaire was completed. It is possible that such students had higher levels of alcohol consumption than those who did attend and that their alcohol consumption was related in some way to their non-attendance at lectures (Gill, 2002). If this is true, however, it clearly means that the real level of alcohol consumption among students at the institutions sampled was even higher than reported here.

#### 6.1.3 Frequency and quantity of student drinking

The proportion of alcohol abstainers recorded here (19%, including both 'never drinkers' who had never drunk or tasted alcohol and those who had drunk in the past but were currently abstaining) is higher than the figure reported by Gill (2002) in a review of studies examining the drinking behaviour of UK undergraduates over the preceding 25 years. From a total of 18 studies, the mean abstention rate over the time period examined was 14% for men and 12.6% for women (Gill, 2002, p. 113). However, not all the studies reviewed reported abstention

rates and, among those that did, different methods were used to define abstinence. Gill (2002) was therefore unable to reach any definite conclusions as to the prevalence or reasons for abstention in the UK undergraduate population but commented that the ethnic origin of the sample is a critical factor due to higher rates of abstention amongst non-White students, particularly Asian students. In the present survey, the proportion of the sample from a non-White ethnic background was 28.7% and this may have contributed to the high rate of abstainers, particularly in view of the fact that the main reason given by students for lifelong abstention was religion. In a US study, Huang and colleagues (2009) examined the sociodemographic and psycho-behavioural characteristics of students who chose not to drink and established that those who reported participation in religious group activities were more likely to abstain from alcohol.

Of students consuming alcohol, 45% indicated they drank on at least 2 days of the week, with very little difference between men and women in this respect. In terms of quantity, 41.4% of the sample drank heavily at 7+ units per typical occasion. While more men (27.0%) than women (15.1%) reported drinking very heavily (i.e. 10+ units per occasion), the number of women doing so might be regarded as especially alarming in view of women's greater physiological vulnerability to the effects of heavy drinking (Fuchs et al., 1995; Becker et al., 1996; Baraona et al., 2001). In confirmation of these rates of heavy drinking, 37.1% of the sample reported engaging at least once a week in 'binge drinking', defined on the AUDIT as 6 or more drinks per occasion for both sexes. While this behaviour was somewhat more likely among men (38.0%), over a third of women surveyed (34.5%) binge drank at least weekly.

Although the literature contains many reports of levels of student drinking from around the world, particularly the USA, comparisons of the results of these studies with the present data are inappropriate because of the large influence of cultural factors affecting drinking in different countries. Unfortunately, however, direct and exact comparisons of our figures for frequency and quantity of drinking with those from previous surveys of students in the UK are not possible because previous work did not use the AUDIT questionnaire. As far as it is possible to judge, the consumption levels recorded here appear to be lower than those reported in some previous studies. Norman and colleagues (1998) and, more recently, Faulkner and colleagues (2006) investigated drinking among 136 and 261 Welsh university

undergraduates respectively, with drinking levels remaining high even though studies were conducted several years apart. Norman, Bennett & Lewis (1998) established that 46.3% of the sample binge drank at least once per week, with 64.4% of males consuming at least 10 units and 32.5% of females consuming at least 7 units in one session on a weekly basis. Faulkner and colleagues (2006) found that 51% of males regularly drank more than 6 drinks and 40% of females regularly drank more than 4 drinks on one occasion on a weekly basis, probably a greater frequency of binge drinking, at least among men, than recorded in the present study. The average number of drinking occasions was also reported to be approximately 3 times per week, with males consuming an average of 9.6 drinks and females 6.3 drinks in each episode. However, both these studies had a smaller sample than collected here and concentrated their data collection on single Welsh universities, so the findings cannot be considered representative of UK students in general or directly comparable with ours.

Several previous UK-based studies have focussed on medical or dental undergraduates. Underwood and Fox (2000), for instance, compared units of alcohol consumed among UK-based dental undergraduates against UK government guidelines of 28 units for men and 21 units for women per week. It was reported that drinking was higher than these recommended levels among 56% of males and 58.5% of females, prompting the suggestion that drinking in this particular population was at levels that could cause damage to both health and forthcoming careers. However, the focus on dental students is obviously not representative of UK students in general. An earlier study by Webb et al. (1996) that included ten universities encompassing several different faculties is a study perhaps more comparable with ours. It must be noted however that, like Underwood and Fox (2000), Webb and colleagues (1996) did not use the AUDIT and so classified binge drinking differently to the present study, defining it as consuming more than half of the 'sensible' weekly number of units (i.e., 7 units for women and 10 units for men) in one session. This earlier study found 28% of the sample reported binge drinking, whereas 41.4% of students in the present study reported drinking 7 or more drinks per typical occasion. Again, different definitions make comparisons difficult but this suggests that there may have been an increase in the number of students who engage in binge drinking from 1996 to the time of the present survey in May 2009.

While comparisons with previous UK surveys of student drinking are difficult, it is also possible to compare our data with norms for the drinking of young people in the same age range in the UK. A report entitled 'Smoking and Drinking Among Adults, 2008' compiled by the Office for National Statistics using data collected in the General Lifestyle Survey (2008) reveals the average weekly consumption of alcohol by British adults aged between 16 and 24 years to be 13.1 units per week. In the present sample of undergraduates, it was established from the AUDIT that the modal frequency of drinking was "2 to 3 times a week" (Table 2) and the modal quantity of alcohol consumed was 7 to 9 drinks (Table 3). Using the mid-point of each of these ranges (2.5 x 8), average weekly consumption equates to 20 units per week. The average number of units consumed per week in the present student sample is therefore clearly higher than in the non-student population of young people in the UK. It should be noted, however, that the minimum age in the present sample was 18 years while the GLS (Robinson & Bulger, 2008) data included 16- and 17-year-olds, who are below the legal age to purchase alcohol. While the consumption of 16-and 17-year-olds may be far from negligible, it is presumably lower than those who can buy alcohol legally. It is not clear whether the age difference in the two sets of data can account for the difference in estimated mean consumption.

#### 6.1.4 Alcohol use disorders

Use of the AUDIT questionnaire in this survey enables estimates to be made of the prevalence of alcohol use disorders approximating to ICD-10 categories. The basic finding of the survey is that no less than 60.9% of the sample is considered to have an alcohol use disorder (i.e., a score of 8+ on the AUDIT for males and 7+ for females). Indeed, the mean AUDIT score for the sample as a whole is above the conventional cut-point for an indication of an alcohol use disorder of 8+. The proportion of alcohol use disorders recorded here may be compared with the proportion of adults classified as showing an alcohol use disorder by the *Alcohol Needs Assessment Project for England* (ANARP: Drummond et al., 2005) carried out for the Department of Health in 2004. In the ANARP, 38% of adult men (16-64), 16% of adult women and 26% overall were deemed to have an alcohol use disorder. In the ANARP the criterion for an alcohol use disorder was a score of 8+ on the AUDIT for both genders, whereas in the data reported here the cut-point for women was lowered to 7+. Nevertheless, there is clearly a much higher prevalence of alcohol use disorders among the students surveyed in the present study than in the general adult population of England.

A total of 41.3% of the sample fall into the category of 'hazardous drinker' (AUDIT 8-15 for males, 7-15 for females), defined by Babor, Higgins-Biddle, Saunders & Monteiro (2001a) for the World Health Organisation as 'a pattern of (alcohol) use that increases the risk of harmful consequences for the user'. This may be compared with WHO guidance on the combined use of the AUDIT (Babor et al., 2001a) and brief intervention (Babor & Higgins-Biddle, 2001b). It is recommended there that individuals falling into the hazardous drinking category be offered brief intervention in the form of 'simple advice' (see Babor & Higgins-Biddle, 2001b, pp. 17-22). However, given the very large number of students to whom this recommendation is likely to apply, the existing counselling services currently available to the student population would become overstretched and more costly to operate (Bewick, Trusler, Mulhern, Barkham & Hill, 2008b); they could therefore be overwhelmed by the increase in referrals created by a widespread application of the AUDIT among university students and the implementation of the WHO guidelines stated above. The most obvious solution to this problem is to make available the kind of web-based interventions that have been developed and evaluated by Kypri et al. (2004) and Bewick et al., (2008c). These interventions require only low administration yet are highly accessible and have been found to be of benefit in the student population (Hustad, Barnett, Borsari & Jackson, 2010; Bewick et al., 2008b; Bewick et al., 2008c; Cunningham, Khadjesari, Bewick & Riper, in press). Good evidence of efficacy and effectiveness of web-based interventions to reduce drinking in the general population has recently been provided by Riper and colleagues (2008; 2009) in the general population in the Netherlands and there appears to be no reason why they should not be equally effective among the student population of the UK. The evidence of the present survey suggests that the dissemination and implementation of web-based preventive interventions on university campuses in England is a matter of urgent necessity.

A further 10.5% of the sample score between 16 and 19 on the AUDIT and are classified as showing 'harmful drinking', defined in ICD-10 (WHO, 1993) as: 'A pattern of (alcohol) use which is already causing damage to health. The damage may be mental or physical.' The WHO recommendation here is that such individuals should be offered 'brief counselling' (Babor & Higgins-Biddle, 2001b, pp. 23-26). This form of brief intervention differs from simple advice in being more intensive and aiming to provide the client with 'tools to change basic attitudes and handle a variety of underlying problems'. While much smaller than those in the hazardous drinking category, the number of students to whom this

applies on the basis of this survey is still very large and would be likely to overwhelm the capacity of existing counselling services. However, it is unlikely that all students in this category would accept the offer of counselling and the proportion that would do so remains to be determined (see Readiness to Change below). The kind of brief single-session motivational interviewing approach evaluated in FE colleges by McCambridge and Strang (2004) could be considered for application among this group of harmful drinking university students, although it should be noted that the beneficial effects of this intervention originally reported were short-lived (McCambridge & Strang, 2005). In more general terms, there has been a great deal of attention to the development of interventions to reduce harmful levels of drinking among students, both in the USA and elsewhere, and the findings of the present survey suggest that this area of work should be given a much higher priority in both research and service development in England.

The final category of alcohol use disorder is the 9.1% of the sample who score 20+ on the AUDIT and are deemed by this to be showing 'probable alcohol dependence'. The WHO guidance (Babor & Higgins-Biddle, 2001b, pp.27-29) states that individuals scoring in this range 'are likely to require further diagnosis and specialized treatment for alcohol dependence' (p.27) but reminds the reader that the AUDIT is not a diagnostic instrument and that it is therefore unwarranted to conclude or inform the individual concerned that alcohol dependence has been formally diagnosed. It is also possible, of course, that some individuals scoring below 20 on the AUDIT require specialized treatment. Again, although the number of students in this category is very large and would likely overwhelm the specialist alcohol services in the local area of the university in question, it is possible that many of these students would reject a referral to a specialist agency even though it might be of benefit to them. As with the number deemed by the AUDIT to need counselling services, however, and accepting that this estimate of prevalence of alcohol dependence is valid, there is clearly a major problem with regard to alcohol dependence in the student population in England. In the ANARP, the prevalence of alcohol dependence in the population at large was estimated at 6% of adult men, 2% of women and 3.6% overall. However, the criterion for alcohol dependence used in the ANARP was an AUDIT score of 16+. Thus, if the same criterion had been used for the present survey data, the prevalence of alcohol dependence would have been estimated at 19.6% and the excess of alcohol dependence in the student population compared to the general population suggested by the present results would have been even greater.

#### 6.1.5 Gender differences

Similarities and differences between the drinking of male and female students were noted above. A basic finding was that, using a pre-set and conservative probability level to indicate statistical significance, there was no difference between the mean AUDIT scores of male and female students, even when those who had never drunk or tasted alcohol were excluded from the analysis. Similarly, there were no significant differences between men and women in proportions falling into the various AUDIT risk categories. There was no significant difference between the genders in the frequency of drinking or in the frequency of binge drinking but men reported drinking more heavily than women on a typical drinking day.

In general population data on alcohol consumption, the decreasing difference between men's and women's drinking is known as the 'gender convergence' hypothesis (Bloomfield et al., 2001; McPherson et al., 2004). Among students, in 1996 Webb and colleagues found that 20% of men and 10% women were drinking hazardously, showing a clear difference in drinking behaviour between genders at that time. Within our sample, there was no significant difference between the genders, with 40.6% of males and 41.7% of females recorded as being hazardous drinkers (recalling that the cut-point for women was lower at 7+ than for men at 8+). It must also be pointed out that, in the 1996 study, AUDIT was not used to classify hazardous drinking; instead, it was defined as males drinking in excess of 50 units and females drinking in excess of 35 units per week. Webb and colleagues (1996) also established that 31% of males and 24% of females were binge drinking, defined as drinking over half the recommended 'sensible' weekly limits in one session. When a comparison is made with the present study, it appears to show an increase in binge drinking over the last 14 years in both genders, with 40.8% of male and 34.5% of female students reporting that they binge drink on a weekly or more frequent basis. Again, despite the problems in making valid comparisons, this suggests that a greater number of female students are now drinking hazardously and taking part in binge drinking on a weekly basis than both the male and female students in the 1996 study.

If the hypothesis of gender convergence is accepted as applying to student drinking in the UK, it no doubt reflects general trends in society at large, to do with a process of 'emancipation' in which women increasingly move into professions and adopt lifestyles previously relatively exclusive to men and adopt the drinking behaviour of men as a consequence (Bloomfield et al., 2001; Measham & Øestergaard, 2009). Alcohol advertising targeted at young women and features of the urban night-time economy may also have contributed to an increase in women's drinking, at least in the UK (Plant & Plant, 2006). Although not examined in the present study, the negative effects that arise from high levels of alcohol consumption have previously been investigated and comparisons made between genders. It has been calculated that binge drinking is roughly 1.5 times more likely to have a negative effect on the student life of a female than of a male by missing a class (Wechsler et al., 1995b). In addition, a study by Gill and colleagues (2007) investigated a sample of female undergraduates and found that a large proportion misunderstood and were unable to define exactly what is meant by the term 'binge drinking' and could not quantify a single unit of alcohol accurately. In a pouring exercise, the mean measure dispensed by participants was equivalent to 1.98 units for wine and 2.24 units for spirits. Because 50% of preferred drinking locations are not licensed premises, it is likely that the student themselves or an acquaintance will be pouring a drink, so that the measures used by licensed premises will not be applied in these circumstances. This could also imply female under-reporting of consumption in the present study because males tend to prefer beer rather than wine or spirits and beer is usually purchased and consumed in more quantifiable amounts (Gill, Donoghy, Guise & Warner, 2007). Finally, the greater vulnerability of women compared with men to the physiological damage caused by excessive drinking has already been mentioned above and obviously gives grave cause for concern regarding the levels of drinking among women recorded in this survey.

#### 6.1.6 Factors specific to student life

Findings of previous studies, especially those conducted with students in the USA, indicate factors specific to student life that can have an impact upon alcohol consumption; these include year of study, student accommodation and age.

In both a longitudinal and cross-sectional sample of UK university students that included post-graduates from all faculties, Bewick and colleagues (2008b) reported that, compared with other years, 1st year students drank the highest amounts, with 50% consuming above the recommended levels. The findings of the present survey replicate those of Bewick and colleagues, with 1<sup>st</sup> year students showing a significantly higher mean AUDIT score than both 2<sup>nd</sup> and 3<sup>rd</sup> year students. A significantly higher mean score for 3<sup>rd</sup> than for 2<sup>nd</sup> year

students ceased to be significant when 'never drinkers' were excluded from the analysis, almost certainly because 'never drinkers' tended to be in their 2<sup>nd</sup> year of study. The finding of greater consumption among 1<sup>st</sup> year students could be explained by the relocation from the family home, which is undoubtedly a difficult period of transition and a time when there is a sudden reduction in parental supervision over drinking (White & Jackson, 2004).

Bewick et al. (2008c) also reported that there was a significant reduction in the number of units consumed per week over the three years of undergraduate study. Even with a reduction in consumption, however, almost one third of the 3<sup>rd</sup> year students were found to drink above the recommended 'sensible' amounts and where high risk drinking was reported in year one, it was likely to be reported in the subsequent years of study. Nevertheless, this reduction in alcohol consumption perhaps suggests that, during the course of their studies, individual students place greater importance on coursework and grades and devote growing thought to future careers (Bewick et al., 2008b; White & Jackson, 2004; Steinman et al., 2003).

A related finding of our survey was of a negative correlation between AUDIT score and age. The vast majority of studies that have examined the reasons for decreasing alcohol consumption as age increases have been conducted on American student populations. A review conducted by Ham and Hope (2003) examined possible causes for the problematic drinking of students, the findings of which supported a trend for a steady reduction in alcohol consumption as students advance through the American college system. There are difficulties in identifying why this should occur but it has been proposed that it is likely due to students becoming more mature as they transit through their student years, a process frequently labelled 'maturing out' (Vik, Cellucci & Ivers, 2003; O'Malley, 2004). At the beginning of university life, students often leave the family home so there are decreasing limitations placed upon them by parents (O'Malley, 2004) so as a consequence they feel 'more freedom than responsibility' (Schulenberg, O'Malley, Bachman, Wadsworth & Johnston, 1996). During their years at university they become more mature and must often take on more responsibility due to them living independently, such as paid employment and some may even marry and become parents themselves. With more responsibility and less freedom, priorities change, this suggests that their attitudes with regards to drinking also change (O'Malley, 2004; Schulenberg et al., 1996).

In a sample of 1st year students, Kypri and colleagues (2002) in New Zealand found that they tended to live in halls of residence, as is the case in the present results with almost one quarter of those in their first year of study living on-campus (22.6%). In our data, termtime accommodation was found to have a significant and large effect on AUDIT scores, even when 'never drinkers', who tended to live with the family, were removed from the analysis. Those living on-campus had the highest mean AUDIT score of 13.69 compared to those living with family (7.17) or in other accommodation (6.09), who had the lowest mean scores. These findings are not dissimilar to those of Kypri and colleagues (2002) who investigated 12 halls of residence at universities in New Zealand and reported that students drank more than the recommended levels in 5 of them. This led the author to conclude that this type of environment has the effect of increasing the amount of alcohol consumed by students. On campus, there are an array of student social events taking place during the course of the academic year which tend to centre on drinking alcohol (Kypri et al., 2002). As a consequence an individual's alcohol consumption will be greatly influenced by peers in ways ranging from offering to buy another individual a drink or buying in rounds, to actually goading to encourage further drinking (Kuntsche et al., 2004). This creates an environment in which students may feel compelled to do the accepted thing and disregard any damaging consequences that might follow (Faulkner, Hendry, Roderique & Thomson, 2006). It might also be explained by a "sense of belonging" felt within those who reside on-campus, in halls of residence, as discovered in a sample of 1st year Canadian university undergraduates (Johnson, Rodger, Aitken Harris, Edmunds & Wakabayashi, 2005). Johnson and colleagues (2005) described this environment as being a 'type of community where small groups of individuals live together in "family" settings. This closeness or sense of belonging may be less apparent in other university living arrangements, such as off-campus student housing, where community membership is not necessarily emphasized or required. This suggests that students may consume higher levels of alcohol to fit in or increase their feelings of belonging to the community' (Johnson et al., 2005, p.15).

The clear finding of the present survey is that the introduction to student life in the 1<sup>st</sup> year of study and living in on-campus student accommodation are combined risk factors for excessive drinking. University authorities should pay more attention to how beginning students can be "inoculated" against these risk factors and to preventing easy access to cheap alcohol on university campuses. For students, there are on-campus bars which offer a

plentiful and wide ranging supply of inexpensive alcohol and use promotion and advertising techniques which tend to glamorise drinking. Local bars within the vicinity of the campus also target student drinkers by offering them alcohol at reduced prices. It has been argued that universities themselves impose inadequate rules with regard to alcohol consumption and, as a result, the university campus environment is one which enables easy access to alcohol and encourages heavy drinking (Ross & Dejong, 2008; Weitzman et al., 2003).

Another factor specific to student life that might affect alcohol consumption and problems is the type of course that students were engaged on. However, the main comparison here in the present survey was between those on a sport-based course and those not on a sport-based course. Since this is more relevant to the issue of the relationship between sports participation and drinking behaviour, it will be dealt with in the next main section of this Discussion.

#### 6.1.7 Readiness to change drinking behaviour

It was noted above that not all the students classified here as having an alcohol use disorder would be interested or willing to accept an intervention or treatment to alleviate their alcohol problem. More objective information on this issue is provided by the findings of the *Readiness to Change Questionnaire* (RCQ: Heather & Rollnick, 2000). While this instrument does not directly ask about preparedness to receive intervention or treatment, it enquires about the respondents' readiness or willingness to change drinking behaviour according to the stages of change model developed by Prochaska and DiClemente (1986). Clearly, the degree of concern about their alcohol consumption shown by heavy drinking students has important implications for approaches aimed at reducing alcohol-related harm in the student population.

It was also noted in the Results section that a large number of survey respondents had missing data on the RCQ. This occurred mainly because items in the questionnaire were meaningless to students who did not drink. The problem of missing data is therefore unlikely to have invalidated the usefulness of these data for assessing readiness to change among the majority of the students who did drink. The moderate but highly significant correlation (0.42) between the RCQ continuous score and AUDIT total score gives an indication of the validity of the questionnaire in the student population. Further validation is provided by the finding that students classified as being in the Action stage of change showed a lower mean AUDIT

total score than those classified as being in the Contemplation stage, implying that the former had already taken steps to reduce alcohol consumption and problems.

While the mean RCQ score in the sample as a whole and the fact that the majority were classified as being in the Precontemplation stage suggest a low readiness to change drinking among students in general, more interesting is the degree of readiness to change shown by students identified as having an alcohol use disorder by the AUDIT. A basic finding here is that, as might be expected, readiness to change increases as the severity of the alcohol use disorder increases. Thus 41.4% of those in the hazardous drinking category were either in the Contemplation or Action stage of change, compared with 57.1% of those in the harmful drinking category and 71.7% in the probable dependence category. This gives an indication of the numbers who might benefit from intervention or treatment - for example, a motivational interviewing approach (Miller & Rollnick, 2002) to resolve ambivalence about heavy drinking among those in Contemplation stage, with the addition of practical skills training for those in the Action stage.

The reverse of this coin concerns the proportions of those with alcohol use disorders who are classified as being in the Precontemplation stage and as therefore being apparently unconcerned about their drinking or any negative consequences arising from it. This applies to 58.7% of hazardous drinkers, 42.9% of harmful drinkers and over one-quarter (28.4%) of those with probable dependence. One response to this situation might be to recommend that the students in question need to receive education about the harmful effects of heavy drinking but, unfortunately, the general literature on the effectiveness of strategies and policies for alcohol harm reduction (e.g. Babor et al., 2003) provides very little justification for such a recommendation. Rather, the literature suggests that the most effective means of reducing consumption and related problems, both in the student and the general population, is by making alcohol more expensive to purchase and less easily available in other ways (Babor, Higgins-Biddle, Saunders & Monteiro, 2001a).

There appear to have been no studies of readiness to change drinking behaviour among students in the UK, although there have been relevant studies in the USA (Vik et al., 2000; McNally et al., 2001; Caldwell, 2002; Shealy et al., 2007; Capone & Wood, 2009). Two of these studies (Caldwell, 2002; Shealy et al, 2007) were conducted among students who had been referred to a university-based intervention programme. Caldwell (2002)

reported that, even among these referred individuals, there was limited acknowledgement of a drinking problem or interest in changing behaviour. In a relatively small study of 49 undergraduates using the RCQ, Shealy et al. (2007) reported that higher levels of motivation to change drinking were related to higher frequency and quantity of alcohol use, similar to findings reported here, and argued for the importance of assessing motivation in students referred to receive alcohol brief interventions. In another study among 335 heavy drinking students, Capone and Wood (2009) found that readiness to change moderated the effects of brief intervention (brief motivational intervention or alcohol expectancy challenge) and suggested that future preventive interventions in the student population could be improved by taking a targeted approach to individual differences, including differences in readiness to change. In a study in which the RCQ was given to 152 binge-drinking undergraduates, McNally and colleagues (2001) found that the only significant predictor of readiness to change drinking behaviour was the level of negative alcohol expectancies (i.e., the degree to which one expects negative consequences to follow from heavy drinking).

The study in the USA with most relevance to the present findings was that of Vik and colleagues (2000), although even here a different measure of readiness to change was used (the SOCRATES: Miller & Tonigan, 1996) and heavy drinking was defined conservatively as at least one episode of heavy drinking (5+ US standard units for men and 4+ for women) during the preceding three months. These authors reported that two-thirds of heavy drinking students did not recognise a need to reduce their alcohol consumption despite evidence of tolerance and negative drinking consequences. Despite cultural differences, this is a similar finding to ours among British students and points to the need to measure and take into account readiness to change in designing interventions and considering policy options for reducing alcohol-related harm in the student population.

### 6.1.8 Student expectations of drinking

The Drinking Expectancy Questionnaire (DEQ: Young & Knight, 1989) was used in the present study to measure both the negative and positive expectancies that students hold about drinking alcohol. There are two negative expectancies, 'Affective Change' and 'Dependence', which measure expectations that alcohol will have a negative effect upon an individual. 'Affective Change' supposes that the individual will lose control over their alcohol consumption and 'Dependence' that drinking will result in a degree of dependence

upon alcohol (Lee, Oei, Greeley & Baglioni, 2003). The four positive expectancies are that drinking is believed to increase 'Social Assertiveness' provide both 'Sexual Enhancement' and 'Cognitive Enhancement' and bring about 'Tension Reduction' (Lee et al., 2003). The findings from the DEQ here revealed that the outcomes students expected most strongly from their consumption of alcohol are Sexual Enhancement, Assertion and Tension Reduction, all of which are positive expectancies. The results are similar to those of Oei and Jardim (2007) who reported that a sub-sample of Caucasian students expected that consumption of alcohol would reduce tension and increase both confidence and sexual interest. Oei and Jardim (2007) also commented that individuals with positive expectations are likely to consume greater amounts of alcohol than those with negative expectancies, a finding also consistent with a previous study conducted by Meade Eggleston and colleagues (2004). Further evidence that positive expectations may potentially lead to drinking at high levels was provided by Park (2004). Park (2004) reported student expectations of consuming alcohol attenuates tension and makes socializing easier, leading to more "fun" and cathartic experiences with friends.

In our data, a significant relationship was found between AUDIT scores and total DEQ scores, suggesting that expectancies are related both to the quantity and frequency of alcohol consumption (Meade Eggleston, Woolaway-Bickel & Schmidt, 2004) and increase the probability of alcohol-related problems (Ham & Hope, 2003). It has also been suggested that 'negative expectancies' may not be viewed as negative by students who drink heavily, as they too have been found to be associated with increased alcohol consumption and drinking-related problems (Meade Eggleston et al., 2004; Ham & Hope, 2003).

Further analysis revealed significant relationships between total AUDIT scores and all DEQ subscales, with the strongest associations being found with 'Assertion' and 'Dependence'. The significant relationship with 'Assertion' indicates that the more alcohol an individual consumes, the more assertive they expect to become. As noted above, previous studies have indicated that individuals who hold positive expectations relating to drinking alcohol will probably consume more alcohol than people who do not (Oei & Jardim, 2007). The 'Assertion' expectancy might also be a key mediating factor in the association between psychological problems, such as depression, anxiety, and alcohol-related problems, especially in men (Ham & Hope, 2003). The significant association discovered between the total

AUDIT scores and the two negative expectancies 'Dependence' and 'Affective Change' indicate that the higher the alcohol consumption the greater the expectation of dependence and negative emotional states, although it should noted that with the latter expectancy there was a much weaker relationship. Greenfield et al., (2009) related negative alcohol expectancies to drinking for escape reasons and also established a correlation between these negative expectations and heavy drinking. A significant association between negative expectations and alcohol-related problems was also found by Meade Eggleston and colleagues (2004).

#### 6.1.9 Student beliefs and misperceptions of drinking

It has been shown that normative beliefs created by an individual's perceptions of another's behaviour are a major contributor to student heavy drinking (Borsari & Carey, 2001). In the present investigation, it was found that students have a tendency to perceive other individuals to drink more frequently, consume more on a night out and drink enough to get drunk more often than they do themselves. Further examination revealed that estimates of other individuals' drinking were highest of an 'average student of the same age' and an 'average person of the same age in the UK' and were lowest of 'closest friends'. These findings are comparable with those of McAlaney and McMahon (2007) who examined a sample of 500 students from the University of Paisley in Scotland and found that, as the social gap widened from an individual to the target of estimation, the higher alcohol consumption was perceived to be.

Additional analysis was performed to explore the relationship between a student's own consumption and their perceptions of alcohol consumption in 'close friends', 'other students of the same age' and 'others of the same age'. It revealed that the perceptions an individual held about alcohol consumption in closest friends were most strongly related to their own behaviour, almost certainly due to close friendships being the most salient. Once again, the results are in agreement with those of McAlaney and McMahon (2007) who suggested that this may be due to a cause-and-effect relationship whereby individuals perceive everybody else to drink more than themselves and so use this to rationalise their personal alcohol consumption. In a sample size similar to the present study, Neighbors and colleagues (2007) investigated social norms related to heavy drinking in American college students and found that, when an individual overestimates the drinking behaviour of others

and they believe that friends endorse the use of alcohol more than they do themselves, the individual will drink more and have more alcohol-related problems.

The extent to which students' misperceive the drinking of others was also explored by comparing individual reports of own consumption against perceptions of the drinking of other students at the same university, assuming that the mean self-reported consumption at the institution in question was the best available approximation to the actual norm. The degree of the misperception for the sample as a whole, for age and gender, was examined between 'frequency of drinking' 'quantity of drinking' and 'frequency of drunkenness', with 'frequency of drunkenness' being misperceived the most highly. This is also consistent with data from the University of Paisley students who perceived other students to get drunk more than twice as often as they did themselves (McAlaney & McMahon, 2007). Between genders there was a tendency for males to have a greater misperception of both 'frequency of drinking' and 'frequency of drunkenness' in others, although not to any significant degree. The similarity of male and female misperceptions might be due to there being greater parity between men and women within the UK drinking culture, particularly in relation to binge drinking (McAlaney & McMahon, 2007). The misperception of 'frequency of drunkenness' could also be due to drunken behaviour in public being noticeable and often memorable, leading individuals to talk about incidents to their peers and exaggerate them (Perkins, 2002). In this way, drunken behaviour becomes more socially acceptable and has an effect upon personal consumption. A significant albeit low association was detected between age and misperception of both 'quantity of drinking' and 'frequency of drunkenness', with the degree of this misperception tending to decrease as age increased. This implies that, as students mature, they acquire a greater accuracy and understanding of the drinking behaviour of others (McAlaney & McMahon, 2007), although it could once again be attributed to the fact that as they become more mature, they place lower importance on drinking and have a reduced need to justify their drinking behaviour (Bewick et al., 2008b; McAlaney & McMahon, 2007).

A final analysis of misperceptions investigated whether there was a relationship between total AUDIT score and misperceptions of 'frequency of drinking', 'quantity of drinking' and 'frequency of drunkenness'. There were low but significant associations between reported personal consumption and misperceptions of 'frequency of drinking' and 'quantity of drinking'. Where high alcohol consumption was reported, there was a greater

degree of misperception in the 'quantity of drinking' in other individuals. These particular students are likely therefore to participate in heavy drinking, believing that they are like everyone else and they do not have a problem (Perkins, 2007). As personal alcohol consumption decreased there was a greater degree of misperception in the 'frequency of drinking' of others. This finding is in agreement with a study that investigated the misperceptions of peer drinking norms in Canadian students. Here Perkins (2007) drew attention to the fact that these misperceptions might also have negative consequences, as students who drink lightly or abstain may feel less socially integrated and more isolated from the other students. The study also concluded that normative beliefs should be considered as being one of the best predictors of student drinking. As the findings in the present study are similar to those found, not only in studies of American students but also of UK students, they therefore illustrate a need for normative-belief type interventions within the overall UK student population (McAlaney & McMahon, 2007).

### 6.2 Sport Participation and Drinking

The specific focus of the present study was an attempt to resolve an ambiguity in the literature regarding whether or not students who participate in sport drink more heavily than students who do not. Given the lack of attention to this issue in British research, the intention was to examine the relationship between sport participation and drinking in a large sample of English students. The answer to the question posed is clear and unambiguous: in the present sample, sport participants reported drinking more heavily and showed more alcohol-related problems than non-sport-participants.

Highly significant differences in mean AUDIT scores were found between students who participated in sport (11.85) and those who did not (8.77). When 'never drinkers' were removed from the analysis, mean AUDIT score for the sport participants remained significantly higher (12.32) than for non-sport participants (9.97), therefore the difference between the two groups cannot be accounted for by the greater numbers of lifelong abstainers among the non-sport-participants. In terms of quantity and frequency of alcohol consumption, it was found that sport participants drank more frequently and in greater quantities than non-sport participants and showed a greater frequency of "binge" drinking. Again, these highly significant differences remained when 'never drinkers' were excluded. The suggestion by

Thombs (2000) that "athletes" might drink in higher quantities than non-athletes but not more frequently found no support in our data.

These differences in alcohol consumption data were also reflected in differences between the two groups in proportions categorised by the AUDIT as showing various levels of alcohol use disorder. Thus, more than half (54.1%) of the sport participants were classified as hazardous drinkers compared to 37.5% of the non-sport participants. The majority of non-sport participants (44.6%) were found to fall into the 'low risk' AUDIT category whereas approximately only one in five (20.4%) of the sport participants fell into this category. The remainder of the sample were classified as either harmful drinkers or probably dependent, with greater proportions of sport participants (harmful 13.3% and possible dependence 9.7%) than non-sport participants (harmful 12.2% and possible dependence 8.3%) once again falling into these categories.

To the best of our knowledge, there have been no previous studies attempting to compare the drinking levels of sport participants with non-sport participants in the UK student population. As a result, the most suitable comparison for the present data is with a study by O'Brien and colleagues (2008) in New Zealand. The legal age for purchasing alcohol in New Zealand and in the UK is 18 years (Alcohol Advisory Council of New Zealand, 2008). O'Brien et al., (2008) employed the AUDIT to ascertain drinking levels and to establish whether there was an association between hazardous drinking and the level of participation in sport. The sample of university undergraduates enabled a comparison of AUDIT scores between students who were sportspeople and those who were non-sporting. There were significant differences between the AUDIT scores of the two groups, with the scores of the sportspeople being higher (11.04±6.86) than the non-sportspeople (8.65±6.84). The findings from New Zealand are similar to the present results in showing that, while both groups showed high proportions of drinking at hazardous levels, those who participated in sport drank more hazardously than those who did not.

The majority of previous studies that have measured and made comparisons between the two groups have been conducted in the American student population. There are obviously cultural differences in drinking between the USA and the UK which create difficulties in using this previous research to advance reasons why the alcohol consumption of sport participants in the present sample is higher than the non-sport participants. However, reasons put forward in a review by Martens et al. (2006) might be considered cross-cultural. This proposed that, due to training and competition schedules, there are not as many opportunities for drinking for sports participants and therefore, when they do drink, it is at a much higher level than others. The competitive personality that sport-participants ideally have and their requirement to win are characteristics that might also be carried over into their social and drinking behaviour (Martens, et al., 2006; Nelson & Wechsler, 2001; O'Brien & Lyons, 2000; Sparkes et al., 2007). On a related note, Garry and Morrisey (2000) in a study of middle school pupils found that those on sports teams were more likely to engage in risky behaviour, including alcohol consumption. This suggests those who participate in sport may possess characteristics associated with increases in certain behaviours such as drinking. This reasoning probably applies only to athletes who take their sport very seriously, not so much to those who play mainly for enjoyment.

It should be noted that the association between sport participation and hazardous drinking observed here is unaffected by gender. When men and women were examined separately, the highly significant difference between sport and non-sport-participants was found for both genders. On the other hand, in line with findings for the total sample, there were no significant differences between the drinking of men and women for either sport participants considered separately or non-sport-participants.

The main implication of these findings is that there is no support for the suggestion (Murphy et al., 2005; Polymerou, 2007) that participation in university sport can serve as a way of preventing hazardous drinking and alcohol use disorders among students. Indeed, our data indicate that sport participation may be a risk factor for the development of such disorders.

# 6.2.1 Possible moderators of the relationship between sport participation and drinking: sport-related variables

A factor that did not moderate the relationship between sport participation and drinking in our data was the level of sport at which the student played. The implicit hypothesis here was that, as the level of competition increased, the greater the commitment of the athlete to fitness and health and therefore the lower the alcohol consumption. However, this was not what was found because there were no significant differences in AUDIT total scores between students at different levels of competition. It is possible that there were too few elite (i.e.,

international) athletes in the sample to detect lower consumption at the highest level of sport participation. It is also the case that mean AUDIT score for national/international athletes combined was lower than for other athletes, although this difference was not significant and the mean was above the cut-point for an alcohol use disorder. However, the highest mean AUDIT score (13.0) was shown by students who represented their universities at BUSA sports, although again this difference was not significant. In general, our results provide no support for the hypothesis that alcohol consumption among student athletes is moderated by level of competition.

O'Brien and colleagues (2005) obtained similar findings in a study which explored hazardous drinking in elite sportspeople in a sample of students from a university in New Zealand. The earlier investigation examined non-elite, provincial and international sportspeople and also found no significant differences between mean AUDIT scores and level of competition (O'Brien et al., 2005). In contrast to our findings, that students who compete at BUSA level have the highest mean AUDIT score, the previous study discovered that sports participants who competed at the highest levels (provincial and international level) had the highest mean AUDIT scores and were the most hazardous drinkers. It must be pointed out, however, that the study by O'Brien and colleagues had a greater number of international-level sports participants than the present study; nevertheless the findings provide further evidence that the assumption that greater commitment to sport is associated with lower alcohol consumption is inaccurate.

Another factor that did not affect the relationship between sport participation and drinking behaviour was the presence of a current or recent injury. It might conceivably be hypothesised that injured students would drink more because of depression but there was no evidence for this conjecture (Holahan, Moos, Holahan, Cronkite & Randall, 2003; Johnston & Carroll, 1998).

A sport-related variable that did have a significant effect on drinking behaviour was whether or not the student took part in a team-based versus an individually-based sport. Students who took part in team sports, such as rugby, football and hockey, showed a significantly higher mean AUDIT score than those who played in individually-based sports, like tennis, badminton, water-sports and snow-sports, while the higher number of individuals in team sports classified as having an alcohol use disorder just failed to meet the pre-set level

of significance. This finding is consistent with that of Ford (2007). Unfortunately, sample sizes were too small to enable meaningful comparisons to be made between individual sports. Nevertheless, it seems likely that the post-game, alcohol-fuelled *camaraderie* traditionally associated with popular team sport in British culture is reflected in the present findings (Robertson, 2003).

A possible moderator mentioned in the Background section above was the degree to which a student identifies with the athlete role, assuming that identification with athletic prowess and an associated high motivation for physical fitness would place limits on alcohol consumption. In our survey this variable was measured by the Athletic Identity Measurement Scale (AIMS). This hypothesis was not confirmed. Although, as would be expected, students who took part in sport showed significantly greater identification with the athlete role than those who did not, the correlation between AIMS score and AUDIT total score was non-significant and weak. This is consistent with the finding discussed above, that level of competition was not related to AUDIT score. It is noteworthy that AIMS score differed significantly between different levels of competition but that neither variable was related to drinking behaviour as measured by the AUDIT. One possible issue to consider is that the AIMS questionnaire is a measure of athletic identity. Miller and colleagues (2006) argue that 'athletic' identity and 'jock' identity may actually be distinct and that future work should consider untangling the differences between them.

# 6.2.2 Possible moderators of the relationship between sport participation and drinking: other variables

The relationship between drinking measures and various non-sport-related variables (i.e., readiness to change, alcohol outcome expectancies, normative misperceptions of drinking) were discussed above. Here we consider whether and to what extent the established relationship between sport participation and alcohol consumption is moderated by these variables.

Although students on sports teams scored higher on a continuous measure of readiness to change drinking behaviour, this difference was not large and was, in any case, non-significant. This lack of significant difference remained when 'never drinkers' were excluded from the analysis. Both sport participants and non-participants tended to show low readiness to change.

With regard to alcohol expectancies, there was very little difference between sport participants and non-participants on the total score from the *Drinking Expectancy Questionnaire* or its subscale scores. The only difference that approached the pre-set level of significance was for the Assertion subscale but even here there was very little difference between means for sport and non-sport participating groups. Despite evidence of strong relationships between alcohol expectancies and drinking among students in general, the conclusion must be that the relationship between sport participation and drinking is not moderated by alcohol expectancies and that, although sport participants drink more heavily, this is not related in any way to differing expectations about the consequences of alcohol consumption.

Degrees of normative misperception were also compared between sport and non-sport participants. Here it was found that sport participants showed greater misperceptions of frequency of drinking than non-sport participants (i.e. sports participants tended to overestimate the frequency with which their fellow students drank more than non-sport participants) but this difference failed to reach the pre-set level of statistical significance. Conversely, there was a tendency for sport participants to overestimate the quantity consumed by fellow students on drinking occasions *less* than non-sport participants. There was no difference between the two groups in the degree to which they misperceived frequency of drunkenness among fellow students. This set of findings does not make much sense and the differences that approached significance are most likely due to chance. The overall conclusion is that the relationship between sport participation and drinking is not moderated by differences in normative misperceptions of drinking behaviour.

# 6.2.3 How can the relationship between sport participation and drinking behaviour be explained?

Given the clear association between taking part in university sport and excessive drinking among students, the question naturally arises how this association can be explained and what causal factors can be adduced to account for it. One possible explanation proposed by Martens et al. (2006) has been noted above (p.81) and many others could no doubt be developed.

However, any attempt at explanation must begin from the assumption that the observed relationship between sport participation and drinking is not an artefact of the

influence of other variables, i.e., that sport participation can predict level of alcohol consumption independently of such variables. It was for this reason that we conducted a logistic regression analysis aiming to predict the presence of an alcohol use disorder assessed by the AUDIT from background variables, including sport participation. The regression model was set up with sport participation entered as a first step and demographic and other background variables entered subsequently in order to test the assumption that sport participation would remain as a predictor of an alcohol use disorder when the effects of those background variables had been taken into account in the analysis.

This, however, is not what was found. Instead, it was found that sport participation ceased to be a predictor of an alcohol use disorder when background variables were added to the model. Significant predictors of an alcohol use disorder were the university or college the student attended, the student's age and their living arrangements (i.e. whether they lived oncampus, off-campus, with family or in other accommodation. When 'never drinkers' were excluded from the analysis, the main finding did not change and sport participation continued not to predict an alcohol use disorder. The same picture emerged when the dependent variable was changed to reflect more severe alcohol use disorders – harmful drinking and probable dependence.

To try to make better sense of these findings, we ran another logistic regression analysis, this time with the aim of predicting sport participation from background variables. In this analysis, significant predictors of sport participation were the university attended, age, type of degree course (sport vs. non-sport), year of study and term-time accommodation. It should be noted that these were all variables with strong first-order relationship with AUDIT score and that 3 of them (university, age, accommodation) were predictors of an alcohol use disorder in the prior logistic regression analysis.

It is not possible, on the basis of these results, to draw conclusions about the causes of the association between sport participation and excessive drinking. However, it is possible to infer that the specific university attended, the student's living arrangements and their age all moderate the relationship between sport participation and drinking. It is also possible to hypothesise that the higher drinking levels of students who take part in sport is not the result of sport participation *per se* but of the fact that they are more likely to attend heavier drinking universities, tend to be younger and are more likely to live in on-campus accommodation

than non-sport participants, all characteristics associated with heavier drinking. This hypothesis should be tested in further research.

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# 8 APPENDICES



## **PROJECT DETAILS**

TITLE OF PROJECT: Use and abuse of alcohol in UK university sport

Participant ID Number:

Principal Investigator: Dr. Sarah Partington

Investigator contact details: Phone: 01 91 243 7554

Email: sarah.partington@northumbria.ac.uk

This project is funded by: Alcohol Education Research Council (AERC)

#### INFORMATION TO POTENTIAL PARTICIPANTS

#### 1. What is the purpose of the project?

Alcohol use amongst young adults, particularly students, has been of increasing concern. As well as identifying current drinking patterns of undergraduate students, It is important to identify any high risk groups (e.g. age, gender, year group) within this population. A comprehensive study into student drinking patterns has not been carried out in the UK since 1996 and none have looked specifically at the different groups with the student body. As a result it is important to investigate the current situation within UK university students, with a particular focus on identifying key 'at risk' groups.

This study aims to investigate the drinking habits and patterns of undergraduate UK university students.

#### 2. Why have I been selected to take part?

You are a current undergraduate student at a UK university.

#### 3. What will I have to do?

Complete a questionnaire pack during one of your lectures. The pack will take around 15 minutes to complete.

#### 4. What are the exclusion criteria (i.e. are there any reasons why I should not take part)?

Unless you are not a registered undergraduate University student at a UK institution there is no reason why you should not take part in this study.

#### 5. Will my participation involve any physical discomfort?

No

#### 6. Will my participation involve any psychological discomfort or embarrassment?

You will be asked to answer questions related to your drinking of alcohol. It is not anticipated that these questions will be uncomfortable however if you are distressed at any point you may withdraw from the study with no consequences. The data collected will not be linked to your name, therefore your identity will remain anonymous. If the study raises your concerns about your own level of drinking and you wish to find out more information, the researcher can provide you with relevant contact numbers and materials for the student counseling service and NHS.

#### 7. Will I have to provide any bodily samples (i.e. blood, saliva)?

No

#### 8. How will confidentiality be assured?

You have been issued with a participant ID number so no names or identifying information will be reported. Only the research team will have access to personal details, such as your name and contact details for the purpose of communicating the results of the study should you wish to receive them.

#### 9. Who will have access to the information that I provide?

Only the research team will have access to the information you provide.

#### 10. How will my information be stored / used in the future?

All data will be stored securely in a locked cabinet and on a password protected computer. This will ensure that only the research team has access to any information.

#### 11. Has this investigation received appropriate ethical clearance?

Yes. If you have any concerns or worries then please contact Professor Kenny Coventry via email at kenny.coventry@unn.ac.uk, or via telephone on 01 91 2437027.

#### 12. Will I receive any financial rewards / travel expenses for taking part?

No

#### 13. How can I withdraw from the project?

You can withdraw anonymously by contacting and quoting your participant ID number, which can be found at the top of this information sheet and your debriefing sheet. Please contact Dr. Sarah Partington (Tel. 01 91 243 7554 or email: sarah.partington@unn.ac.uk) or any other member of the research team:

Helen Wareham (Tel. 01 91 227 4863 or email: helen.wareham@unn.ac.uk).

#### 14. If I require further information who should I contact and how?

You can contact any of the above mentioned members of the research team via telephone or email.

In collaboration with:





# **INFORMED CONSENT FORM**

TITLE OF PROJECT:	Use and abuse of alcohol in UK university sport					
Participant ID Number:						
Please read and complete the	nis form <i>carefully.</i>					
		Please tick if applicable				
I have read and understood the Participant Information Sheet.						
I have had an opportunity to ask questions and discuss this study and I have received satisfactory answers.						
I understand I am free to withdraw from the study at any time, without having to give a reason for withdrawing, and without prejudice.						
I agree to take part in this study.						
	on the overall results of the study at the email address give not receive individual feedback on my own performance.	en 🗌				
Email address						
Signature of participant	Doto					
Signature of participant	Date					
(NAME IN BLOCK LETTERS)						
Signature of researcher	Date					
(NAME IN BLOCK LETTERS)						

# **Demographic Questionnaire**

1.	Sex:				Male			Female			
2.	Age:										
3.	Degree s	ubject(s)									
4.	Length of course in years (Please Circle): 1			: 1	2	3	4	5			
5.	Year of s	tudy (Please Circle):		1 st	2nd	3rd	4th	5th			
6.	Which U	Which University sports teams do you play for:			(if none, go to question 9)						
	Sport 1			Sp	ort 2			Sport 3			
7.	What is t	nat is the highest level you compete at (Please Circle):									
		ntra-mural n the university)	BUSA			Natio	onal	International			
8.	3. Are you currently or have you recently been injured and unable to play sport (Please <i>Tick</i> ):										
	No ☐ Currently ☐ Recently ☐ (within the last 2 <b>months)</b>										
9.	Are you a member of any other University clubs and/or societies, please specify:										
0.	). How would you describe your ethnicity (Please <i>Tick</i> ):										
	White		Mixed								
	Black		Asian								
	Chinese		Other	Пр	lease so	ecify:					

11.	Where do you live during term time (Please Circle):					
	On-campus/Halls	Off-campus/Student house			Family/Guardian	
	Other (Please Specify):					
12.	Have you ever drunk alcohol:	•	Yes		No	
13.	Are you currently teetotal or ab	estaining from				
10.	drinking alcohol:	•	Yes		No	
	ж					
14.	If yes what were your reasons	for becoming teetotal or absta	ainin	g:		

# **Audit**

One unit of alcohol is: 1/2 pint average strength beer/lager OR one glass of wine OR one single measure of spirits.

**Note:** some drinks may contain deceptively high quantities of alcohol. For example, a can of high strength lager may contain 3–5 units and a bottle of pre-mixed spirit drink may contain up to 2 units.

# Please circle the answer that is correct for you:

1.	How ofter	n do you have a drink	containing alcohol?		
	Never	Monthly or less	2-4 times a month	2-3 times a week	4 or more times a week
2.	How man	y units of alcohol do	you drink on a typical	day when you are drin	king?
	1 or 2	3 or 4	5 or 6	7, <b>8 or 9</b>	1 0 or more
3.	How ofter	n do you have six or r	more units of alcohol o	on one occasion?	
	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
4.	How ofter started?	n during the last year	have you found that y	you were not able to st	op drinking once you had
	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
5.	How often during the last year have you failed to do what was normally expected from you because of drinking?				
	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
6.		n during the last year avy drinking session?		st drink in the morning	to get yourself going
	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
7.	How ofter	n during the last year	have you had a feelin	g of guilt or remorse af	ter drinking?
	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
8.		n during the last year you had been drinking		e to remember what ha	ppened the night before
	Never	Less than monthly	Monthly	Weekly	Daily or almost daily
9.	Have you	ı or someone else bee	en injured as a result	of your drinking?	
	No	Yes, but not in the las	st year	Yes, during the last ye	ar
10.		ative or friend or doct d you cut down?	tor or another health v	vorker been concerned	about your drinking or
	No	Yes but not in the las	st year	Yes, during the last ye	ar

# The Athletic Identity Measurement Scale

Please circle the number which best reflects the extent to which you agree or disagree with each statement in relation to your own sports participation.

1.	I consider myself to be a sportsman/woman.								
	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
2.	I have many goa	ls relate	d to spo	rt.					
	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
3.	Most of my friend	ds are s	portsme	n/wome	n.				
	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
4.	Sport is the most	t importa	ant part	of my lif	e.				
	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
5.	I spend more time thinking about sport than anything else.								
	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
6.	I need to participate in sport to feel good about myself.								
	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
7.	Other people see me mainly as a sportsman/woman.								
	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
8.	I feel bad about myself when I do poorly in sport.								
	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
9.	Sport is the only important thing in my life.								
	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree
10.	I would be very o	depresse	ed if I we	ere injure	ed and c	ould no	t compe	te in sport.	
	Strongly Agree	1	2	3	4	5	6	7	Strongly Disagree

# **Drinking Expectancy Questionnaire (DEQ)**

Key:	Strongly Disagree 1	Disagree 2	Neither Agree nor Disagree 3	Agre 4	e		Strongly Agree 5	
	pond to these items ase circle answer)	according to YO	OUR beliefs about drinki	ng				
1.	I get better ideas wh	nen I am drinking		1	2	3	4	5
2.	I do not drink alcoho or week's work	ol to help me unwi	nd after a hard day	1	2	3	4	5
3.	Little things annoy me less when I'm drinking			1	2	3	4	5
4.	Drinking makes me feel outgoing and friendly			1	2	3	4	5
5.	Drinking alcohol makes me tense			1	2	3	4	5
6.	I have more self-confidence when drinking			1	2	3	4	5
7.	It is not necessary to	o drink to get full o	enjoyment out of life	1	2	3	4	5
8.	Drinking makes me more sexually responsive			1	2	3	4	5
9.	When I am anxious or tense I do not feel a need for alcohol			1	2	3	4	5
10.	Drinking makes the future brighter			1	2	3	4	5
11.	I drink alcohol because it's a habit			1	2	3	4	5
12.	Drinking makes me bad tempered			1	2	3	4	5
13.	. I am more aware of what I say and do if I'm drinking alcoho			1	2	3	4	5

5

14. I feel that drinking hinders me in getting along with otherpeople 1

# **Drinking Expectancy Questionnaire (DEQ)**

Key:

Key:	Strongly Disagree 1	Disagree 2	Neither Agree nor Disagree 3	Agre 4	е		Strongly Agree 5	
	spond to these items ase circle answer)	according to YO	UR beliefs about drinkir	ng				
15.	I feel restless when	drinking alcohol		1	2	3	4	5
16.	I am more sullen and	d depressed when	I'm drinking alcohol	1	2	3	4	5
17.	I rarely think about a	ulcohol		1	2	3	4	5
18.	I cannot always control my drinking				2	3	4	5
19.	I am less concerned about my actions when I'm drinking				2	3	4	5
20.	If I'm drinking it's easier to express my feelings			1	2	3	4	5
21.	I drink to relieve tens	sion		1	2	3	4	5
22.	I often feel sexier aft	er l've been drinki	ng	1	2	3	4	5
23.	Drinking does not he recent concerns and		ension I feel about	1	2	3	4	5
24.	Drinking increases n	ny aggressiveness	<b>.</b>	1	2	3	4	5
25.	Drinking makes me	feel like a failure		1	2	3	4	5
26.	Drinking helps me to	be more mentally	/ alert	1	2	3	4	5
27.	Drinking alcohol rem	noves most though	nts of sex from my mind	1	2	3	4	5
28.	I tend to adopt a "wh	no cares" attitude	when drinking	1	2	3	4	5
29.	Drinking makes me more easily irritated				2	3	4	5

# **Drinking Expectancy Questionnaire (DEQ)**

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1	Сy	•

Key:	Strongly Disagree 1	Disagree 2	Neither Agree nor Disagree 3	Agre 4	e		Strongly Agree 5	
	pond to these items ase circle answer)	according to YOU	JR beliefs about drinki	ng				
30.	I am addicted to alco	phol		1	2	3	4	5
31.	Drinking brings out t	the worst in me		1	2	3	4	5
32.	I feel less shy when	drinking		1	2	3	4	5
33.	Drinking makes me feel more violent				2	3	4	5
34.	I am less discreet if I drink alcohol			1	2	3	4	5
35.	When I am drinking it's easier to open up and express my feelings			1	2	3	4	5
36.	I am powerless in the	e face of alcohol		1	2	3	4	5
37.	When I'm drinking I a embarrassment	avoid people or situ	uations for fear of	1	2	3	4	5
38.	Drinking alcohol sha	rpens my mind		1	2	3	4	5
39.	I feel disappointed in	n myself when drink	king	1	2	3	4	5
40.	Drinking is unimportant to me			1	2	3	4	5
41.	I tend to avoid sex if	I've been drinking		1	2	3	4	5
42.	I lose most feelings	of sexual interest a	fter I've been drinking	1	2	3	4	5
43.	I am clumsier when o	drinking alcohol		1	2	3	4	5

## **Normative Belief Measure**

(Please circle the option which best reflects your response and opinion)

No Response options (please circle) Item Every day 1. How many days in a month do you normally drink alcohol? 5-6 days a week 3-4 days a week 2 days a week 1 day a week 2-3 days a month Once a month Less than once a month Never or rarely 2. How many days in a month do you think most of your closest Every day friends drink alcohol? 5-6 days a week 3-4 days a week 2 days a week 1 day a week 2-3 days a month Once a month Less than once a month Never or rarely How many days in a month do you think an average student Every day 3. 5-6 days a week your age normally drinks alcohol? 3-4 days a week 2 days a week 1 day a week 2-3 days a month Once a month Less than once a month Never or rarely 4. How many days in a month do you think the average person Every day your age in the UK normally drinks alcohol? 5-6 days a week 3-4 days a week 2 days a week 1 day a week 2–3 days

Once a month

Never or rarely

Less than once a month

5	How many alcoholic drinks would you normally drink during a night out in a pub or club?	0 1-2
	a mg. a cara a para cara cara	3-4
		5-6
		7-8
		9-10
		11-12
		13-14
		15 or more
6	How many alcoholic drinks do you think most of your closest	0
	friends would normally drink during a night out in a pub or a	1–2
	club?	3–4
		5–6
		7–8
		9–10
		11–12
		13–14
		15 or more
7	How many alcoholic drinks do you think an average student your	0
	age would normally drink during a night out in a pub or a club?	1–2
		3–4
		5–6
		7–8
		9–10
		11–12
		13–14
		15 or more
8	How many alcoholic drinks do you think an average person	0
	your age in the UK would normally drink during a night out	1–2
	in a pub or a club?	3–4
		5–6
		7–8
		9–10
		11–12
		13–14
		15 or more

How many days in a month do you drink enough alcohol to Every day become drunk? 5-6 days a week 3-4 days a week 2 days a week 1 day a week 2-3 days a month Once a month Less than once a month Never or rarely How many days in a month do you think most of your closest Every day 10 friends drink enough alcohol to become drunk? 5-6 days a week 3-4 days a week 2 days a week 1 day a week 2-3 days a month Once a month Less than once a month Never or rarely 11 How many days in a month do you think an average student your Every day your age drinks enough alcohol to become drunk? 5-6 days a week 3-4 days a week 2 days a week 1 day a week 2-3 days a month Once a month Less than once a month Never or rarely How many days in a month do you think an average person Every day 12 your age in the UK drinks enough alcohol to become drunk? 5-6 days a week

5–6 days a week
3–4 days a week
2 days a week
1 day a week
2–3 days a month
Once a month
Less than once a month

# **Readiness to Change Questionnaire**

The following questionnaire is designed to identify how you personally feel about your drinking right now. Please read each of the questions below carefully, and then decide whether you agree or disagree with the statements. Please circle the answer of your choice to each question. Your answers are completely private and confidential.

		Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree	Official e Only
1.	I don't think I drink too much	1	2	3	4	5	Р
2.	I am trying to drink less than I used to	1	2	3	4	5	Α
3.	I enjoy my drinking, but sometimes I drink too much	1	2	3	4	5	С
4.	Sometimes I think I should cut down on my drinking	1	2	3	4	5	С
5.	It's a waste of time thinking about my drinking	1	2	3	4	5	Р
6.	I have just recently changed my drinking habits	1	2	3	4	5	Α
7.	Anyone can talk about wanting to do something about drinking, but I am actually doing something about it	1	2	3	4	5	Α
8.	I am at the stage where I should think about drinking less alcohol	1	2	3	4	5	С
9.	My drinking is a problem sometimes	1	2	3	4	5	С
10.	There is no need for me to think about changing my drinking	1	2	3	4	5	Р
11.	I am actually changing my drinking habits right now	1	2	3	4	5	Α
12.	Drinking less alcohol would be pointless for me	1	2	3	4	5	Р

In collaboration with:





# PARTICIPANT DEBRIEF

TITLE OF PROJECT:	Use and abuse of alcohol in UK university sport				
Participant ID Number:					
Principal Investigator:	Dr. Sarah Partington				
Investigator contact details:	Phone: 01 91 243 7554 Email: sarah.partington@northumbria.ac.uk				

#### 1. What was the purpose of the project?

To investigate the drinking habits and patterns of undergraduate university students at UK institutions.

#### 2. How will I find out about the results?

If you have provided us with contact details on your consent form we will send you a summary of our findings once the study is completed.

#### 3. Will I receive any individual feedback

No individual feedback will be given.

#### 4. What will happen to the information I have provided?

The information will be viewed by the research team as part of the study.

#### 5. How will the results be disseminated?

The findings of this study are likely to be presented at academic conferences and published in academic peer reviewed journals, however no names, personal or identifying details will be given.

# 6. Have I been deceived in any way during the project?

No deception has taken place.

## 7. If I change my mind and wish to withdraw the information I have provided, how do I do this?

You can withdraw anonymously by contacting Dr. Sarah Partington (as above) or any other member of the research team:

Helen Wareham (Tel. 01 91 227 4863 or email: helen.wareham@unn.ac.uk) and quoting the participant ID number at the top of this sheet.

If you have any concerns about issues related to alcohol misuse you can access these organisation for free:

## Online.

## www.downyourdrink.org.uk

## On the telephone:

Drinkline (Helpline): 0800 917 8282 9.00am-1 1.00pm, Monday to Friday

## Alternatively:

Drop in or contact your universities student services for local information and support.

If you have any concerns or worries concerning the way in which this research has been conducted, or if you have requested, but did not receive feedback from the principal investigator concerning the general outcomes of the study within a few weeks of taking part, then please contact Professor Kenny Coventry via email at <a href="mailto:kenny.coventry@unn.ac.uk">kenny.coventry@unn.ac.uk</a>, or via telephone on 01 91 2437027.