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An investigation into the relationship between social anxiety and alcohol use in a non-clinical student population

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An investigation into the relationship between social anxiety and alcohol use in a non-clinical student population

Abstract

The current study investigated the relationship between social anxiety and alcohol use in a student population through 5 dimensions: overall harmful alcohol use, alcohol consumption, drinking behaviour, adverse reactions and alcohol-related problems, based upon previous research in this area that has demonstrated inconsistent findings in regards to student populations. This was achieved through the use of a questionnaire adopting the SIAS and AUDIT scales, which was completed in full by 76 participants, all of whom were current students at the University of South Wales. Results of 5 Pearson product-moment correlations found no relationships between social anxiety and the 5 dimensions of alcohol use, which did not support the hypotheses. Further exploratory analyses were carried out to aid clarification of these results. Methodological reasons as well as theoretical reasons are discussed for these findings, as well as future directions and important implications of the study.

KEY WORDS	SOCIAL ANXIETY	ALCOHOL USE	SELF-MEDICATION HYPOTHESIS	STUDENT POPULATION
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1. Introduction:

1.1. Background

A common social norm seen in students at universities is that of alcohol consumption. This alcohol use has been seen to be excessive, and a leading cause of injury and in some cases death in students (Wicki, Kuntsche, & Gmel, 2010). Alcohol use has been seen to be the third highest preventable risk factor for disease globally, and can cause health concerns such as cancers and liver damage (Mekonen, Fekadu, Chane & Bitwe, 2017). This excessive harmful alcohol consumption in students is currently seen as a public health concern, with it having multiple negative consequences (Quigg, Hughes & Bellis, 2013). These include risky and unprotected sex, criminal behaviour such as assaults, lowered academic performance and negative impacts on physical and mental health (Quigg et al., 2013). A study by Heather et al. (2011) investigating levels of alcohol consumption in the UK in undergraduates found that 10% of participants displayed probable alcohol dependence through use of the AUDIT, and 1 in 5 participants likely met the criteria for a diagnosable alcohol use disorder (AUD). An AUD often involves experiencing a strong urge to consume alcohol, is a lifetime chronic illness and is usually comorbid with other physical and mental health disorders (Bartoli, Carrà, Crocamo & Clerici, 2015). Individuals with AUD often persist with this alcohol consumption despite negative consequences brought on by the consumption, and this causes clinically significant impairment (American Psychiatric Association, 2013). These drinking rates are said to be at their highest when the individual is aged 21-22, with students often maturing out these habits (Cronce & Larimer, 2011). Drinking rates are seen to drop as the student progresses through their degree (Bewick, Trusler, Mulhern, Barkham & Hill, 2008). Alcohol consumption is generally higher for those living on campus, and there appears to be no effect of course type on the amount of alcohol consumed (Stock et al., 2009).

1.2. Literature Review

Due to these serious effects of excessive alcohol consumption, which refers to heavy and binge drinking occurring on or almost a daily basis (Campbell et al., 2009), identifying potential risk and protective factors are essential. One area of research that has received much attention in relation to alcohol use is that of social anxiety. Social anxiety is characterised as an intense fear of situations in which an individual must socially interact with others and will potentially be watched or judged by others (American Psychiatric Association, 2013). An example would be a situation where an individual is introduced to people they do not know well. There is often a fear they will embarrass themselves, and these anxiety provoking situations tend to be avoided (American Psychiatric Association, 2013). Students can often be exposed to situations that could trigger this anxiety, such as parties and living in halls of residence.

1.2.1. Self-Medication Hypothesis

A theory that has claimed to explain the link between social anxiety and alcohol use is the self-medication hypothesis (SMH). The theory was first introduced by researcher Khantzian, who explains that those who are unable to handle their emotions are more vulnerable to developing a substance addiction (Khantzian, 1997). The theory explains this as those who are socially anxious will use substances such as alcohol or other drugs in order to reduce and manage negative painful emotions and distress associated with being anxious (Khantzian, 1997; Hall & Queener, 2007). This alcohol

consumption is then negatively reinforced, leading to an increased risk of developing an AUD (Menary, Kushner, Maurer & Thuras, 2011). However research into this proposition often displays inconclusive findings (Carrigan & Randall, 2003). Menary et al. (2011) found that anxious individuals who reported using self-medication through alcohol consumed high amounts of alcohol and had a higher likelihood of having an alcohol dependence problem. However it was also reported that some individuals with anxiety who did not self-medicate through alcohol consumption displayed lower levels of alcohol use compared to individuals who exhibited no anxiety. This finding demonstrates two extremes of alcohol consumption levels, with SMH potentially having an effect on this.

Alcohol dependence refers to an individual having a strong craving for alcohol use and an inability to control alcohol consumption. These individuals often have a high alcohol tolerance, with alcohol consumption often taking priority over other activities (Babor, Higgins-Biddle, Saunders & Monterio, 2001). Strahan, Panayiotou, Clements and Scott (2011) used the Alcohol Use Disorders Identification Test, Social Interaction Anxiety Scale and Alcohol Outcome Expectancies Questionnaire to investigate the relationship between social anxiety and alcohol consumption in student populations in both Cyprus and the USA. A curvilinear relationship between social anxiety and alcohol use was found, with the highest levels of alcohol consumption occurring when social anxiety was at a moderate level. It was then noticed that high levels of social anxiety resulted in the lowest levels of alcohol consumption. This finding was only found in male participants, with no relationships being noted in female participants. It was concluded that these findings did not support the SMH as an explanation for alcohol use in socially anxious individuals, and that the relationship between these two variables is in fact a lot more complex (Strahan et al, 2011). A study from Shepherd and Edelmann (2007), which adopted a case study design, provides support for the SMH. Through examination of 4 case studies of individuals suffering social phobia (social phobia and social anxiety are used interchangeably in the literature), it was demonstrated that alcohol was used as a coping mechanism to deal with social fears, alongside use of prescription drugs. One case used alcohol to enable themselves to interact with members of the opposite sex, and admitted to being reliant on alcohol to cope in such situations.

1.2.2. Alcohol use in socially anxious non-student populations

If the SMH is to be taken as a valid explanation for alcohol use in socially anxious individuals, these trends should be seen in socially anxious populations, with findings that should indicate high levels of consumption and using alcohol for coping with distress and unwanted emotions. There is some research support for this idea, with suggestions that those who have anxiety sensitivity may be more likely to engage in alcohol use to cope with negative feelings stemming from this anxiety (Norton, 2001). Research suggests that social anxiety acts as a precursor to alcohol use problems and alcohol dependence (Schneier et al., 2010; Buckner & Schmidt, 2009). Buckner and Turner (2009) investigated the relationship between social anxiety and AUD's through use of the Michigan Composite International Diagnostic Interview, and found a positive unidirectional relationship between social anxiety and AUD's, with social anxiety developing before the onset of an AUD, and did not find evidence to support the opposite direction to this.

Social anxiety may act as a risk factor for developing an AUD or alcohol dependence (Buckner et al., 2008; Buckner & Turner, 2009, Schneier et al., 2010; Buckner & Schmidt, 2009). In particular, Buckner and Schmidt (2009) found that it is fear of scrutiny that is most strongly linked to the development of an AUD, and so those who manage their anxiety of being observed through alcohol will have the greatest risk of suffering alcohol-related problems. Blumenthal, Leen-Feldner, Frala, Badour and Ham (2010) found in a sample of adolescents that socially anxious individuals were motivated to consume alcohol as a form of coping mechanism, and not for enhancement or conformity. This supports the idea that alcohol is consumed in order to manage unwanted anxious feelings rather than for enjoyment. However, a small amount of research suggests that there is no link between social anxiety and alcohol use. Fröjd, Ranta, Kaltiala-Heino and Marttunen (2011) found adolescents with social phobia demonstrated no association with alcohol use, but those with general anxiety did. Booth and Hasking (2009) found that those who display high anxiety and worry will likely avoid social situations where alcohol is common, and so found alcohol consumption to be negatively correlated to social anxiety as there is less opportunity and motivation to drink. It was also found that those who scored low on avoidance of social situations but high on fear of socialisation were more likely to consume alcohol due to the expectation it will reduce their fear.

Following on from Booth and Hasking (2009), Morris, Stewart and Ham (2005) conducted a critical review of the research relating to social anxiety and alcohol usage. This paper highlighted a key idea from the existing research, which helps to clarify the mixtures of research in the literature. The idea is that studies that measure alcohol consumption levels will have negative correlations to social anxiety, whilst those that measure alcohol—related problems will be positively correlated to social anxiety. This is because alcohol-related problems can occur even in low levels of alcohol consumption, and whilst these individuals may not drink frequently or in large quantities, when they are exposed to situations where alcohol is unavoidable, they will suffer problematic drinking as it is being used to manage their anxiety, and could become dependent on this. Morris et al. (2005) found support for this idea in student population studies looking at this relationship. There was evidence to suggest that undergraduates have a positive relationship between social anxiety and problem alcohol usage, with these individuals being motivated to drink for coping reasons, whilst other studies found that drinking levels were negatively correlated with social anxiety. It was overall suggested that the relationship appears to be between alcohol problems and social anxiety rather than alcohol consumption.

1.2.3. Alcohol use in socially anxious student populations

To assess whether social anxiety is linked to problematic drinking in university students, many studies have focused their research on this high risk population. A number of these studies support the conclusion that socially anxious students consume more alcohol and suffer more adverse consequences to this consumption. Mekonen et al. (2017) found that students with social phobia were 1.7 times more likely to have a problematic AUD, with social phobia being positively correlated with problematic alcohol use. Lewis and O'Neill (2000) found students who reported higher levels of social anxiety were more likely to be identified as problem drinkers. It was found that problem drinking was related to expectancies that the alcohol would cause improvements in social behaviour, relaxation, and had tension reducing qualities.

Norberg, Olivier, Alperstein, Zvolensky and Norton (2011) found that female students who experienced high levels of social anxiety also experienced adverse personal and role functioning consequences of alcohol compared to females with lower levels of anxiety, as well as males. Males tended to suffer more physical consequences of alcohol consumption than females. It was also found that coping mechanisms in relation to alcohol use led to the experience of social consequences. Raj, Yasin, Othman and Othman (2016) through the use of the SIAS, AUDIT and Drinking Motives Questionnaire-Revised also found that those with high social anxiety drank for coping mechanisms. These studies would all suggest that SMH is taking place in these populations. Brook and Willoughby (2016) found results that support both the idea that socially anxious students may or may not part take in harmful and high levels of alcohol use. Two groups of socially anxious students were identified, one displaying high levels of alcohol consumption and the other displaying low levels. The explanation for this was that one group tended to avoid social gatherings such as parties, whilst the other group who either chose not to avoid these situations or were unable to avoid them resulted in high levels of alcohol consumption to cope with feelings of anxiety. Other points noted from Brook and Willoughby (2016) were that those who lived on campus appeared to drink more, and that depression is often comorbid with social anxiety and could play a role in alcohol consumption.

Brook and Willoughby (2016) demonstrate the idea that in some cases social anxiety and alcohol consumption may in fact be negatively correlated, and would dispute the SMH as playing a role in this. Schry and White (2013) found that social anxiety was negatively correlated with frequency and quantity of alcohol consumed overall, as well as frequency and quantity of binge drinking, indicating that socially anxious students consume less alcoholic drinks and have them less frequently, as well as having lower rates of binge drinking compared to non-anxious students. It was suggested this was because those with social anxiety may avoid consuming alcohol, or only consume lower levels out of fear that alcohol will negatively alter their behaviour. However, it was found that these students had a small positive correlation with alcohol-related problems, suggesting there still exists a link between social anxiety and alcohol related-problems. Nitka and O'Connor (2017) found that overall socially anxious students drank less than non-socially anxious students. However, these students were at higher risk of experiencing negative alcohol-related problems regardless of the amount of alcohol consumed or frequency. Overall, this body of research would suggest that those with social anxiety consume lower levels of alcohol and consume alcohol less frequently than those without social anxiety, perhaps due to avoidance of social gatherings, out of fear of being negatively judged due to alcohol consumption, or behaviour brought on by heavy alcohol consumption being considered negative or undesirable. It is however still suggested that there could be a link between alcohol use disorders and social anxiety, as the studies described previously have still found evidence that socially anxious individuals are experiencing alcohol-related problems.

There does exist a small body of research that suggests there is no link between social anxiety and alcohol use, or alcohol use disorders. Ham and Hope (2005) found social anxiety largely had no relationship with drinking variables, and the relationships that were found were mainly negative, such as alcohol use. It was suggested that social anxiety may act as a protective factor against alcohol use problems and is unlikely to be a risk factor. Ham and Hope (2006) investigated whether drinking expectancies, valuations and norms mediate social anxiety and alcohol use in college students, as

well as whether social anxiety had a negative or no relationship with drinking variables. Ham and Hope (2006) also support the idea that social anxiety is not a risk factor for alcohol use problems, finding no relationship between social anxiety and alcohol use. Possible reasons for this finding were suggested that it may only be at severe clinical levels of social anxiety that it starts to impact upon drinking, and therefore individuals at this level are unlikely to be attending university for numerous reasons. It was suggested that these milder levels of social anxiety are not likely to have a meaningful impact on alcohol consumption (Ham & Hope, 2006).

In summary, it is clear from the research in this area (Brook & Willoughby, 2016; Raj et al., 2016; Lewis & O'Neill, 2000; Nitka & O'Connor, 2017; Ham & Hope, 2005; Ham & Hope, 2006, Schry & White, 2013; Morris et al., 2005), that there are many inconsistent findings, with mixtures of studies coming to different conclusions as to the nature of the relationship between social anxiety and alcohol use. It may be useful in this area to separate alcohol consumption from alcohol-related problems and investigate these separately. This is due to the idea that alcohol consumption and alcohol-related problems are not the same thing, and so may affect individuals with social anxiety in different ways (Morris et al., 2005). It is important for research to understand the relationship between social anxiety and alcohol use as there is a potential for those with social anxiety to be at more risk of developing alcohol use problems and potentially an AUD later in life if they do become dependent on alcohol to cope with their anxieties. As well as this, if socially anxious individuals are suffering negative consequences of alcohol use then interventions should be developed to try and prevent this behaviour.

1.3. Hypotheses

The majority of research focusing specifically on alcohol use in student populations appears to point to the idea that social anxiety is associated with lower levels of alcohol consumption (Brook & Willoughby, 2016, Schry & White, 2013, Nitka & C'Connor, 2017), perhaps due to avoidance of social situations or fear of being viewed negatively. This research also suggests that the SMH is not playing a role in socially anxious student alcohol usage. It is also suggested that those with social anxiety may be prone to suffering negative alcohol related problems (Nitka & O'Connor, 2017). For this study, the AUDIT was used to assess alcohol use, particularly harmful alcohol consumption (this is discussed in further detail in the section 2.3.3). Based on this previous research, it is hypothesised that social anxiety will be negatively correlated with overall harmful alcohol use, with those scoring high on the SIAS (see section 2.3.2) scoring a low total score on the AUDIT. This is based on the assumption that whilst they may be more likely to suffer adverse problems from drinking, they are unlikely to drink often or heavily. Therefore:

H1: Social anxiety will be negatively correlated with overall harmful alcohol use.

The AUDIT is split into four subscales, each assessing a different dimension of alcohol consumption. These subscales will each be considered separately against social anxiety in order to attempt to clarify the idea that those with social anxiety consume less alcohol and alcohol less frequently, but are more likely to experience alcohol-related problems (Morris et al., 2005). To current knowledge, no other research has examined the SIAS against the four subsections of the AUDIT, and so this may add

new knowledge to the breadth of research in this area. The first subscale of the AUDIT assesses alcohol consumption. It was hypothesised that social anxiety would be negatively correlated with alcohol consumption. This is based on research that has found that those with social anxiety drank less frequently and lower quantities of alcohol than those without social anxiety (Schry & White, 2013; Nitka & O'Connor, 2017). Therefore:

H2: Social anxiety will be negatively correlated with alcohol consumption.

The second subscale of the AUDIT assesses drinking behaviour, particularly drinking dependence. Similar to H2, it is predicted that social anxiety will have a negative correlation with drinking behaviour. This is based on the idea that those who are socially anxious are unlikely to be in situations often where there are high amounts of alcohol present and so are unlikely to become dependent upon this, and also appear less likely to drink frequently or binge drink (Schry & White, 2013). Therefore:

H3: Social anxiety will be negatively correlated to drinking behaviour.

The third subscale of the AUDIT assesses adverse reactions. This is an area where those with social anxiety may be more vulnerable. It was predicted that those with social anxiety will be more likely to suffer negative reactions to alcohol use, based on the research that those with social anxiety often suffer negative reactions to alcohol use, such as physical and social consequences (Norberg et al., 2011; Nitka & O'Connor, 2017, Schry & White, 2013). Therefore:

H4: Social anxiety will be positively correlated with adverse reactions.

The final subscale of the AUDIT assesses alcohol-related problems. This is similar to H4, and using the same reasoning it is predicted that those who are socially anxious are more likely to suffer from alcohol-related problems. This is also based on the idea that those with social anxiety are using alcohol to manage their anxiety, and may be more sensitive to its effects (Morris et al., 2005). Therefore:

H5: Social anxiety will be positively correlated with alcohol-related problems.

The aim of the current study is to examine whether there exists a relationship between social anxiety and alcohol use within student populations due to the inconsistent findings in the literature over the past two decades (Schry & White, 2013, Raj et al., 2016, Brook & Willoughby, 2016, Nitka & O'Connor, 2017, Lewis & O'Neill, 2000, Mekonan et al., 2017). As well as this, there is also an aim to examine specific dimensions of problematic alcohol consumption, such as alcohol consumption and alcohol related problems. This is based on ideas proposed by Morris et al. (2005) that the relationship between social anxiety and alcohol use exists with alcohol-related problems rather than actual alcohol consumption. This should help add to the research already existing in this area, by assessing whether there does exist different forms of relationship between these components, and may help clarify why different studies have resulted in different findings.

2. Method

2.1. Design:

The current study used a correlational design examining the relationship between social anxiety and alcohol use.

2.2. Participants:

Eighty seven participants responded to the questionnaire, however only seventy six data sets were used due to incompleteness and missing data. Participants were all current students from the University of South Wales. All participants were aged over 18 so were of legal age to consume alcohol, and had a mean age of 23.9. The gender ratio of the participants was male to female 25:51. Participants were not specific to one course, however course type was not recorded. Participants were recruited either online or in person. Online participants were recruited via opportunity sampling through SurveyMonkey®, with the link being emailed to the all students enrolled on the University's various psychology courses by the dissertation supervisor. Peers of the researcher were also gathered online. Participants completing paper copies were recruited via opportunity sampling in public areas at the University, predominately the library. Participants were also recruited at society meetings.

2.3. Materials:

The questionnaire consisted of an information sheet, consent form, 2 scales and a debrief form (See Appendix 1-5). This was either carried out online via SurveyMonkey® or on paper handouts.

2.3.1. Demographics:

Participants were asked to provide their age and gender for demographic purposes.

2.3.2. Social Interaction Anxiety Scale:

The Social Interaction Anxiety Scale (SIAS), created by Mattick and Clarke (1998), measures an individual's fear of social interaction with others, such as not knowing what to say in a social environment or humiliating oneself. It is a 20 item scale, with each statement rated using a 4 point likert scale (0 = Not at all, 4 = Extremely), with examples of statements being "When mixing socially, I am uncomfortable," "I become tense if I have to talk about myself or my feelings." Questions 5, 9 and 11 are reversed scored. The SIAS has been shown to be a valid measure of social anxiety, and demonstrates high internal consistency and test-retest reliability (Mattick & Clarke, 1998). Many studies have used this scale when looking at social anxiety in student populations, and can be self-administered (e.g. Raj et al., 2016; Norberg et al., 2011). It should be noted that this scale does not provide a diagnosis of social anxiety, its purpose is to give an indication as to whether the individual demonstrates signs of social anxiety (See Appendix 3 for SIAS).

2.3.3. The Alcohol Use Disorders Identification Test:

The Alcohol Use Disorders Identification Test (AUDIT) is a 10 item measure used to identify if an individual is engaging in harmful and hazardous alcohol consumption and was developed by the WHO (Saunders, Aasland, Babor, De La Fuente & Grant, 1993).

Subsections of the scale include alcohol consumption, drinking behaviour, adverse reactions and alcohol-related problems (Saunders et al., 1993). Examples of questions from the AUDIT include “How often during the last year have you had a feeling of guilt or remorse after drinking?”, “Has a relative or friend, doctor or other health worker been concerned about your drinking or suggested that you cut down?”. The AUDIT was chosen as it is designed to detect harmful and hazardous drinking at mild stages before the development of alcoholism, and can be self-administered to non-clinical populations (Saunders et al., 1993). The AUDIT has been shown to be effective in university students at identifying alcohol dependence, and has demonstrated satisfactory internal consistency and test-retest reliability (Babor et al., 2001). Other studies that have investigated alcohol use and social anxiety in students have also adopted the AUDIT (e.g. Strahan et al., 2011, Raj et al., 2013). It is emphasised that this scale is not a diagnostic tool for alcohol use disorders, but is designed to give an indication of engagement in harmful and hazardous alcohol consumption (See Appendix 4 for AUDIT).

2.4. Procedure:

Data was collected over a 4 month period at the University of South Wales. Participants were given the same questionnaires whether they completed it online or on paper and were tested individually. They were given an information and consent form and allowed to ask questions prior to starting. The information sheet provided participants with their rights as a participant, a brief overview of the study and why it was being carried out, what would be expected of the participants and details of the researcher and researcher’s supervisor. All participants provided consent prior to starting the study (See Appendices 1 and 2 for information sheet and consent form). Participants completed a small section on demographics, then completed the SIAS and then the AUDIT, and were then given a debrief form. Participants that indicated they were not above the age of 18, or were not current students at the University of South Wales were excluded from the study. Answers were circled to indicate which answer was selected. Participants were allowed as much time as they needed to complete the questionnaire. On average, the questionnaire took 6 minutes to complete. An email was sent out by the dissertation supervisor containing the link to the SurveyMonkey® questionnaire which went to all psychology students at the University, and participants were able to complete the questionnaire independently. Participants first read an information sheet, and then provided an electronic password to allow participants to be identified if they wished to withdraw. Participants then gave consent and completed the questionnaire. Paper copies were collected in public areas at the University such as the library and at society meetings. Participants were approached by the researcher and asked whether they would want to fill in a survey for the researcher’s dissertation. Those who agreed were given as much time to complete the questionnaire as needed, and questionnaires were then collected once complete. The debrief sheet consisted of the nature of the study, a list of support services and references, and details of the researcher and researcher’s supervisor (See Appendix 5 for debrief form). Data from both the online and paper copies were compiled into a spreadsheet for an overall dataset. Participants were not deceived or caused physical or psychological stress during this study, and were able to withdraw at any point. This study was approved by the University of South Wales Ethics Board prior to implementation (See Appendix 6).

3. Results

3.1. Descriptive Statistics

Table 1: Mean scores for SIAS, AUDIT and AUDIT subscales

	<i>M</i>	<i>SD</i>
Age	23.93	8.10
Total AUDIT Score	10.20	5.70
Alcohol Consumption Score	5.83	2.66
Drinking Behaviour Score	.99	1.25
Adverse Reactions Score	1.59	1.49
Alcohol-Related Problems Score	1.79	1.98
Total SIAS Score	30.21	16.47

As displayed in Table 1, the mean AUDIT score of 10.20 indicates students on average are partaking in hazardous and harmful alcohol use and possible alcohol dependence, as a score of 8 or above is indicative of this (Babor et al., 2001). Of the 4 AUDIT subscales, alcohol consumption had the highest score of 5.83, with a score of 2 or above suggesting hazardous alcohol consumption (Babor et al., 2001). Drinking behaviour had the lowest score of .99. A mean score 30.21 on the SIAS does not indicate that students are experiencing high social anxiety, as a score of 43 and above is indicative of this (Mattick & Clarke, 1998). (See Appendix 7 for Descriptive Statistics SPSS Output).

3.2. Reliability Analysis

A Cronbach's Alpha was run on both scales to assess internal consistency. The SIAS demonstrated satisfactory reliability with a reliability coefficient of .945. The AUDIT had a reliability coefficient of .757, indicating just below satisfactory reliability (See Appendix 8 and 9 for Cronbach's Alpha SPSS outputs).

3.3. Correlations

Five correlations were run to assess the overall relationship between alcohol use and social anxiety, as well as each AUDIT subscale with social anxiety. The Pearson product-moment correlation coefficient was used for all 5 correlations.

3.3.1. Correlation between overall harmful alcohol use and social anxiety

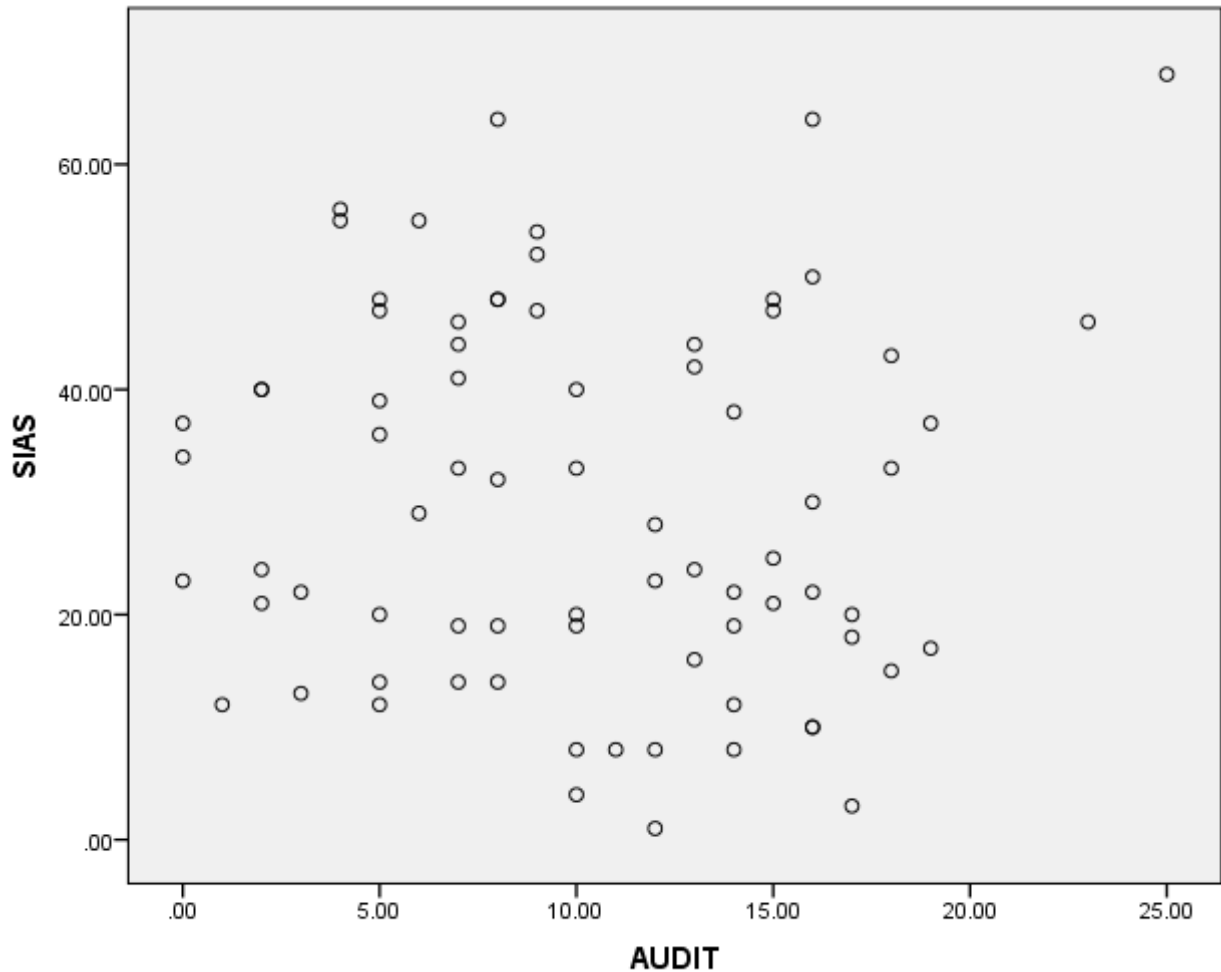


Figure 1: Scatter plot of total AUDIT score and SIAS score

Figure 1 indicates no correlation between overall harmful alcohol use and social anxiety. The results of the Pearson product-moment correlation were ($r=-.026$, $n=76$, $p=.413$, one-tailed). Whilst the correlation coefficient is negative, this finding is small and was not significant. Therefore **H1** is not supported, with results suggesting there is no relationship between overall harmful alcohol use and social anxiety in students. (See Appendix 10 for SPSS overall harmful alcohol use and social anxiety correlation output).

3.3.2. Correlation between alcohol consumption and social anxiety

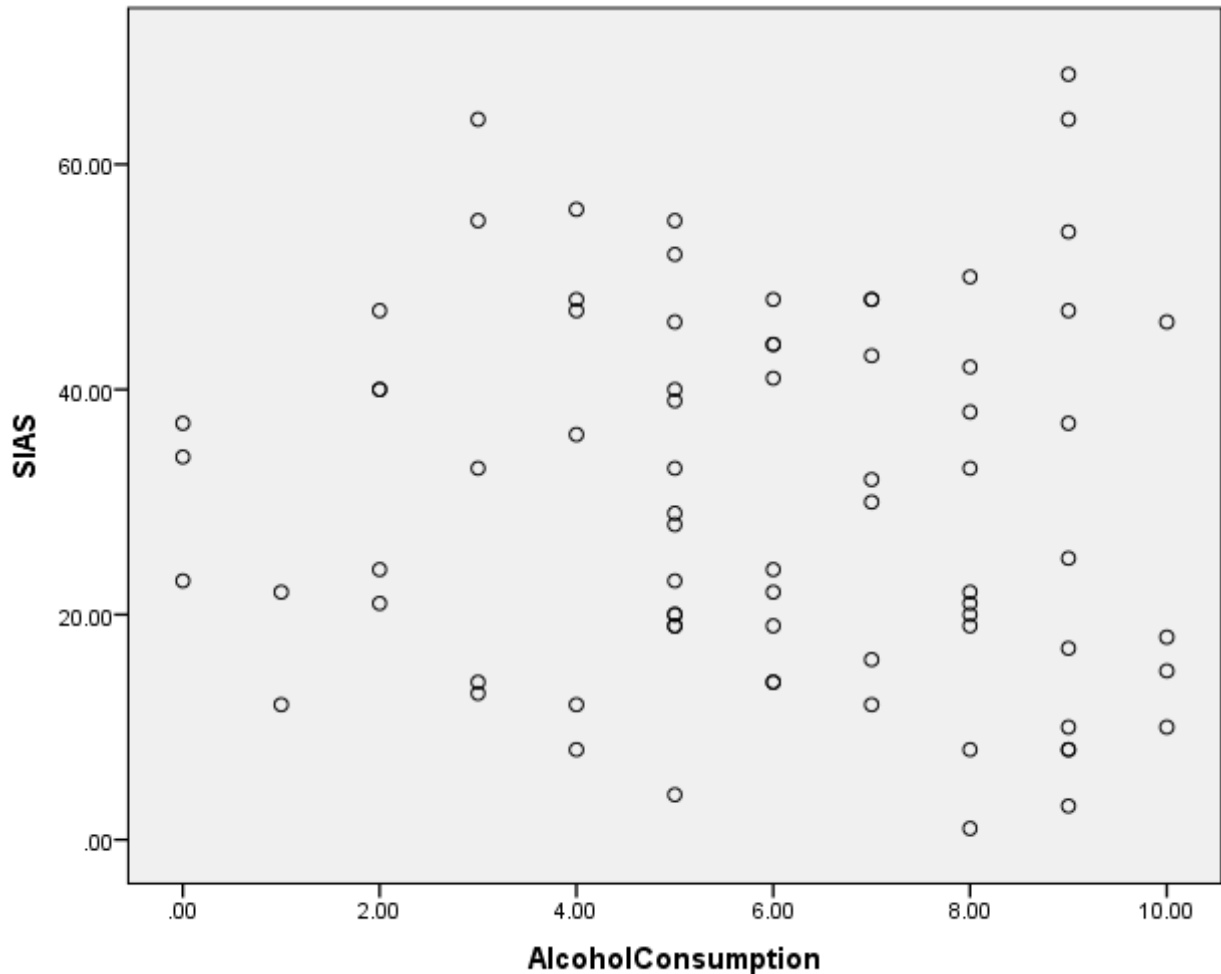


Figure 2: Scatter plot of alcohol consumption score and SIAS score

Questions 1-3 in the AUDIT measure alcohol consumption. Figure 2 indicates no relationship between alcohol consumption and social anxiety. The results demonstrate a correlation coefficient of ($r=-.089$, $n=76$, $p=.223$, one-tailed). These results were not significant, and suggest there is no relationship between alcohol consumption and social anxiety. **H2** is therefore not supported. (See Appendix 11 for SPSS alcohol consumption and social anxiety correlation output).

3.3.3. Correlation between drinking behaviour and social anxiety

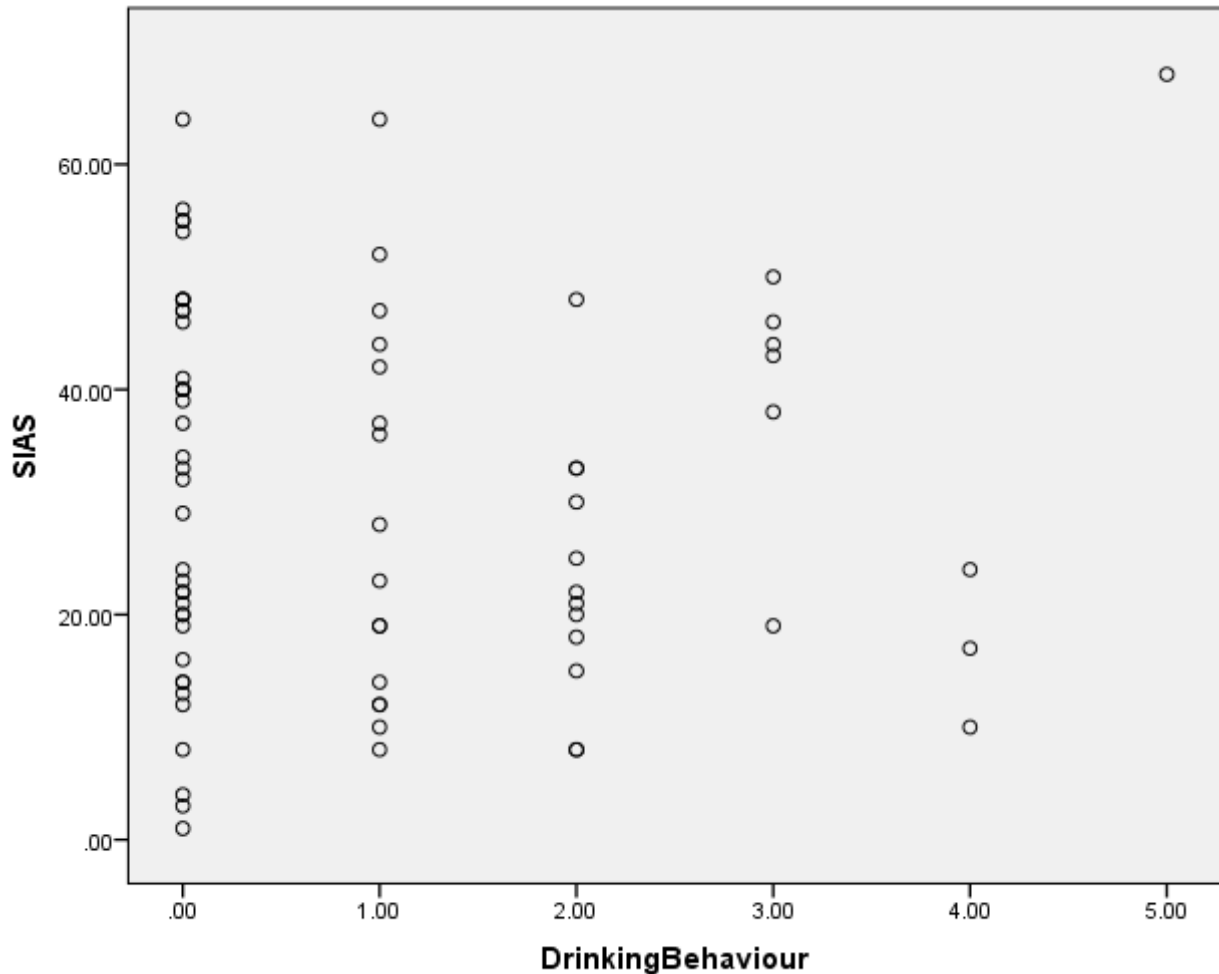


Figure 3: Scatter plot of drinking behaviour score and SIAS score

Questions 4-6 in the AUDIT measure drinking behaviour. Figure 3 indicates no correlation between drinking behaviour and social anxiety. Results found a correlation coefficient of ($r=.018$, $n=76$, $p=.440$, one tailed). These results were not significant, and suggest there is no relationship between drinking behaviour and social anxiety, and therefore **H3** is not supported. (See Appendix 12 for SPSS drinking behaviour and social anxiety correlation output).

3.3.4. Correlation between adverse reactions and social anxiety

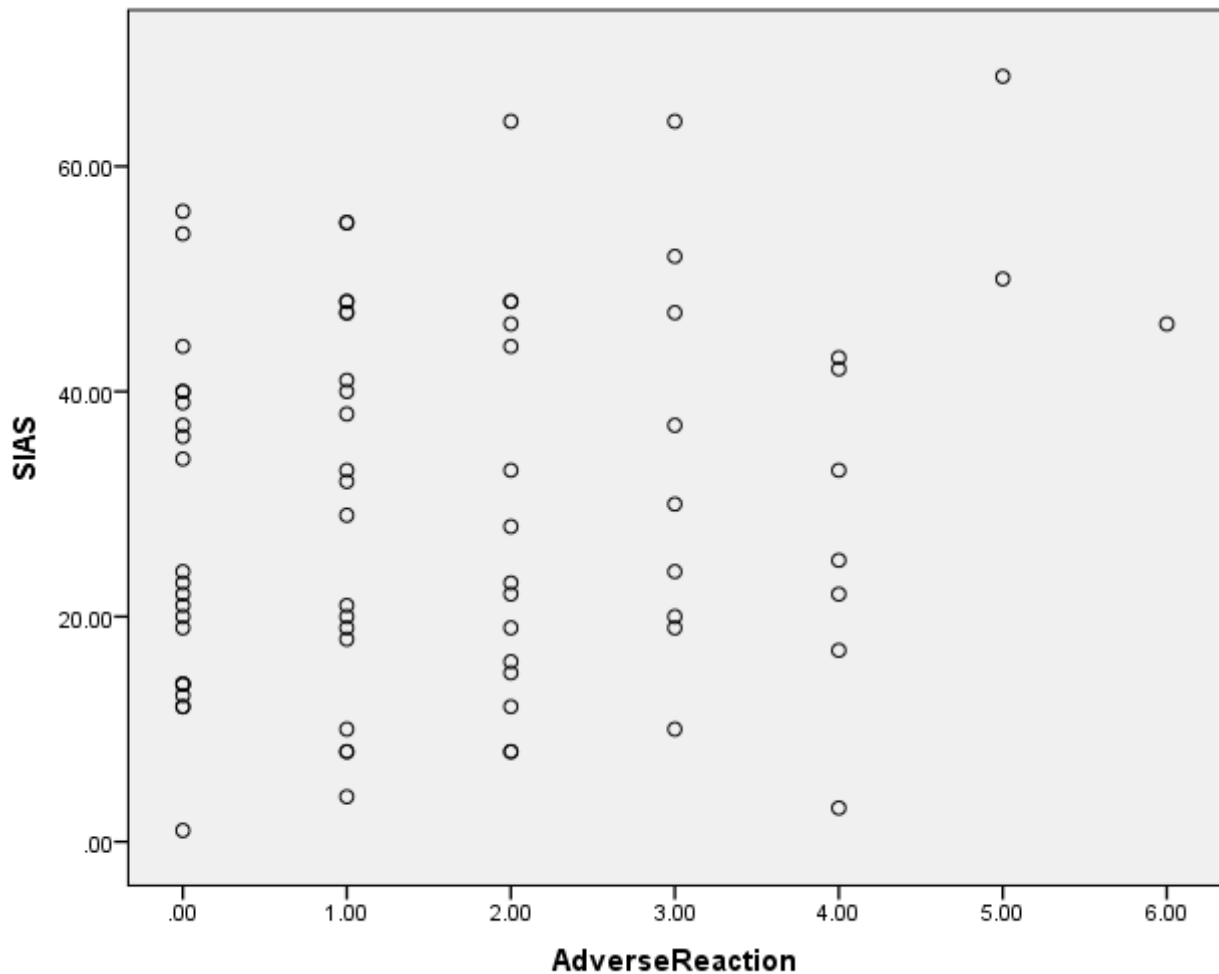


Figure 4: Scatter plot of adverse reactions score and SIAS score

Questions 7-8 in the AUDIT measure adverse reactions. Figure 4 indicates no correlation between adverse reactions and social anxiety. Results found a correlation coefficient of ($r=.189$, $n=76$, $p=.051$, one-tailed). No significant results were found, suggesting that there is no relationship between adverse reactions and social anxiety and does not support **H4**. (See Appendix 13 for SPSS adverse reactions and social anxiety correlation output).

3.3.5. Correlation between alcohol-related problems and social anxiety

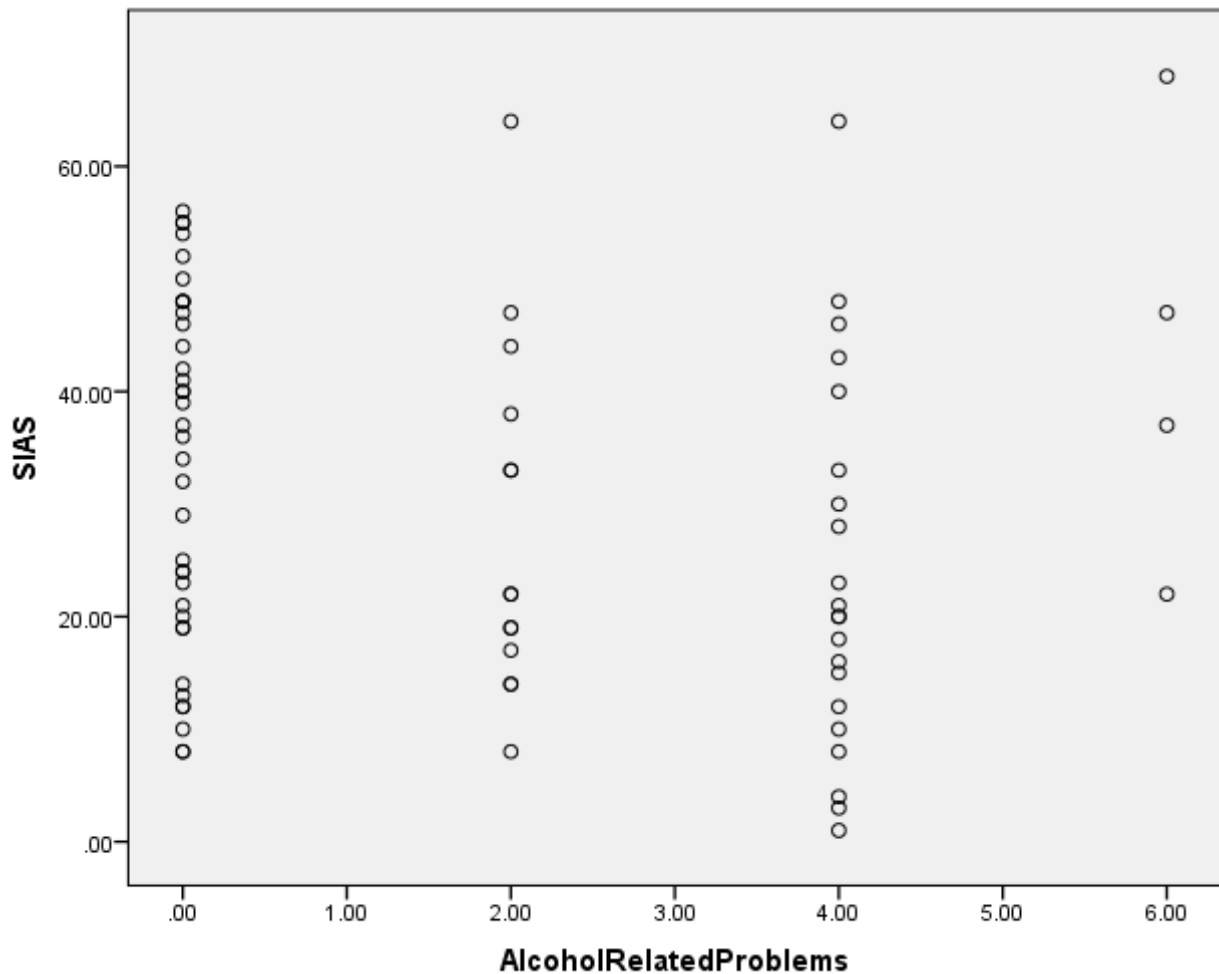


Figure 5: Scatter plot of alcohol-related problems score and SIAS score

Questions 9-10 in the AUDIT measure alcohol-related problems. Figure 5 indicates no correlation between alcohol-related problems and social anxiety. Results show a correlation coefficient of ($r=-.108$, $n=76$, $p=.176$, one-tailed). These results were not significant suggesting no relationship between alcohol-related problems and social anxiety, and so **H5** is not supported. (See Appendix 14 for SPSS alcohol-related problems and social anxiety correlation output).

3.4. Further Exploratory Analyses

A multiple regression was conducted to determine whether any of the variables were predictive of alcohol use. The three predictor variables chosen were age, gender and social anxiety. The criterion variable was alcohol use.

Table 2: Correlations of variables

	Age	Gender	Social Anxiety
Alcohol Use	-.310**	-.084	-.026
Age		.200*	-.189
Gender			.065

* = $p < .05$ ** = $p < .01$

Table 2 shows the correlations between the variables. Significant correlations were seen between age and alcohol use ($r=-.310$), and between gender and age ($r=.200$). No other significant correlations were found.

Results showed that gender did not individually significantly predict alcohol use ($\beta=-.172$, $t=-.124$, $p=.901$), and social anxiety did not individually significantly predict alcohol use ($\beta=-.030$, $t=-.751$, $p=.455$). It was found that age was a significant individual predictor of alcohol use ($\beta=-.227$, $t=-2.78$, $p=.007$). The overall model significantly predicted alcohol use ($F(3,72)=2.771$, $p=.048$), accounting for 6% variance in alcohol use ($R^2=.104$, $AdjR^2=.066$). Whilst this is a significant result, this is a small finding. These results suggest that when alone age may be playing a role in alcohol use whereas gender and social anxiety do not. However, when combined together social anxiety, age and gender may collectively predict alcohol use.

Table 3: Unstandardised and standardised regression coefficients

	B	Std Error	Beta
Age	-.227	.082	-.323**
Gender	-.172	1.380	-.014
Social Anxiety	-.030	.040	-.086

** = $p < .01$

Table 3 shows the unstandardised and standardised coefficients, indicating that age significantly predicts alcohol use. No other variables significantly predicted alcohol use. (See Appendix 15 for SPSS multiple regression outputs).

4. Discussion

The aim of the current study was to investigate the relationship between social anxiety and alcohol use, with a particular focus on identifying specific relationships of alcohol consumption and alcohol-related problems with social anxiety. Results of the study found no significant relationships between social anxiety and overall harmful alcohol use, alcohol consumption, drinking behaviour, adverse reactions and alcohol-related problems. These results suggest that social anxiety is not associated with the level of alcohol an individual consumes, their behaviour of drinking or any negative consequences as a result of alcohol consumption. These findings did not support the research hypotheses, and did not support the previous findings of Nitka and O'Connor (2017), Brook and Willoughby (2016), Norberg et al. (2011) and Schry and White (2013). Further exploratory analyses through use of a multiple regression found that age significantly predicted alcohol use, as well as the combination of age, gender and social anxiety. However on their own, social anxiety and gender were not significant predictors of alcohol use. There are a number of reasons as to why these results were found, as well as real world implications of the study and directions for future research.

4.1. Methodological limitations

The sensitivity of the scales could have contributed to the results that were found. Whilst other studies have had success using the AUDIT scale (e.g. Raj et al., 2013), as alcohol consumption is considered to be the norm at many universities and becoming a larger problem in recent years, it is possible that the AUDIT is not sensitive enough to distinguish between the normal level of alcohol consumption of university students and those who have a severe problem. Whilst the AUDIT will still be indicating

that hazardous and harmful drinking is taking place, the AUDIT only contains 10 questions, and so it may not be able to demonstrate variation within this high level of alcohol use. The reliability of the AUDIT found through use of Cronbach's Alpha was slightly under satisfactory level, and was below that of the SIAS, which may indicate a slight lack of consistency in student's answers on the AUDIT. Whilst the AUDIT has been found to be applicable in student populations (Babor et al., 2001), it may be preferable in future research to use a scale designed specifically for students to assess alcohol use due to this population already having such a high level of consumption. However, the reliability of the SIAS was of a satisfactory level, which indicates that participants were answering the scale consistently, suggesting that this scale was appropriate for the sample and was a reliable measure of social anxiety for this study. This is also the first study to current knowledge that has examined the specific subsections of the AUDIT against the SIAS, and so gives findings from methodology that has not been previously implemented in other studies.

There are also a number of participant factors which were not controlled for that could have affected the results. Firstly, as this study involved participants who may have had social anxiety, it is possible that students with this anxiety would not have answered the AUDIT accurately. They may have over or under reported the amount of alcohol they consumed out of fear of being judged by the researcher. Whilst the questionnaires were anonymous, participants may still have been affected by social desirability. This could also be applied to the questions asking about adverse reactions and alcohol-related problems as they may not want to be judged in a negative way. For students who were not socially anxious, they may have over reported their alcohol consumption and alcohol-related reactions due to wanting to look involved in what is expected socially of the university lifestyle. If participant scores were not a true reflection of their alcohol consumption and alcohol-related problems, this would not have demonstrated the true relationship between the social anxiety and alcohol use. However, for the purpose of this study, using self-report data through use of a questionnaire is most likely to give the most accurate results as it is a topic that is personal to the individual, and may be a sensitive topic for individuals to talk about through other means such as an interview. All precautions were taken to ensure results were anonymous to give the most accurate data. Whilst individuals may still report data that is not a true reflection of their current behaviour, it may not be possible to test these hypotheses by any other means.

The study did not control for factors such as whether participants lived on campus and or if participants were religious. Research has shown that students who live on campus are likely to consume more alcohol than those who do not live on campus (Stock et al., 2009). It is possible that this affected the results, with some individuals likely presenting higher levels of alcohol use who live on campus than those who do not. As well as living status, the study did not control for the participants year of study. Bewick et al. (2008) suggest that levels of alcohol use decrease as students' progress through their degree. Therefore, it is possible that participants who were in their first year of study may have been more likely to report higher levels of consumption than those in their third year, with those in their first year also being more likely to be living on campus in the halls of residence. It may be possible that those who live at home may also be more socially anxious, and so are unlikely to be in situations where there are high levels of alcohol present. However, the data collection period for the current study was not implemented during the university's freshers' week which is known to involve

high levels of alcohol consumption, and so results cannot be attributed to this. Another factor that may have affected participant's alcohol use levels is whether participants were religious. As some religions such as Islam do not advocate alcohol use, for participants of this religion they would report no alcohol use regardless of whether or not they were socially anxious, and so may have affected results.

Another possible factor that was not controlled for in this study was the role of other conditions which could be comorbid with social anxiety and may play a role in alcohol use. Brook and Willoughby (2016) suggest that depression can play a role in alcohol consumption, and is often comorbid with social anxiety. If participants in the current study were suffering depression either with or without the presence of social anxiety, this may have affected results as it could have influenced the levels of alcohol being consumed more so than social anxiety. As conditions such as depression were not measured or controlled for, it is not possible to know whether this may have been present in the sample and a factor contributing to alcohol use in students.

Some of the studies previously conducted in this area (Brook & Willoughby, 2016; Nitka & O'Connor, 2017; Ham & Hope, 2005; Ham & Hope, 2006) have taken place in the USA and Canada. The legal age of consumption in the USA is 21, and for Canada varies from 18 to 19 dependent on location, whereas in the UK the legal age of alcohol consumption is 18. Therefore, results from the USA and the UK in relation to university and college drinking may be affected by this. As the age of drinking is higher in the USA, it could be possible that attitudes towards drinking are different. As students at university in the UK will most likely be of legal age to consume alcohol, these students may engage more in alcohol use as they are able to purchase it themselves, whereas students in the USA may have difficulty obtaining alcohol, or may not want to engage in this alcohol use due to laws on drinking. Therefore results from the two countries may be different due to these laws. This may explain why Ham and Hope (2005) and Ham and Hope (2006) who conducted their studies in the USA found no relationship between alcohol use. Other studies have been conducted in Australia (Norberg et al., 2011) and Malaysia (Raj et al., 2016). It may be possible that these countries have different attitudes towards alcohol consumption from one another, and may explain the inconsistent findings in this area. As this study was conducted in the UK, these attitudes and laws may explain why findings are different to these previous studies.

4.2. Links to previous research

Whilst the findings of this study are not in line with the research upon which the study hypotheses were based (Brook & Willoughby, 2016; Schry & White, 2013; Nitka & O'Connor, 2017; Morris et al., 2005; Norberg et al., 2011), they may reflect results found by Ham and Hope (2005) and Ham and Hope (2006). Both studies found no relationship between social anxiety and alcohol use. It was suggested in these studies that it may only be at severe clinical levels of social anxiety when this anxiety starts to have a significant impact upon an individual's alcohol use. It is then suggested that these individuals may not attend university. This may explain why the current study found no relationships, as those who are at these severe levels of social anxiety may not be attending university. This could be out of fear of social interaction that often occurs at university. It may also be possible that individuals with AUD's also do not attend university for a variety of reasons, such as having other comorbid physical and mental health disorders which accompany AUD's (Bartoli et al., 2015). Therefore,

there may not be many students which indicate presence of an AUD due to the difficulty of attending university with such a disorder, as well as a low number of students with high levels of social anxiety. In the current study students mean score on the SIAS was 30.21, which is much below the threshold level of 43 that indicates a presence of high social anxiety (Mattick & Clarke, 1998), suggesting that most students were unlikely to be suffering from a severe level of social anxiety.

4.3. Other reasons for findings

It may also be possible that no relationship was found due to the fact that students with social anxiety may partake in social drinking in order to not stand out or feel isolated, and so the drinking levels of these individuals would be no different from those who do not have social anxiety. Therefore, there would be no particular relationship between social anxiety and alcohol use, as these individuals would not differ from the rest of the population. It may be possible that these students partake in alcohol consumption when in a situation where alcohol is present, but do not drink heavily due to fear of how they will behave (Schry & White, 2013). This would therefore indicate that students with social anxiety are not at any more risk of developing alcohol-related problems or disorders than the rest of the student population.

Other research has suggested that some students will avoid these social situations completely, and those who cannot avoid these situations will drink in order to cope with anxiety (Brook & Willoughby, 2016), and may help explain the findings of the current study in a different view. It could be that avoidance of social situations is the crucial factor in determining whether those with social anxiety consume high or low levels of alcohol. As none of the measures addressed this, it is not possible to know whether these students actively avoid these types of situations at university, and could explain why no clear relationship was found. If socially anxious individuals are avoiding these social situations, then they are unlikely to be consuming high levels of alcohol, and so are also unlikely to be suffering any adverse effects or problems caused by alcohol consumption. Those who are exposed to these situations may consume higher levels of alcohol in order to manage their anxiety brought on by the situation. Therefore, if there was a mixture of these two types of socially anxious students, this could explain why results showed no clear pattern or relationship between social anxiety and alcohol use, as scores would be drastically different between these individuals.

The results suggest that socially anxious individuals do not experience any more alcohol-related problems or consequences than other non-socially anxious individuals. This does not support the findings by Norberg et al. (2011) which suggested that socially anxious students experience more social and physical consequences from alcohol consumption. It may be possible that students with social anxiety do not have a higher sensitivity to alcohol consumption, and so therefore are not likely to have a more severe reaction than any other individual. Also, whilst not a main focus of this study, results would also imply that students are not experiencing the self-medication hypothesis (Khantzian, 1997). Socially anxious students do not appear to be consuming higher levels of alcohol than other non-anxious students, which does not suggest that these socially anxious students are consuming alcohol in order to control and manage negative emotions brought on by their anxiety. The lack of relationship found between alcohol use and social anxiety implies that students with social anxiety

do not differ from those without social anxiety, and that there is no significant association between these two variables.

4.4. The role of age in alcohol consumption

Through use of a multiple regression during a further exploratory analysis, results of the current study found age was a significant predictor of alcohol use. This finding has large implications for the study. The age range in this study was large, with participants ranging from 18 to 56. Previous research has suggested that individuals reach peak levels of alcohol use between the ages of 21-22 (Cronce & Larimer, 2011). It could therefore be possible that students which are younger may be more likely to consume more alcohol than students who are older. Particularly in recent years, universities have a higher percentage of mature students who attend university, and so there is a vast range of ages in student populations. The broad age range in the current study may have affected results. Alcohol consumption levels and its affect may be different between younger and older individuals. As younger students may have only recently been able to consume alcohol legally, it could be possible that they are drinking more heavily compared to individuals who have been able to consume alcohol for years, and so the novelty of alcohol has decreased. When age, social anxiety and gender were taken together, they significantly predicted alcohol use. It may be possible that younger students who are anxious are more likely to consume alcohol compared to older students who are anxious. However, the results of the multiple regression only significantly accounted for a small amount of variance of 6%, and so these results must be interpreted with caution. As the current study did not control for age, it may be possible that drinking behaviours are different between younger and older participants, and so no clear relationship was seen due to these variations.

4.5. Implications of the current study

The findings from the current study would suggest that there is no relationship between social anxiety and alcohol use. Therefore, social anxiety does not seem to act as a risk factor for problematic drinking, meaning students with social anxiety are not under threat of developing an AUD. However, whilst not a main aim of the research, it was noticed that students level of alcohol use is within the harmful and hazardous level according to the results of the AUDIT, with students demonstrating a mean score of 10.20, which is 2 points above the threshold of 8 which indicates harmful and hazardous alcohol use (Babor et al., 2001). This therefore suggests that students are consuming alcohol at harmful levels. As there are many health and social problems associated with heavy alcohol use (Wicki et al., 2010; Quigg et al., 2013; Mekonen et al., 2017), alcohol use interventions should be considered by the university to try and address this issue and prevent students from suffering any short term or long term consequences from these high levels of alcohol consumption. It is suggested by Babor et al. (2001) that a score above 8 on the AUDIT warrants a focus on reducing this harmful alcohol consumption. This could include promoting awareness of the problems associated with alcohol consumption to try and control the levels of consumption. As the AUDIT aims to detect signs of early harmful and hazardous alcohol use (Saunders et al., 1993) it is important that these drinking habits are addressed as early as possible to prevent further complications and progression of this harmful behaviour.

4.6. Future directions

Based on the findings of this study and previous research by Ham and Hope (2006), future research could look into examining whether individuals who display severe clinical levels of social anxiety will demonstrate a relationship with alcohol use. Professional interviews that can identify clinical levels of social anxiety should be used to identify a clinical diagnosis, and from there examine closely the relationships these individuals have with alcohol use. It would also be useful to use measures that can identify if an individual is suffering an AUD. This research would help test the idea proposed by Ham and Hope (2006) that it may only be once an individual reaches a severe level of social anxiety that they begin to show signs of alcohol misuse, and would help determine more clearly the relationship between social anxiety and alcohol use, and may explain why the results of this study showed no relationship between the two.

Another avenue for potential future research is investigating further the role of age in the social anxiety and alcohol use, particularly whether age mediates the relationship between the two. This is based on the current results of the this study, which has demonstrated that age predicts alcohol use, and once combined with social anxiety and gender, may also predict alcohol use. As the current study used a wide range of ages, future research should narrow the age range to younger students, particularly those aged 21-22, to assess whether social anxiety when young is associated with alcohol use. Research could also aim to assess whether there are differences between age groups in relation to social anxiety and alcohol consumption in student populations, and whether younger students are at more risk than older students. Other factors which may also affect alcohol use should be controlled for, such as religion and whether the participants live on campus, in order to assess the relationship between social anxiety and alcohol use more closely. Other conditions such as depression should also be measured to determine whether it is this that is determining alcohol consumption rather than social anxiety. As these two conditions are often comorbid in students (Brook & Willoughby, 2016), it is important to measure both of these aspects.

4.7. Conclusion

The present study investigated the relationship between social anxiety and alcohol use in a student university population. This was based on previous research which demonstrated inconsistent findings in the area, with some studies suggesting a positive relationship (Raj et al., 2016; Mekonen et al., 2017), some finding a negative relationship (Schry & White, 2013; Nitka & O'Connor, 2017) and others findings no relationship (Ham & Hope, 2005; Ham & Hope, 2006). The current study found no relationships between overall harmful alcohol use, alcohol consumption, drinking behaviour, alcohol-related problems and adverse reactions. Findings from the study also suggest that the SMH does not apply to student populations. There were a number of methodological issues with this study that could have contributed to these findings, as well as theoretical reasons. The study does however have strengths, as it has provided future direction for research in this area, suggesting there should be a stronger focus on the role of age, as well as investigating clinical levels of social anxiety rather than using non-diagnostic scales. As well as this, the study has also demonstrated important implications for student populations as results demonstrated these populations are likely consuming harmful levels of alcohol, and so interventions

for this consumption could be considered to prevent complications arising from this behaviour. Overall, this study has contributed to the research on the relationship between social anxiety and alcohol use through use of a different methodology, and provided further avenues for research in this field.

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