

Running Head: MENTAL HEALTH RISKS AND REINFORCED ALCOHOL INTAKE

Mental Health Risks Between Positively and Negatively Reinforced Alcohol Intake

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Thesis Presented in Partial Fulfillment of the Requirements for the Bachelor of Arts (Hons)

Degree in Psychology, Submitted to the National College of Ireland, March 2025.

Submission of Thesis and Dissertation

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Degree for which thesis is submitted: B.A (Hons) Psychology

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Acknowledgements

Firstly, I would like to thank my parents, brothers, and sisters for their constant support and encouragement, pushing me to always want to work as hard as you do. To my friends, thank you for giving me a source of light throughout this project, being an enabler to be able to learn and grow together in a positive and fun environment. Thank you to my supervisor, Dr. Brendan Cullen, for your time, patience, and guidance during this process. Finally, thank you to all the participants of the study, of which would not be possible without, your effort to take time out of your day to help is unimaginably appreciated.

Abstract

Aims: The goal of the current study is to further outline the drinking motives (Cooper, 1994) behind positively and negatively reinforced alcohol intake and if these motives have an effect on the individual's mental health risks such as depression, anxiety or stress. **Method:** A questionnaire was completed online by participants (n=105) assessing their levels of positive and negative reinforcing behaviours associated with alcohol, using a scale by Cho and colleagues (2019) and their symptoms of mental health risk, using the DASS-21 scale. Demographic questions were included to fulfil hypotheses within the study. **Result:** Significant findings were found associating negatively reinforced alcohol with mental health risks ($r=0.208$). Anxiety was the only symptom to have significant findings, being associated with both positive ($r= 0.245$) and negative ($r= 0.205$) reinforcement. **Conclusion:** Findings do outline the potential mental health risks associated with negatively reinforced alcohol intake more so than positive. Further research would be improved through the use of a longitudinal design to causality opposed to correlation.

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Literature Review

Positive Reinforcement

The American Psychological Association (APA) defines positive reinforcement as “an increase in the probability of occurrence of some activity because that activity results in the presentation of a stimulus or of some circumstance”. Adolescents partaking in risk taking or pleasure-seeking activities or behaviour has been seen throughout the research, as the adolescent is hunting or desiring the rewards of positive reinforcement (Cooper et al., 2000). This is further exemplified through MacPherson and colleagues (2010) study where adolescents were behaviourally assessed over a 2-year period. The study compared positive reinforcement and risk-taking behaviour, finding a univariate relationship between the two (MacPherson et al., 2010).

This desire for pleasures and risk provided by the potential of positive reinforcement can also lead to a problematic relationship with alcohol, with increased alcohol use being consistently associated with positive reinforcement throughout the research (Jonker et al., 2014; Lyvers et al., 2011; van Hemel-Ruiter, de Jong, Ostafin, & Wiers, 2015). This is caused by an individual’s likelihood to perceive alcohol as a reward to behaviours (Kabbani & Kambouropoulos, 2013; Palfai & Ostafin, 2003; Smith & Anderson, 2001).

Some drink alcohol to enhance positive emotions and social performance (Cooper, Frone, Russell, & Mudar, 1995). Drinking in social settings to enhance positive emotions and social experiences is the biggest positive factor amongst adolescence and young adults (Cooper et al., 2016). This improved mood and experience is strongly associated with problematic drinking within the research (Leigh & Stacy, 1993). This is further proved by Crutzen and colleagues (2013) who investigated the motives behind alcohol consumption between adults and adolescents, showing that drinking motives correlate with drinking

behaviours has remained consistent throughout development from adolescence to adulthood (Crutzen et al., 2013; Schelleman-Offermans et al., 2011).

Other factors that positively reinforce alcohol intake, such as improved social connectedness (Hunt & Burns, 2017), more close friends (Saether et al., 2019), lower social anxiety (Battista et al., 2010; Ham & Hope, 2005) and a better sense of alignment with your community (Nezlek et al., 1994), contribute to a better mental well-being. This shows that positive reinforcement and alcohol intake cannot be perceived in a causal direction as a lot of the research done is contextually written (Aen Het Rot et al., 2008; Heath, 2007).

A study by Koob (2013) looks at a model of addiction that views impulsivity as a cause for substance addiction. Impulse control disorders are seen as failures to resist temptations involved in risk taking or pleasure-seeking behaviours, both of which being associated with positive reinforcement (Koob, 2013). This model compared to substance use behaviours, predicts positive reinforcement such as sensation or taste associated with alcohol is an important factor that influences increased alcohol consumption rates (Cho et al., 2019; Koob, 2013).

Research provided for positive reinforcement regarding substance use can be conflicting whether it is problematic (Koob, 2013; Leigh & Stacy, 1993) or can be used positively in a social setting (Hunt & Burns, 2017; Cooper, Frone, Russell & Mudar, 1995).

Negative Reinforcement

The APA defines negative reinforcement as “the removal, prevention, or postponement of an aversive stimulus as a consequence of a response which in turn, increases the probability of that response”. Some papers indicate that there is a shift between positive reinforcement to negative reinforcement, in regards to substance use, after a prolonged period of time through addiction, this is the change from impulsivity to compulsivity (Koob, 2013;

Kwako & Koob, 2017). This view is inconsistent throughout the research with other papers arguing that negatively reinforced substance use potentially being caused by negative or aversive experiences (Dora, et al., 2024).

Various papers hypothesize that alcohol use, in its entirety, is a negatively reinforcing behaviour (Baker et al., 2004; Conger, 1956; M.L. Cooper, et al., 1995). It is assumed that once that negative or aversive stimuli are experienced that people will use alcohol to “self-medicate” (Khantzian, 1990) or “reduce tension” (Greeley & Oej, 1999) as they then associate these stimuli with alcohol over time becoming addicted to it’s mood-enhancing effects (Dayan & Daw, 2008; Niv, 2009). These views are conflicting as within lab research it is supported (Bresin et al., 2018), but in the wider context of day to day life some studies suggest otherwise (e.g. Dora, Piccirillo, et al., 2023). Dora and colleagues (2023) suggest that this is due to the consumption of alcohol being situational, with most alcohol consumers that are in question partake in alcohol consumption at the weekend rather than daily.

Negatively reinforced alcohol intake is often consumed in solitude (Cresswell, 2021), solitary drinking has been linked within the research to measures of social anxiety (Skrzynski et al., 2018) and loneliness (Gonzalez & Skewes, 2013). Cresswell (2021) theorizes that solitary drinking is a form of self-medication, utilized to cope with negative affect (Mason et al., 2020; Skrzynski & Cresswell, 2020).

In the study by MacPherson and colleagues (2010), individuals that quit during the risk taking or pleasure-seeking measures were seen to of been escaping or avoiding uncomfortable or pain inducing negative affectivity. Studies show that due to this ‘weakened will-power’ so to say, there is an association between negative reinforcement and: increased substance use (Quinn, et al., 1996), shorter periods of attempted abstinence from substances

(Brandon et al., 2003; Brown et al., 2002; Daughters et al., 2005b) and higher rates of antisocial personality disorders specifically amongst males (Daughters et al., 2005a).

Negative Reinforcement models show that the individual's decision-making processes are down to a longing to escape or avoid stimuli (Baker et al., 2014; Solomon & Corbit, 1974; Wikler, 1965). These tendencies of avoidance are associated with a negative upbringing (Cooper et al., 2003). Other papers suggest that genetic vulnerability is an underlying negative reinforcer which could influence depressive symptoms and excessive drinking (Foo et al., 2018). Throughout the research, negative reinforcers is defined differently which can provide conflicting point of views from researcher to researcher, as outlined through these findings.

Positive versus Negative Reinforcement

In regards to alcohol, Cho and colleagues (2019) define positive reinforcement as “the pleasant feelings and social enhancement effects that alcohol provides” and defines negative reinforcement as “relief from negative affective states like stress or anxiety”. Cho and colleagues (2019) did outline that their definition did conflict with other studies definitions (e.g Koob & Volkow, 2010).

Previous studies have shown that drinking motives related to positive and negative reinforcement predicted alternative outcomes for alcohol usage (Grotmol et al., 2010; Jester et al., 2015). Positive reinforcement has been assessed to have association to adulthood with quantity of drinking, when reinforced during adolescence or early adulthood (Anderson, Briggs & White, 2013). Negative reinforcement was found to predict drinking related problems within the same study. There is a gap in the literature for positive and negative reinforcement's affect on mental health risks, with none comparing the reinforcers against one another in association with mental health risks.

Cooper (1994) proposed 4 primary drinking motives: Social (external approach), Conformity (external avoidance), Enhancement (internal approach) and Coping (internal avoidance). This model has primarily been used in studies for young adults (Bresin & Mekawi, 2021) as the few studies using older age groups conveying conflicting results (Moran & Saliba, 2012; van Gils et al., 2021). These drinking motives outline further evidence of positive (approach) and negative (avoidance) reinforcement in literature.

Aligning with Koob and Volkow's multistage model of drug addiction (2010), positive and negative reinforcement can both play a part in the impulsivity-compulsivity cycle of motivation of drug use. Therefore, both reinforcers are associated with influencing drug use during early and later stages of addiction (Cho et al., 2019). Positive reinforcement is highly associated with moderate drinking whereas negative reinforcement is associated with alcohol related problems such as alcohol dependency (Kuntsche et al., 2005).

In young adulthood and adolescence, research supports that drinking alcohol in a social setting is associated with positive sociality and emotionality (Cooper et al., 2016; Engels et al., 1999). Alternatively, drinking alone was found to have more negative effect and higher levels of social discomfort in comparison to their social-only drinking peers (Skrzynski & Cresswell, 2020). It was also found that drinking in solitude compared to social drinking had higher association to negative emotionality (Cresswell, Chang & Wright et al., 2015) and depressive symptoms (Tomlinson & Brown, 2012).

Due to situational constraints such as driving, working, or caring for a child, alcohol may be a negatively reinforced behaviour that can only occur in positively reinforcing social situations (Acuff et al., 2021; Arfken, 1988). Being able to further understand the drinking-to-cope pathway to alcohol use would be especially helpful to the prevention and treatment of

problematic alcohol behaviours, in order to properly identify when the drinking-to-cope pathway needs to be utilized as an intervention (Dora et al., 2024).

Demographic

Various studies show that alcohol consumption is more prevalent in males than females (Engs & Hanson, 1990; van Hooiendonk et al., 2022; Wicki et al., 2010). In a study by van Beuningen and colleagues (2024) measuring the association between mental well-being and alcohol consumption, it was found that male participants had a significant association between social satisfaction and alcohol consumption. In contrast, female participant's alcohol use was associated with lower general life satisfaction (van Beuningen et al., 2024).

Research shows that there are differences in alcohol metabolism between gender groups, resulting in different physiological reactions (Gill, 2000; Thomasson, 2002). There are more negative repercussions for female due to excessive alcohol consumption, depending on the situation (e.g. alcohol related-illnesses, stronger cognitive and motor impairment, higher risk of physical harm and sexual assault; Holmilla & Raitasalo, 2005; Nolen-Hoeksema, 2004). Due to tendencies that internalize emotions, studies show that females have a stronger association with mental health problems compared to males (Dyrbye et al., 2006; Prowse et al., 2021). Males are more likely to externalize emotions by way of non-compliant behaviour in comparison to females (Eaton et al., 2012), which explains higher alcohol consumption for males.

Alcohol and Mental Health Risks

Regardless of alcohol's sociocultural importance globally, it is still a psychotropic and toxic substance liable to misuse (World Health Organisation (WHO), 2019). Mental health risks have been outlined across the literature to be associated with risky drinking, particularly depression (Churchill & Farrell, 2017) and anxiety (Kushner et al., 1990). Levels of lower

well-being has also been associated to risky drinking (Appleton et al., 2018; Jones et al., 2013). Bell and Britton (2014) suggested that reducing alcohol intake may improve the individual's mental health, after finding evidence that suggests drinking and poor mental health are bi-directionally associated.

In the US, alcohol usage is widespread with 22.7% adolescents (12-17 years old) and 70.1% of adults (18 years old and above) reporting levels of alcohol consumption in some capacity (Substance Abuse and Mental Health Services Administration (SAMHSA), 2016). As only a small figure of these go on to have an alcohol disorder, it is imperative to outline what paths lead to the consumption of alcohol in order to tailor prevention and intervention methods, rather than outlining just potential risks of disorders.

A study by Creery and Davies (2024) found evidence that individuals with a lower well-being drinking at levels that indicate a higher risk of dependence, aligning with findings from other studies (e.g. Appleton et al., 2018; Parackal & Parackal, 2017). This was down to the individuals proclivity to drink to cope, aligning with research on the influence of coping motives and alcohol consumption (Bresin & Mekawi, 2021; O'Hare & Shen, 2012). Creery and Davies (2024) study also outlines the necessity of identifying drinking motives in order to further develop research on alcohol prevention and intervention methods.

Various studies outline the importance of environmental changes, especially in adolescents that facilitate risky alcohol use such as parental influence, peer influence, community/ cultural norms, media, and school environment (Bachman, Wadsworth, O'Malley & Johnston, 1997; Borsari, Murphy, & Barnett, 2007; A.M. White, Kraus, & Swartzwelder, 2006; H.R. White et al., 2006). In a study by Hahn and colleagues (2020) evidence is provided showcasing that negative reinforcement can act as both a risk and protective factor for alcohol consumption. When in the presence of small socially positive

reinforcers, negative reinforcement can act as a protective factor. However, as the positively reinforced environment increases (e.g. the inclusion of negative environmental influences), negative reinforcement becomes a risk factor (Hahn et al., 2020). This was not the case for positive reinforcement in negatively reinforced environments as the necessity of risk taking/pleasure-seeking was not present (Hahn, et al., 2020).

There were studies with conflicting views, suggesting that there was no association between alcohol consumption and mental well-being (Esmaeizadeh et al., 2018; Schnetzer et al., 2013) or psychological problems (Dopmeijer, et al., 2021). These studies mainly measured participants based on levels of alcohol consumption (excluding Schnetzer et al., 2013). Findings with the studies indicate that individuals with moderate alcohol consumption have lower depression scores (Adewuja et al., 2006; O'Donnell et al., 2006) and a higher overall well-being (Lanier, et al., 2001) compared to excessive drinkers and people who do not drink, suggesting that there is no linear association between mental well-being and alcohol consumption.

Current Study

The goal of the current study is to further outline the drinking motives (Cooper, 1994) behind positively and negatively reinforced alcohol intake and if these motives have an effect on the individual's mental health risks such as depression, anxiety or stress. The study will measure mental health risks using the Depression, Anxiety, and Stress Scale-21 items (DASS-21) (Lovibond & Lovibond, 1995) compared to a measure constructed by Cho and colleagues (2019) for positive and negative reinforcement respectively. **Hypothesis 1-** Negatively reinforced alcohol intake will have a stronger association with mental health risks compared to positively reinforced. This hypothesis is based off of the theme of mental health risk symptoms being negatively associated with alcohol throughout the literature (Kuntsche et al.,

2005; Cho et al., 2019). **Hypothesis 2-** Female participants will have a stronger association between the DASS-21 and the negative reinforcement measure compared to men. This hypothesis was constructed through the findings in the literature provided (e.g. Dyrbye et al., 2006; Prowse et al., 2021).

Methodology

Design

The study was also quantitative in nature, utilizing survey research as a form of data collection. The research design of the present study is a cross-sectional research design as all data was collected between a specific time frame. The dependent variable is the DASS-21 scale with the independent variable being gender, positive reinforcement, and negative reinforcement.

Participants

The research sample within the current study consisted of 105 participants. Participants were recruited through convenience sampling using the researcher's social media accounts on WhatsApp and Instagram. Participants were to click a link on the associated social media post (see Appendix VI), which would automatically open the survey. In line with ethical considerations, especially with the inclusion of alcohol within the study, participants were required to be at least 18 years of age to participate. All participants were also required to read and provide consent through the consent form which was at the bottom of the information sheet (see Appendix III) provided on the opening screen of the survey. Participants were also required to have consumed alcohol at some point in life in order to provide realistic results to the study.

Demographic information was collected from participants, this was required due to research questions within the study involving comparing effects between genders and age groups. Participants were asked to enter their age, which was manually entered by the participant, and their gender with the options of male, female, or for the participant to self-describe available.

Measures

Depression, Anxiety, and Stress Scale- 21 item (DASS-21)

This scale was used to measure the mental health risks within the study, focusing on depression, anxiety, and stress (Lovibond & Lovibond, 1995). This scale also allows to be able to decipher which risks in particular had stronger or weaker effects on the research question, as the scale measures symptoms of depression, anxiety, or stress. The 21-item scale asks participants to answer a Likert scale on statements such as ‘I found it hard to wind down’ or ‘I tended to over-react to situations’ depending on how relevant each statement was to the participant within the last week (See Appendix I). The Likert scale ranged from 0-3 with each number correlating as follows: 0- did not apply to me at all, 1- applied to me to some degree or some of the time, 2- applied to me to a considerable degree or a good part of time, and 3- applied to me very much or most the time. This scale was used opposed to another scale such as Beck’s Depression Inventory (Beck et al., 1961) due to the various symptoms measured within rather than just depression. A sum score was then calculated for the scale as a whole as well as each mental health risk symptom individually after data completion to begin data analysis.

Positive and Negative Reinforcement of Alcohol Use

The participants then completed two subscales which were constructed for another study measuring alcohol dependency and reinforcement (Cho et al., 2019). Due to the similarities between the study’s research question, this scale was chosen to measure the participant’s positive and negative reinforcement towards alcohol intake. This scale was an adaption from the Alcohol Expectancy Questionnaire (Brown et al., 1980, 1987). Reliability was investigated for the study with the Cronbach’s α calculated in Cho & colleague’s study (2019) ranged from .85 to .89 for positive reinforcement and .87 to .92 for negative reinforcement. Participants were asked to respond to statements regarding their “own personal thoughts, feelings, and beliefs about alcohol now.” The first section of the scale asked participants to answer 9 statements regarding positive reinforcement such as ‘drinking

adds a certain warmth to social occasions’ or ‘time passes quickly when I am drinking’. The second section of the scale asked participants to answer 9 statements regarding negative reinforcement such as ‘alcohol helps me sleep better’ or ‘alcohol can act as an anaesthetic; that is, it can deaden pain’ (see Appendix II for full 18-item subscale). Participants responded to the statements using a likert scale which ranged from 0 (strongly disagree) to 4 (strongly agree). A sum score was created for each sub scale following data collection to start data analysis.

Analysis

Once the data was collected, descriptive statistics were run on positive reinforcement, negative reinforcement and DASS-21. Frequency statistics were run on gender. Reliability analyses were also run on positive reinforcement, negative reinforcement and DASS-21. Independent T-Tests were then run on gender, positive reinforcement, and negative reinforcement with DASS-21 being used as the dependent variable. To align with the non-parametric findings of the descriptive statistics, spearman’s correlation was run on positive reinforcement and negative reinforcement on DASS-21 as a whole, and then each symptom of the DASS-21 (Depression, Anxiety, and Stress) individually.

Procedure

Data was collected through an online questionnaire. The questionnaire used within the current study was an anonymous self-reported questionnaire, which was shared through the researcher’s social media accounts on WhatsApp and Instagram, through a link on the social media post (see Appendix VI). When participants decided to participate in the study and open the link shared through social media, they were provided with an information sheet on the opening screen of the questionnaire which provided all necessary information for participation as well as any benefits or risks of participation (see Appendix III). Participants

were also provided with a consent form and were required to provide their informed consent to participate in this research before continuing with the questionnaire (see Appendix IV).

The questionnaire was completed by participants with no time limit and took an estimated 5-10 minutes to complete. Participants could cease participation at any point by closing their browser.

The questionnaire consisted of three sections. The first section of the questionnaire asked participants to fill out demographic information. Participants were asked to enter their age, which was manually entered by the participant, and their gender with the options of male, female, or for the participant to self-describe available. This was essential to the study to answer research questions within the study regarding age-group and gender differences, respectively. The second section of the questionnaire was the Depression, Anxiety, and Stress Scale (21-item) (Lovibond & Lovibond, 1995). This scale was used to measure the participants mental health risk symptoms of depression, anxiety, or stress. The third section of the questionnaire included two subscales measuring positive (9-items) and negative (9-items) reinforcement (Cho et al., 2019). The scale used was adapted by Cho et al. (2019) from the Alcohol Expectancy Questionnaire (Brown et al., 1980, 1987) in order to assess positive and negative reinforcement more efficiently. Once participants completed this questionnaire they were provided with a debriefing sheet, which provided helplines and websites associated with the topics within the questionnaire (see Appendix V).

Ethical Considerations

All data was collected aligning with the ethical guidelines of NCI. All participants filled out a consent form at the bottom of the information sheet (See Appendices IV) on the opening page of the questionnaire. The risks and benefits of partaking in the study were clearly outlined in the information sheet also. There was no added incentive for participants

to take part in the study. Participants were informed that the study was apart of a final year project and had the potential to be published. This was stated on the debrief form (See Appendices V) along with websites and helplines, such as drinkaware.ie regarding alcohol use and mentalhealthireland.ie regarding mental health problems. It was clearly identified within the study that the scales used were to measure symptoms of mental health problems and did not diagnose. Participants could stop participation at any point by closing the browser as no information would be saved until the end of the questionnaire. All participants remained anonymous, and all information was saved on a password protected laptop.

Results

Descriptive Statistics

The current data is taken from a sample of 105 participants ($n = 105$). This consisted of 53.3% females ($n = 56$) and 46.7% males ($n = 49$). The age range of the study was 18 to 47 with the mean age being 22.81 years ($SD = 5.14$).

For the independent variables, positive reinforcement scores ranged from 0 to 27, with a mean score of 16.89 ($SD = 6.96$). Negative reinforcement scores ranged from 0 to 26, with a mean score of 14.99 ($SD = 6.45$). The dependent variable, mental health risks as measured by the DASS-21 had scores ranging from 0 to 57 ($M = 20.30$, $SD = 12.57$). The mean scores for the DASS-21 subscales were as follows: Depression ($M = 6.76$, $SD = 5.37$), Anxiety ($M = 5.51$, $SD = 4.28$), and Stress ($M = 8.02$, $SD = 4.28$).

Table 1

Descriptive Statistics for Age, DASS-21, Positive Reinforcement, and Negative Reinforcement

Variable	<i>M</i> [95% CI]	<i>SD</i>	Range
Age	22.81 [21.81, 23.80]	5.14	29
DASS-21	20.30 [17.87, 22.73]	12.57	57
Positive Reinforcement	16.89 [15.54, 18.24]	6.96	27
Negative Reinforcement	14.99 [13.74, 16.23]	6.45	26

Reliability analyses were conducted to assess the internal consistency of the study measures, Cronbach's alpha (α) was calculated for each scale. The DASS-21 demonstrated excellent reliability ($\alpha = 0.93$). The positive reinforcement scale showed good reliability ($\alpha =$

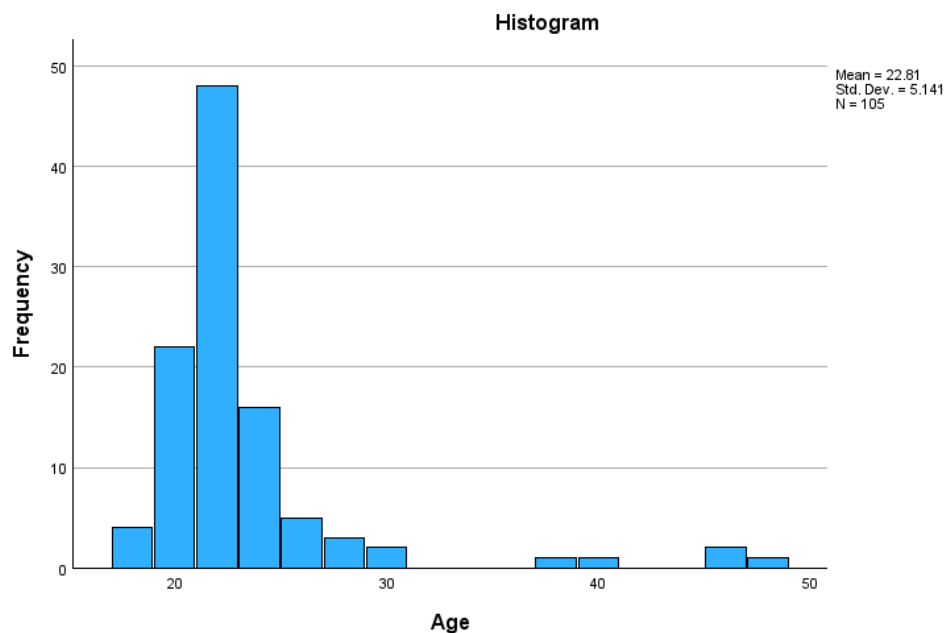
0.80), while the negative reinforcement scale also demonstrated good reliability ($\alpha = 0.81$).

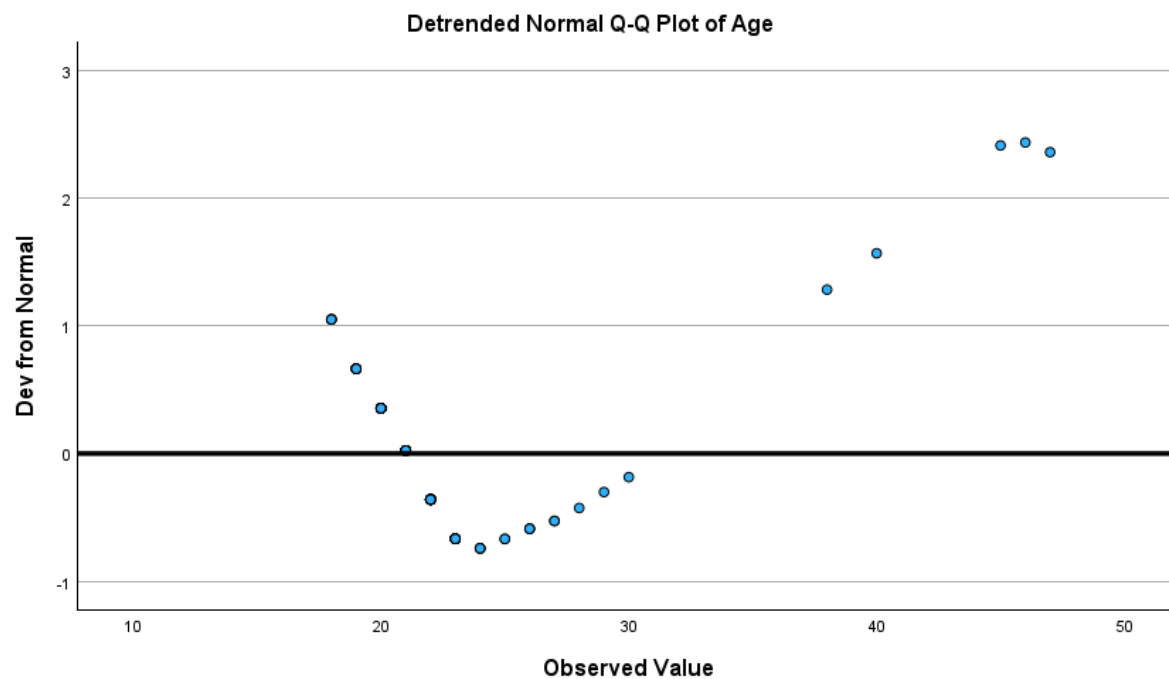
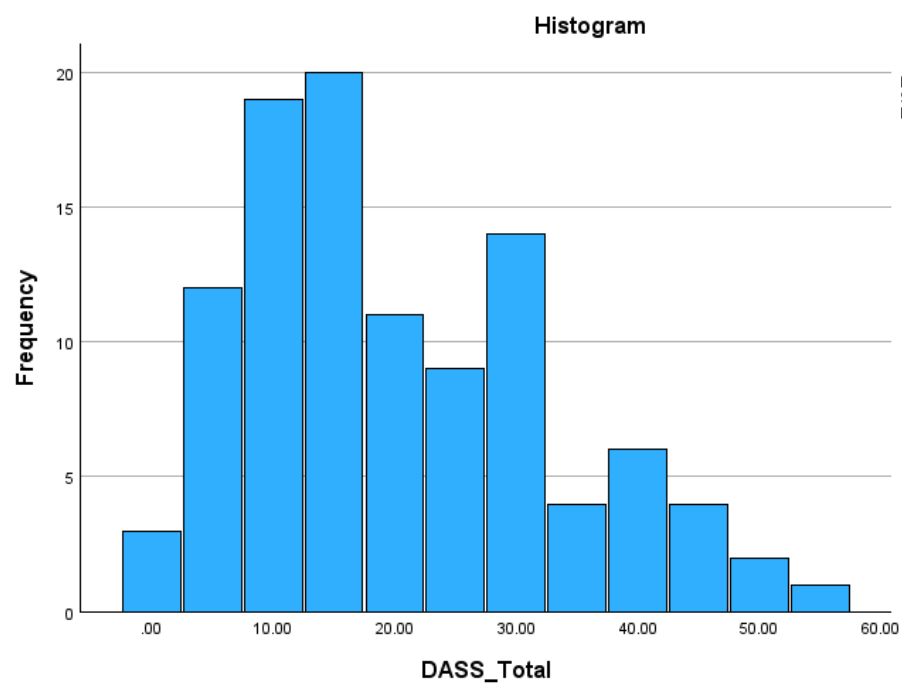
These results indicate that the measures used in this study were internally consistent and suitable for further analysis.

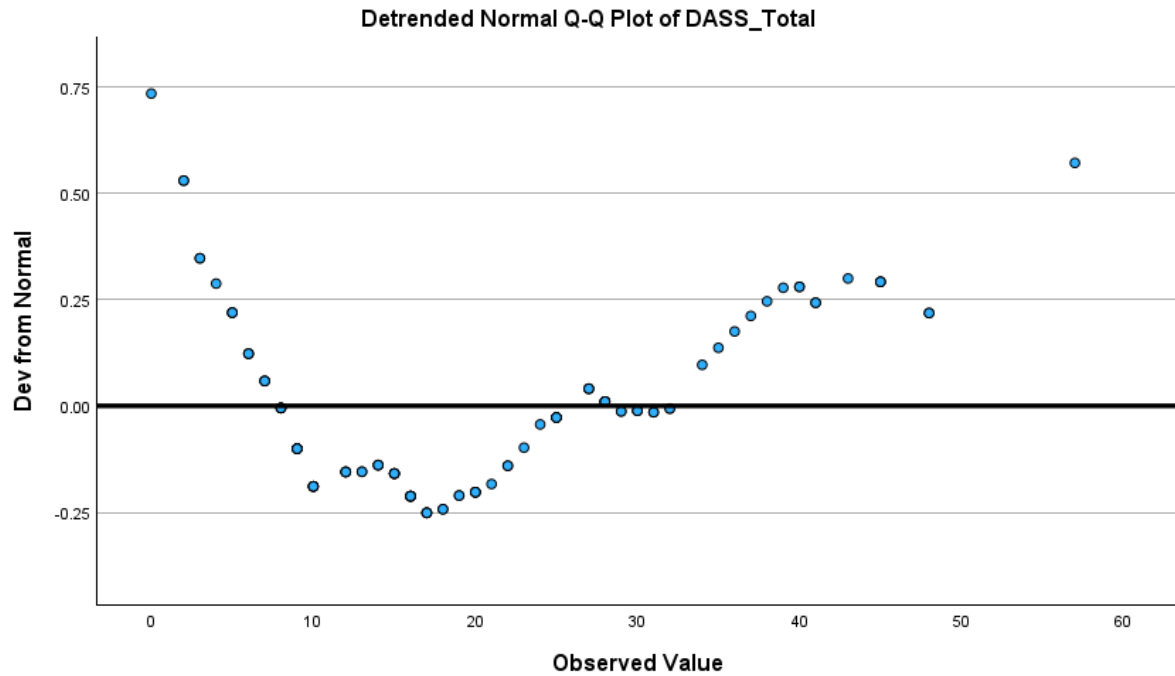
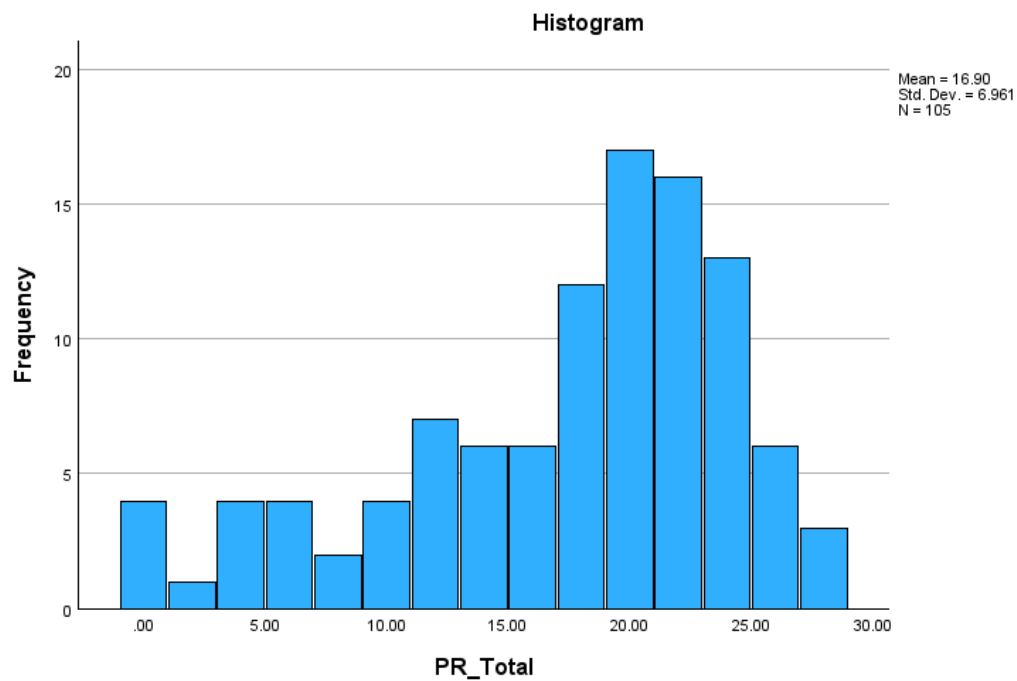
The normality of the data was assessed using the Kolmogorov-Smirnov test with Age ($D = 0.30, p < 0.001$), and positive reinforcement ($D = 0.14, p < 0.001$) scores indicating that they were not normally distributed. The distribution of the age scores exhibited a skewness of 3.30 and, a kurtosis of 11.87. The distribution of the positive reinforcement scores exhibited a skewness of -0.87, and a kurtosis of -0.03. DASS-21 ($D = 0.11, p = 0.004$) and negative reinforcement were normally distributed ($D = 0.10, p = 0.004$). Visual inspections of histograms and Q-Q plots were also constructed (see below). Given these results, non-parametric tests were used for further analyses to account for violations of normality in the data ($n = 105$).

Graph 1

Histogram for Age

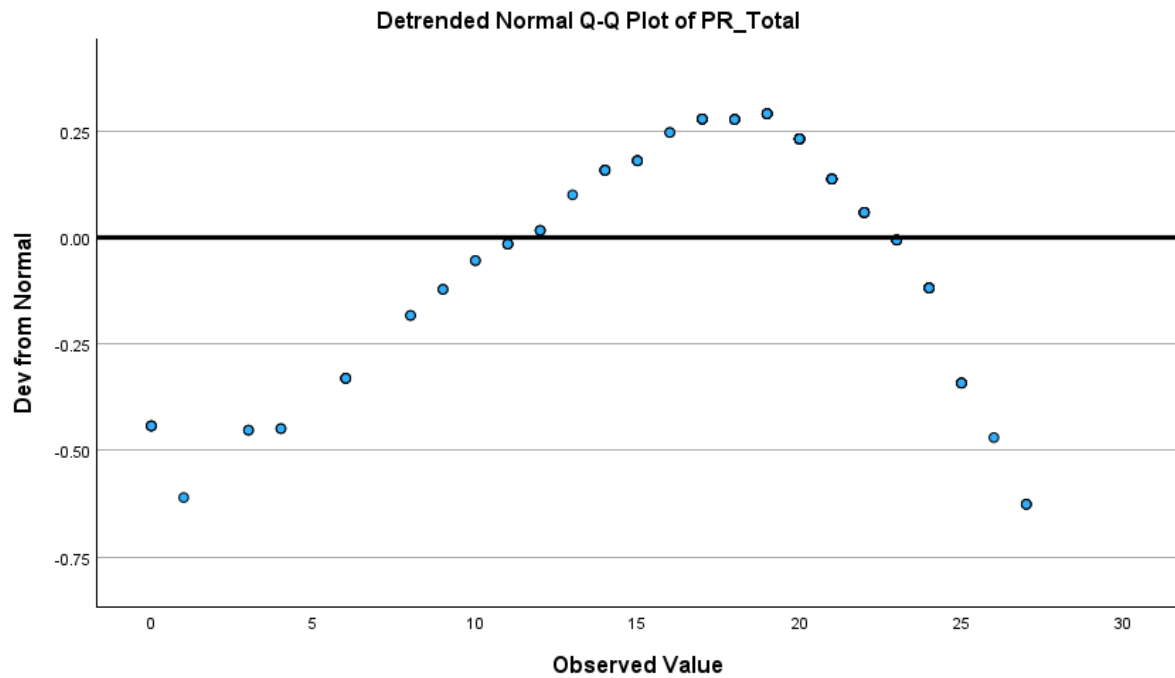


Graph 2*Q-Q Plot for Age***Graph 3***Histogram for DASS-21 (DASS_Total)*

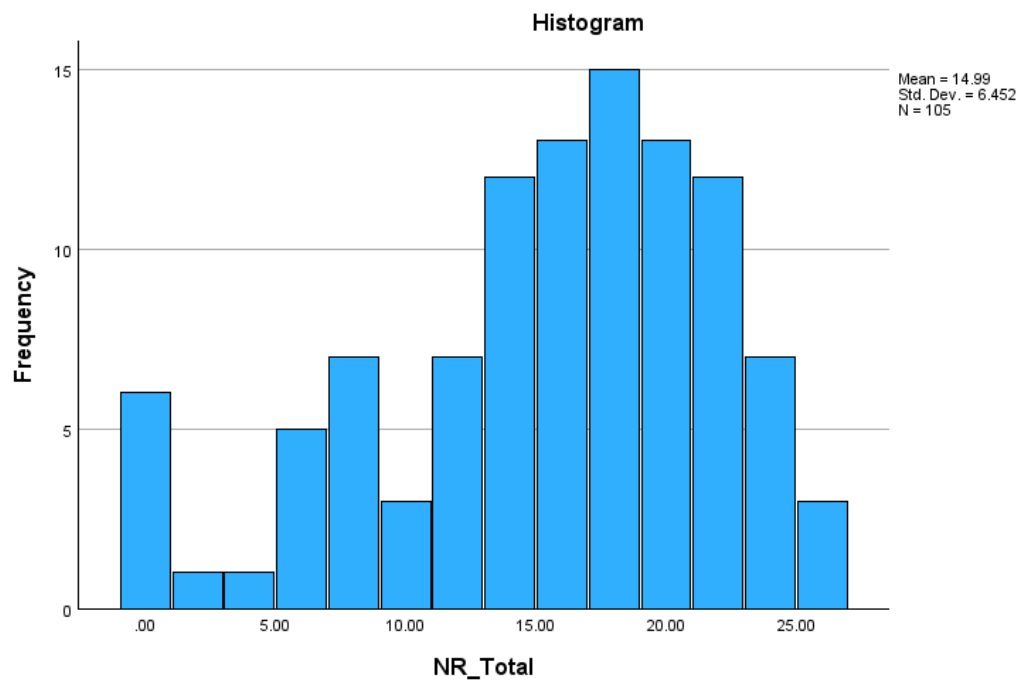
Graph 4*Q-Q Plot for DASS-21 (DASS_Total)***Graph 5***Histogram for Positive Reinforcement (PR_Total)*

Graph 6

Q-Q Plot for Positive Reinforcement (PR_Total)

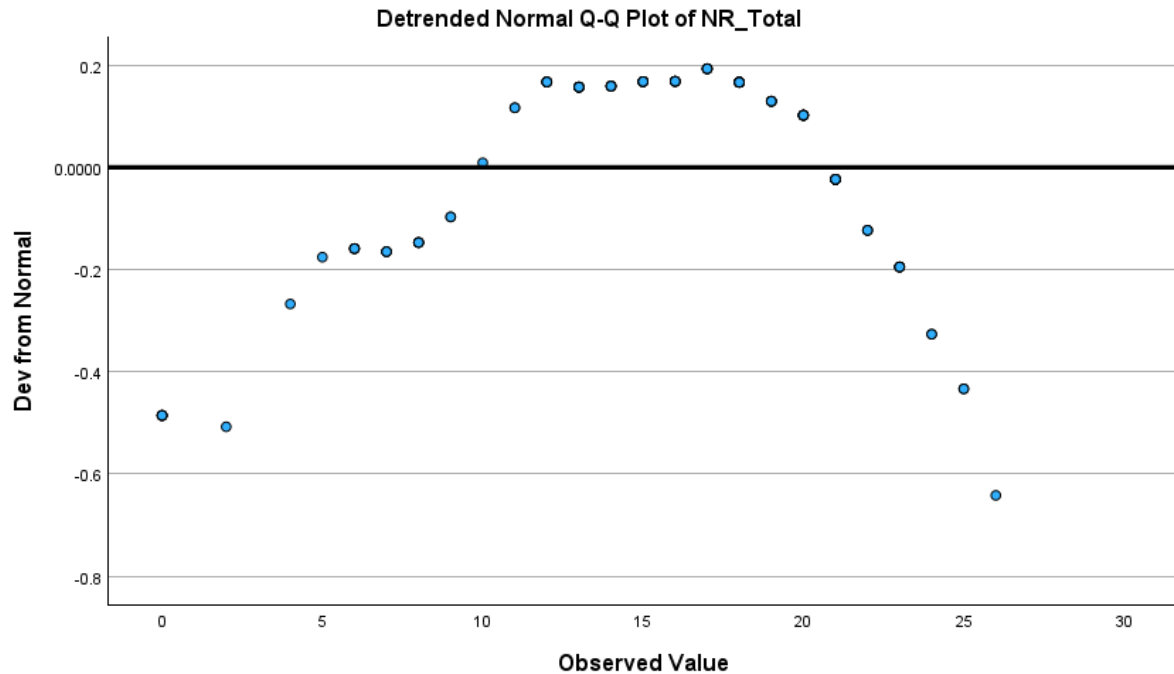
**Graph 7**

Histogram for Negative Reinforcement (NR_Total)



Graph 8

Q-Q Plot for Negative Reinforcement (NR_Total)



Inferential Statistics

Preliminary analyses were performed to ensure no violations of the assumptions of normality; age and positive reinforcement was non normally distributed. Therefore, a nonparametric Spearman correlation was computed instead of Pearson correlation coefficient to assess the relationships between the positive reinforcement, negative reinforcement compared to the DASS-21 and it's individual symptoms. There was a significant correlation between negative reinforcement and the DASS-21 ($r = 0.208$). Results indicate that higher levels of negatively reinforced alcohol intake are associated with higher scores on the DASS-21. There was a nonsignificant correlation between positive reinforcement and the DASS-21. When tested for individual symptoms, there was a significant correlation between anxiety and both positive ($r = 0.205$) and negative reinforcement ($r = 0.245$).

Table 2

Spearman's correlation between the DASS-21, Positive Reinforcement and Negative Reinforcement.

Variable	1.
1.DASS-21	-
2.Positive Reinforcement	0.152
3.Negative Reinforcement	0.208*

*. Correlation is significant at the 0.05 level (2-tailed).

Table 3

Spearman's correlation between the Depression, Anxiety, Stress, Positive Reinforcement and Negative Reinforcement.

Variable	1.	2.
1.Positive Reinforcement	-	0.480**
2.Negative Reinforcement	0.480**	-
3.Depression	0.185	0.122
4.Anxiety	0.245*	0.205*
5.Stress	0.146	0.149

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

An independent samples t-test was conducted to compare scores from the DASS-21 and positive and negative reinforcement scales for males and females. There was no

significant difference in scores for males ($M = 18.122$, $SD = 13.398$) and females ($M = 22.214$, $SD = 11.587$) in the DASS-21. The magnitude of the differences in the means (mean difference = 4.091, 95% Confidence Interval: -0.743 to 8.927) was very small. There was no significant difference in scores for males ($M = 14.224$, $SD = 6.488$) and females ($M = 15.660$, $SD = 6.402$) in the Negative Reinforcement Scale. The magnitude of the differences in the means (mean difference = 1.436, 95% Confidence Interval: -1.063 to 3.935) was very small. There was no significant difference in scores for males ($M = 16.918$, $SD = 6.642$) and females ($M = 16.875$, $SD = 7.289$) in the Positive Reinforcement Scale. The magnitude of the differences in the means (mean difference = 1.36, 95% Confidence Interval: -2.757 to 2.670) was very small.

Discussion

Summary of Findings

The goal of this study was to outline the reasons behind why the individual consumes alcohol through the drinking motives (Cooper, 1994) of positive and negative reinforcement and how these motives can affect mental health risks. Results show that there is a small significant association between negatively reinforced alcohol intake and mental health risks ($r = 0.208$). This aligns with the study's first hypothesis that 'negatively reinforced alcohol intake will have a stronger association with mental health risks compared to positively reinforced', being further proved by Skryzynski and Creswell (2020) who found that negatively reinforced alcohol consumption can lead to negative mental health symptoms.

There were no significant findings in regard to hypothesis 2- 'female participants will have a stronger association between the DASS-21 and the negative reinforcement measure compared to men'. While females did have higher mean scores in the DASS-21 ($M = 22.214$) compared to men ($M = 18.122$), as well as the negative reinforcement scale (female $M = 15.660$, male $M = 14.244$), both scores were too similar to confidently assume differentiation between them. This conflicts with the literature where females were found to have a stronger association compared to males regarding alcohol and mental health problems (Dyrbye et al., 2006; Prowse et al., 2021).

Interpretation of Results

There was a strong significant correlation between positive and negative reinforced alcohol intake ($r = 0.480$), this could be associated with studies by Koob (2013) that found there is a shift from positive reinforced alcohol intake turning into a negative reinforcement under extended periods of time as a result of the impulsivity turning to compulsivity (Koob, 2013; Kwako & Koob, 2017). This association would still be speculative at best.

While there was small significance association between the DASS-21 scores and negative reinforcement, when further investigated the individual scores for mental health symptoms of anxiety ($r = 0.245$) and depression ($r = 0.185$) have marginally higher associations to positively reinforced alcohol intake compared to negative reinforced alcohol intake. The reason behind these results may be theorized as the demographic of the study being predominantly students who will be in more social settings when consuming alcohol, experiencing anxiety and/or depression from college stress although there is no literature to support this theory from a positively reinforced perspective.

Anxiety was the only symptom to have been significantly associated to positive ($r = 0.245$) and negative reinforcement ($r = 0.205$). There are studies that further prove negatively reinforced alcohol consumption's association with anxiety, such as Adewuya et al. (2006) and Begdache et al. (2020) which both found that there was a negative linear relationship between anxiety and alcohol consumption. In contrast, Dopmeijir et al. (2021) found that those who had a higher alcohol consumption were linked with lower levels of anxiety due to being in more social settings, conflicting with the results found in the current study associating positive reinforcement and anxiety.

There were no significant differences between the 46.7% of males ($n = 49$) and the 53.3% of females ($n = 56$). All mean scores were nearly identical between male and female participants, with the largest difference being in the DASS-21 with the male mean score being 18.122 and female mean score being 22.214, which still adds no significant findings to the current study. This conflicts with previous studies where evidence is provided to show that males who had higher rates of alcohol consumption being associated to positive mental well-being, with the opposite effect of higher rates of alcohol consumption for females (van Beuningen et al., 2024).

Implications

The results of negatively reinforced alcohol intake correlating with the DASS-21 ($r=0.208$) could theoretically align with the primary motives framework (Cooper, 1994) which suggests that reinforcing coping mechanisms such as alcohol have higher associations with avoidant behaviours. This theory coincides with Sidman's (1953) the Sidman Avoidance Theory, which described how individual's would avoid negative consequences through learned behaviour.

Mental health interventions such as Cognitive Behavioural Theory (CBT) (Beck, 2020) would have direct practical implications as an intervention for mental health risks. Research regarding CBT show techniques of reducing avoidant behaviours (Hofmann & Smits, 2008) such as drinking in solitude which is shown in the study by Cresswell (2020). CBT is also effective to counteract alcoholism, especially those that struggle with addiction due to negatively reinforced alcohol intake (Breuninger et al., 2020). This is due to CBT styles applying methods to encourage prosocial behaviour and interpersonal interactions with others. It is important to note that although Alcoholics Anonymous recommend CBT to those in rehabilitation and therapy, showing the strong association between alcoholism and mental health risks.

The overall results highlight the need for attention to mental health policies that look to tackle reinforcement-based stressors. This could be a key thing for schools, universities, and workplaces to look at going forward, trying to include more information within their support programmes on how positive or negative reinforced motives can shape an individual's mental health (Moriya & Takahashi, 2013). It should also be said that these programmes should also promote the effect that healthy coping mechanisms can have in comparison to negative or avoidant behaviours being used as a coping mechanism, this is

especially a problem amongst adolescents and young adults struggling with anxiety or stress (Wersebe et al., 2018).

Strengths and Limitations

The current study has many strengths contributing to the validity and significance in understanding the relationship between positively and negatively reinforced alcohol intake and mental health risks. The use of the DASS-21 scale (Lovibond & Lovibond, 1995) does enhance the consistency and reliability of the study as it has been used widely within psychological field, although the use of self-report measures is a limitation due to the potential of bias (Podsakoff et al., 2003). The scale was used due to its simplicity and as it covers three symptoms of mental health risk, adding incentive to use it as opposed to Becks Depression Inventory (1996). To further improve reliability of the scale, potentially using the 42 item Depression, Stress and Anxiety Scale (DASS-42) (Lovibond & Lovibond, 1995) is recommended.

The positive and negative reinforcement scales (Cho et al., 2019) were used as they were the only available scales that measure positively and negatively reinforced alcohol intake within the available data. This is a limitation for reliability as it is not as common as the DASS-21 within the psychology field but the simplicity of the scales are a strength to make the study more accessible to all participants.

As the participation requirements were to be over 18 years old and to have consumed alcohol at some point throughout life, this led to quite a broad sample size. The majority of the participants ranged from ages 18 to 24 years of age leaving any older participants to be outliers within the data analyses. Originally, the study was to include correlations between age groups but due to the limited generalizability of the sample size it was deemed unnecessary to the study. The general population of young adults within the study did allow

for more relevant findings within the research, with many studies being based on reinforcement and mental health within the adolescent and young adult age group (e.g. van Beuningen et al., 2024; Hahn et al., 2020).

The study design of being cross-sectional is a limitation to the study as it prevented conclusions about causality. Although the study did find significant correlation between negatively reinforced alcohol intake and mental health risks ($r=0.208$), the study fails to determine whether negatively reinforced alcohol intake leads to an increased mental health risk. The study also fails to determine whether participants that score higher in the individual symptoms of depression, anxiety and stress within the DASS-21 are more likely to engage in the negatively reinforced behaviours (Maxwell & Cole, 2007). In future studies, a longitudinal or experimental study design would better suit to be able to determine causality between the variables.

Future Research Directions

To address these limitations, it would be advised for future research to primarily be done as a longitudinal study to be able to analyse causality between alcohol reinforcing behaviours and mental health risks. It would also be beneficial to include a stricter participation requirement to enable a clearer data analysis across a particular population rather than just a broader general population. Implementation of a different scale such as the DASS-42 could be used to provide an increased reliability, a stronger internal consistency and construct validity. Further research could be done in regards to the positive and negative reinforcement scales (Cho et al., 2019) as it is an adaption from the Alcohol Expectancy Questionnaire (Brown et al., 1980, 1987), potentially adapting a new scale to better fit the research question. It is also important to acknowledge that while the current study focused on reinforcement processes, other influencing factors of mental health risk such as personality

traits, environment, or genetic vulnerabilities, could be looked at within the study to provide a broader overview and understanding of the topic.

Conclusion

The current study examined the relationship between positively and negatively reinforced alcohol intake and mental health risks, finding that negative reinforcement is more strongly associated with mental health risks ($r=0.208$), aligning with the preconceived hypothesis of the study. Gender differences were analysed, and no significant findings were found to separate the gender groups. Anxiety was found to have significant associations with both positive ($r= 0.245$) and negatively ($r= 0.205$) reinforced alcohol intake, no other symptoms had significant findings. Implications of the findings suggest an improved focused on reinforced behaviours within institution programmes to further educate public knowledge of the potential risks, and the use of CBT methods to help with dangers associated with the negative reinforced behaviour associated to alcohol consumption.

Limitations within the study of using self-report scales and a cross-sectional design opposed to a longitudinal or experimental design were explored and recommended for future research. Using a generalized population sample size rather than a targeted population was also noted as a limitation, it is recommendable in future studies to used a targeted population sample to get clearer and more precise data. Despite these limitations, the study impacts behavioural psychology outlining the role of reinforcing behaviours associated with alcohol in mental health. Promoting this knowledge could be beneficial within an educational, therapeutic, or working setting to improve psychological resilience and well-being.

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Appendices

Appendix I

Depression, Anxiety, and Stress Scale- 21 item (DASS-21)

Answer each statement depending on how it has applied to you over the past week.

The rating scale is as follows:

0 Did not apply to me at all

1 Applied to me to some degree, or some of the time

2 Applied to me to a considerable degree or a good part of time

3 Applied to me very much or most of the time

1 (s) I found it hard to wind down 0 1 2 3

2 (a) I was aware of dryness of my mouth 0 1 2 3

3 (d) I couldn't seem to experience any positive feeling at all 0 1 2 3

4 (a) I experienced breathing difficulty (e.g. excessively rapid breathing, breathlessness in the absence of physical exertion) 0 1 2 3

5 (d) I found it difficult to work up the initiative to do things 0 1 2 3

6 (s) I tended to over-react to situations 0 1 2 3

7 (a) I experienced trembling (e.g. in the hands) 0 1 2 3

8 (s) I felt that I was using a lot of nervous energy 0 1 2 3

9 (a) I was worried about situations in which I might panic and make a fool of myself 0 1 2 3

10 (d) I felt that I had nothing to look forward to 0 1 2 3

11 (s) I found myself getting agitated 0 1 2 3

12 (s) I found it difficult to relax 0 1 2 3

13 (d) I felt down-hearted and blue 0 1 2 3

14 (s) I was intolerant of anything that kept me from getting on with what I was doing 0 1 2 3

15 (a) I felt I was close to panic 0 1 2 3

16 (d) I was unable to become enthusiastic about anything 0 1 2 3

17 (d) I felt I wasn't worth much as a person 0 1 2 3

18 (s) I felt that I was rather touchy 0 1 2 3

19 (a) I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase, heart missing a beat) 0 1 2 3

20 (a) I felt scared without any good reason 0 1 2 3

21 (d) I felt that life was meaningless 0 1 2 3

Appendix II

Items Included in the Measures of Positive and Negative Reinforcement

Positive Reinforcement

1. Some alcohol has a pleasant, cleansing, tingly taste.
2. Drinking adds a certain warmth to social occasions.
3. Time passes quickly when I am drinking.
4. Drinking makes me feel good.
5. Having a few drinks is a nice way to celebrate special occasions.
6. When I feel "high" from drinking, everything seems to feel better.
7. Drinking is pleasurable because it is enjoyable to join in with people who are enjoying themselves.
8. I like the taste of some alcoholic beverages.
9. Sometimes when I drink alone or with one other person it is easy to feel cozy and romantic.

Negative Reinforcement

1. Alcohol helps me sleep better.
2. Alcohol decreases muscular tension.
3. After a few drinks I am usually in a better mood.

4. If I am tense or anxious, having a few drinks makes me feel better.
5. Alcohol enables me to fall asleep more easily.
6. Alcohol can act as an anaesthetic; that is, it can deaden pain.
7. I feel like more of a happy-go-lucky person when I drink.
8. Drinking makes get-togethers more fun.
9. If I am cold, having a few drinks will give me a sense of warmth.

Appendix III

Information Sheet

PROJECT TITLE

Mental health risks between positively and negatively reinforced alcohol intake

INVITATION

You are being asked to take part in a research study on the mental health risks that alcohol intake may have. The study will measure if you drink as a negative reinforcement (i.e. to reduce stress, forget about ongoing issues etc..) or a positive reinforcement (i.e. to increase social skills, provide a more jovial mood, etc...), comparing if the reasons why you drink may be a representative of your mental health. This study is for adults over the age of 18 that partake in social drinking. This research will be done by Callum Sterio under the supervision of Dr. Brendan Cullen within the National College of Ireland, *This project has been approved by the Psychology Research Ethics Committee. *

WHAT WILL HAPPEN

In this study, you will be asked to complete a positive/negative reinforcement scale to determine the reasons behind why you drink. You will also be asked to complete the Depression, Anxiety and Stress Scale-21 which will be used to measure levels of attitude and symptoms of depression, anxiety, or stress. This scale only identifies symptoms, it does not diagnose. You will also be asked demographic questions such as age and gender, this will allow the researcher to be able to compare differentiations between age groups and genders. The study is not assessing whether participants are depressed, anxious, or stressed but rather measuring depressed, anxious, or stressed symptoms.

TIME COMMITMENT

The study typically takes less than 10 minutes to complete.

PARTICIPANTS' RIGHTS

You may decide to stop being a part of the research study at any time without explanation.

You have the right to ask that any data you have supplied to that point be withdrawn/destroyed.

You have the right to omit or refuse to answer or respond to any question that is asked of you.

You have the right to have your questions about the procedures answered (unless answering these questions would interfere with the study's outcome). If you have any questions as a result of reading this information sheet, you should ask the researcher before the study begins.

BENEFITS AND RISKS

Participation in this study involves completion of some standardised tests [DASS-21] which are routinely used as preliminary screens for clinical conditions involving depression, stress or anxiety [as relevant to the particular study] of which you may not be aware. Scores from these tests would not be sufficient basis for clinical decisions or diagnosis, contain substantial margins of error, and are not used for diagnostic purposes in this study. Though it is not possible to provide feedback of individual scores to participants, scores may lead to ruminations into the participants drinking habits or mental health risks. Helplines and websites are all available on the debrief sheet that follows the survey. If any of the subject matter is distressing, participants may stop at any time by closing the browser, no data is stored until the submit button is pressed. Participants can withdraw at any point before pressing submit by closing the browser. Any further questions may be directed to the researcher @x21479566@student.ncirl.ie.

CONFIDENTIALITY/ANONYMITY

All research gathered will remain de-identified with the only demographic questions being asked your age and gender. The anonymous results will be used as part of a final year project and may be presented at conferences. All data will be stored on the researcher's OneDrive which will be password protected. Only the researcher and supervisor will have access to the data collected.

FOR FURTHER INFORMATION

Callum Sterio will be glad to answer your questions about this study at any time. You may contact him @x21479566@student.ncirl.ie.

To find out about the results of this study, you should contact Callum using the contact information above.

Appendix IV

Consent Form

I have read and understood the attached Information Leaflet regarding this study. I have had the opportunity to ask questions and discuss the study with the researcher and I have received satisfactory answers to all my questions.

I understand that I am free to withdraw from the study at any time without giving a reason and without this affecting my training.

I agree to take part in the study.

Yes

☐

Appendix V

Debriefing Sheet

The research aim is to identify the mental health risks between positively and negatively reinforced alcohol intake, this study does not assess if the participant is depressed but looks into attitudes and depressive symptoms.

After having completed the scales, it may provide some internal questions that you feel need answering or that you may feel you need help with. Alcohol and Depression websites and

helplines are below for you to contact if you are having any queries or fears following the completion of these scales. The websites and helplines below are recommended if anything found in this study is in anyway distressing to the participant.

Alcohol

HSE Drugs and Alcohol Helpline – 1800247247

Drinkaware.ie

Mental Health Risks

Aware (Depression and Bipolar Disorder Support) – 1800804848

Mentalhealthireland.ie

Turn2me.ie

Appendix VI

Social Media Post

