

Coping Style as a Moderator of Chronic Loneliness and Substance Use in Emerging Adults

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Abstract

Primary affective bonds are integral to forming successful close adult relationships and an inadequate sense of belongingness can lead to loneliness. Loneliness and insecure attachment have been consistently related to negative behavioural outcomes, such as substance use which is often used as a means to cope with negative emotions. The goal of this study was to examine whether coping may moderate the relationship between attachment security, loneliness, and substance use. Two hundred and nine (209) young adults (18-30 years of age) completed self-report questionnaires measuring attachment security, loneliness, coping style, and level of substance use. In the current sample, 60.3% of participants met the criteria for alcohol misuse and 48.3% met the criteria for drug misuse. Results showed that higher levels of chronic social loneliness predicted higher levels of substance use ($p = 0.029$), but coping did not moderate this relationship. Higher attachment avoidance predicted higher levels of substance use ($p < 0.001$), while adaptive coping moderated this relationship ($p = 0.001$). Since adaptive coping skills may buffer avoidant individuals against substance misuse, it may be useful for substance use interventions to be tailored, such that avoidant individuals are taught coping skills that promote greater awareness of internal states and lessen feelings of interpersonal distress.

Keywords: Coping style; Chronic loneliness; Distress

Introduction

Loneliness is often the result of a discrepancy between one's desired interpersonal relationships and one's perceived current relationships [1,2]. Loneliness has been conceptualized as a multidimensional construct comprised of different types of loneliness based on the source of distress [3,4]. Weiss described social loneliness as a result of inadequate social interaction and unsatisfactory social relationships, whereas, emotional loneliness results from unsatisfactory emotional attachments. Research has shown that emotional and social loneliness are distinct constructs that can have different antecedents and behavioural outcomes [3-6].

Loneliness can be influenced by quantitative characteristics of relationships, such as number of social contacts or frequency of social interaction, but loneliness is more often defined by qualitative characteristics of relationships, such as subjective sense of belonging [7-10]. Our sense of belonging and the quality of interpersonal relationships are often rooted deeply in the initial relationships we have with parents and caregivers [11-13]. Attachment theory suggests that, as infants and children, individuals form internal working models of themselves and others which are largely based on their relationship with caregivers [12-14]. These working models result in either secure or insecure attachment. A secure attachment is built in a loving and supportive environment, where the child has a secure base from which to explore their environment [12-14]. Attachment security has been shown to be relatively stable and persist throughout adulthood [15]. Attachment can be conceptualized as a dimensional construct based on attachment related anxiety and attachment related avoidance [16,17].

The transition into adulthood requires both a striving for independence and a reliance on attachment figures [18,19]. Young adulthood is generally a time when the focus on attachment figures shifts from primary caregivers to peers and romantic partners [15] therefore, if secure attachments are not formed early in life, this transition may be challenging. Loneliness is one outcome that can arise during this transition, and research has shown that attachment style is significantly related to loneliness [18]. Research suggests that many young adults experience significant levels of loneliness, particularly during the initial

transition to university/college [20-23]. Past research on loneliness has revealed that a large portion of the young adult population is frequently lonely [24,25], and more recent prevalence rates for loneliness range from 20% to 30% [26,27]. Individuals manage feelings of loneliness in different ways, and these coping strategies can have a significant influence on behavioural outcomes.

Coping is commonly defined as a process which includes cognitive and behavioural efforts to manage external or internal stimuli that are appraised as demanding or beyond the resources of the individual [28-30]. Researchers generally categorize coping strategies based on the function of coping efforts. Zuckerman and Gagne [31] proposed a 5-factor model of coping, where adaptive coping is represented by self-help, approach, and accommodation; while maladaptive coping is represented by avoidance and self-punishment [31]. Individuals develop characteristic coping strategies early in childhood and it is suggested that attachment patterns may help explain individual differences in coping strategies. Insecure attachment has been consistently related to maladaptive coping strategies such as withdrawal, avoidance, emotion-minimizing, repression, and diversion [32,33]. Adaptive coping strategies have been linked to fewer externalizing problems in adults, while maladaptive coping efforts have been linked to both emotional and behavioural problems [34,35].

Research has reported a significant increase in substance use in young adults during the 21st century [36-38]. Alcohol is a particularly

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popular drug for young adults and is often perceived as part of university/college campus culture [39-46]. Exposure to alcohol and peer pressure makes time spent in university a window of vulnerability for alcohol use and abuse [39]. Alcohol is often used to facilitate intimacy [47], closeness, [48] and support [39]; therefore, alcohol use in young adults has been viewed by some researchers as a socially normative behaviour that can have beneficial outcomes for social development [42]. Although an abundance of research addresses alcohol use in emerging adults, use and abuse of substances other than alcohol is also a significant concern for this population, which may result in negative outcomes such as academic/occupation failure, as well as, unsuccessful social and interpersonal relationships [49-51].

The current study

The current study aims to examine loneliness and attachment orientation as predictors of substance use, and the potential role of coping style in moderating these relationships. The research discussed above has shown that attachment, loneliness, coping, and substance use are related [52-55], but it is not entirely clear how coping intervenes between stressors, such as loneliness, and negative behavioral outcomes, such as substance use. Two moderation models are hypothesized in the current study. First, the relationship between loneliness and substance use is hypothesized to be dependent on differences among individual coping styles; with coping style influencing the direction and/or strength of the aforementioned relationship. Specifically, in the current study, it is predicted that adaptive coping styles will buffer individuals who report high levels of loneliness against increased substance use behavior. Second, the relationship between attachment orientation and substance use is hypothesized to be dependent on differences among individual coping styles; with coping style influencing the direction and/or strength of this relationship. Specifically, it is predicted that adaptive coping styles will buffer insecurely attached individuals against increased substance use behavior. Given that research has found substance use is correlated with several variables related to personality and mental health [52-54,56-58], the current study will control variables related to personality, anxiety, and depression.

Method

Participants

A total of 299 participants took part in the current study; however, after data screening 246 cases remained, due to incomplete survey data and data screening procedures. For the purpose of the current study, only participants who were 30 years of age or younger were retained for analysis, given the present interest in an emergent adult population. The sample consisted of 149 females (71.3%) and the majority (83.7%) of the sample identified as Caucasian. Age ranged from 18 to 30 years ($M=21.29$, $SD=3.44$), and 87.6% of participants indicated that they were university or college students.

Measures

Demographics and substance use survey (self-developed): This 15-item self-report questionnaire was adapted from University of Washington's University Life and Substance Use Survey [59]. The questionnaire contains basic demographic questions related to age, gender, ethnicity, and education. The substance use section contains items pertaining to past and current drug and alcohol use, as well as, perceptions of peer substance use.

Social and emotional loneliness scale for adults- short version (SELSA-S) [60]: The SELSA-S is a 15-item questionnaire that measures

loneliness as a multidimensional construct. The SELSA-S has three, 5-item subscales: Romantic loneliness, family loneliness, and social loneliness. Each item is rated on a 7-point Likert scale that ranges from 1 (strongly disagree) to 7 (strongly agree). The SELSA-S divides emotional loneliness into romantic and family loneliness, which have been shown to be independent constructs [3,60]. The SELSA can be used to assess both transient (the last two weeks) and chronic (the past year) loneliness. The current study focused on levels of chronic loneliness. The SELSA-S has been shown to be a reliable and valid measure of adult loneliness [60,61]. For the current study, reliability coefficients for chronic loneliness were 0.88, 0.84, and 0.86 for social, family, and romantic, loneliness respectively.

Experiences in close relationships scale (ECR) [16]: This is a 36-item self-report questionnaire designed to measure adult attachment style. The ECR has two subscales which assess attachment related anxiety and attachment related avoidance. Each item is rated on a 7-point Likert scale that ranges from 1 (disagree strongly) to 7 (agree strongly). Higher scores on the two subscales indicate greater attachment related anxiety and attachment related avoidance, respectively. The ECR subscales have shown to be reliable and valid [16,33]. In the current study, the reliability coefficients were 0.85 and 0.91 for the avoidance and anxiety subscales, respectively.

The alcohol use disorder identification test (AUDIT) [62,63]: This is a 10-item self-report questionnaire that measures three different aspects of drinking: alcohol use, dependence, and problems resulting from drinking. The first 8 items are scored on a 5-point Likert scale that ranges from 0 to 4 and the last two questions are scored on a 3-point scale with values of 0, 2, and 4. A score of 8 is the generally accepted cut-off to indicate alcohol misuse and a score of 20 suggests alcohol dependence [63]. The AUDIT has been shown to be a reliable and valid instrument for measuring alcohol misuse [63-66]. In the current study, the AUDIT showed good internal consistency with a reliability coefficient of 0.89.

The drug use disorder identification test (DUDIT) [67]: This is an 11-item self-report questionnaire that measures the use of drugs other than alcohol. Nine of the questions are scored on a 5-point scale ranging from 0 to 4, and two are scored on a 3-point scale with values of 0, 2, and 4. Recommended cut-off scores to indicate drug abuse vary. Voluse, Gioia, Sobell, Dum, Sobell, and Simco [68] suggested a cut-off score of 8, with adequate sensitivity and specificity scores (0.90 and 0.85 respectively). The DUDIT has been shown to be a reliable and valid instrument for measuring drug misuse [67-69]. In the current study, the DUDIT had a Cronbach's alpha coefficient of 0.95.

The revised COPE Scale (R-COPE) [31]: This is a 40-item self-report questionnaire that assesses a 5-factor model of coping strategies. The five factors include: self-help, approach, accommodation, avoidance, and self-punishment. Each item is rated on a 4-point Likert scale, indicating how often the participant engages in each statement, ranging from 1 (I usually don't do this at all) to 4 (I normally do this a lot). Composite scores can be computed for one adaptive subscale and one maladaptive subscale. The R-COPE has been shown to be a reliable and valid instrument for measuring coping styles [31]. In the current study the reliability coefficients were 0.90, 0.89, 0.90, 0.84, and 0.92, for self-help, approach, accommodation, avoidance, and self-punishment, respectively. The reliability coefficient was 0.93 for the adaptive subscale and 0.90 for the maladaptive subscale, indicating that these scales were reliable.

Generalized anxiety disorder-7 scale (GAD-7) [70]: This is a 7-item self-report questionnaire for screening individuals for and

measuring the severity of generalized anxiety disorder symptoms. Each of the items is rated on a 4-point Likert scale ranging from 0 to 3, with responses: “not at all,” “several days,” “more than half the days,” and “nearly every day.” The GAD-7 has been shown to be a reliable and valid instrument for measuring levels of generalized anxiety [71-73]. In the current sample, the reliability coefficient was 0.94.

Patient health questionnaire (PHQ-9) [74]: This is a 9-item self-report questionnaire for screening individuals for and measuring the severity of depressive symptoms. Each item is rated on a 4-point Likert scale ranging from 0 to 3, with responses: “not at all,” “several days,” “more than half the days,” and “nearly every day.” The PHQ-9 has demonstrated adequate reliability and validity [74,75] and in the current sample the reliability coefficient was 0.93.

Big Five Inventory (BFI) [76]: This is a 44-item self-report questionnaire that measures the Big Five Factor theory of personality. The five subscales are: extraversion, neuroticism, openness to experience, agreeableness, and conscientiousness. In previous research, the subscales have shown high reliability and strong convergent and divergent validity with longer Big Five measures [77,78]. In the current sample, reliability coefficients for neuroticism, extraversion, and openness were 0.72, 0.67, and 0.73, respectively. Reliability coefficients for the subscales agreeableness and conscientiousness were very low: 0.55 and 0.43, respectively, and were not included in analyses.

Procedure

The current study was advertised on the campus of an Atlantic Canadian post-secondary institution and through social media outlets. Participants completed the current study either as a paper and pencil survey or as an electronic survey via the data collection software Qualtrics. Participants completed the set of self-report questionnaires in small groups or individually and an informed consent form was presented first to each participant. Participants received one bonus point towards their grade if they were enrolled in an Introductory Psychology course. Students who were not enrolled in an Introductory Psychology course, or who completed the survey electronically, had the option to be entered in a raffle for one of three prizes: a \$10, \$20, or \$30 gift card to a local restaurant, in appreciation for their participation in the current study.

Results

Power analysis and data screening

A priori power analysis was conducted to determine adequate sample size, using an online sample size calculator [79], as well as the program G*Power [80]. Both programs recommended a minimum sample size of N=122 to conduct the moderation regression analysis. This was based on 11 predictors, a medium effect size estimate of $f^2=0.15$, and alpha level of $p=0.05$. Prior to statistical analyses, the data was screened for accuracy and model assumptions.

Descriptive analyses

After controlling for age, 209 cases were retained for analysis. Eighty-eight point five percent (88.5%) of participants reported consuming alcohol at least once, and 61.1% of participants indicated using an illicit drug at least once. Based on the cut-off s for AUDIT scores [63], 58.4% of participants met the criteria for alcohol misuse, and 3.8% of participants met the criteria for alcohol dependence. Based on the cut-off for DUDIT scores [68], 49.8% of participants met the criteria for drug misuse. The most commonly used drug was marijuana or hashish

(26.3%), and was followed by cigarettes, cigars, or pipe tobacco (17.7%). All other drug categories had very low rates of use (<4.3%; Table 1). Descriptive statistics for other study variables are presented in Table 2.

Loneliness and substance use

Given that no significant differences were found between chronic and transient loneliness for any of the loneliness domains (social, family, romantic), chronic loneliness scores were used in the following analyses, as research suggests that chronic loneliness is related to greater levels of distress and other pathological issues [57]. A series of hierarchical multiple linear regression analyses were performed to assess whether chronic loneliness predicted level of substance use over and above personality, anxiety, and depression. AUDIT scores were entered as the criterion variable and the overall model was statistically significant, $R^2=0.27$, $F(8, 200)=9.35$, $p<0.001$. After controlling for personality, anxiety, and depression, chronic social loneliness was the only unique predictor of AUDIT scores, $t(245)=-2.19$, $p=0.029$. In a second regression analysis, DUDIT scores were entered as the criterion variable and the overall model was statistically significant, $R^2=0.38$, $F(8, 200)=15.17$, $p<0.001$. After controlling for personality, anxiety, and depression, chronic loneliness scores did not account for any unique variance in DUDIT scores (Table 3).

	Never use	Less than once a month	About once a month	Two or three times a month	Once a week or more
Cigarettes, Cigars	82.3	7.2	1.9	1.4	6.7
Smokeless tobacco	97.1	2.4	0	0	0.5
Marijuana, Hashish	73.7	13.9	1.4	3.8	7.1
Cocaine	97.1	1.9	1.0	0	0
Stimulants	96.2	2.9	1.0	0	0
Sedatives	98.6	1.4	0	0	0
Hallucinogens	96.7	1.9	0	0	0
Opiates, Narcotics	97.6	1.0	0.5	1.0	0
Inhalants	99.5	0.5	0	0	0
Steroids	98.5	0.5	0.05	0	0.5
Club drugs	98.0	2.0	0	0	0
Designer drugs	96.6	2.4	1.0	0	0

Note: The last column consists of the categories once or twice a week, three or four times a week, nearly every day, and once a day or more. Given the small n, they were collapsed into a single category.

Table 1: Frequency statistics for reported current drug use (%).

	M	SD	MIN	MAX
SELSA Social	12.69	6.53	0	32
SELSA Family	12.33	7.04	0	35
SELSA Romantic	16.11	8.79	0	35
AUDIT	9.37	6.33	0	26
DUDIT	6.54	6.15	0	25
ECR Avoidance	69.35	16.24	18	111
ECR Anxiety	66.89	19.65	24	116
RCOPE Adaptive	69.86	12.85	24	96
RCOPE Maladaptive	35.12	9.07	16	55
GAD-7	12.16	6.62	0	28
PHQ-9	12.43	7.97	0	34
DASS-S	22.14	12.39	0	56
BFI Neuroticism	18.98	3.86	10	30
BFI Extraversion	22.28	4.42	10	31
BFI Openness	26.97	4.81	15	40

Table 2: Descriptive statistics for variables included in analyses.

Attachment and substance use

Two hierarchical multiple regression analyses were performed to assess whether attachment style predicted level of substance use over and above personality, anxiety, and depression. First, AUDIT scores were entered as the criterion variable and the model was statistically significant, $R^2=0.32$, $F(7, 201)=13.46$, $p<0.001$. After controlling for personality, anxiety, and depression, only attachment avoidance accounted for unique variance in AUDIT scores, $t(208)=-4.38$, $p<0.001$. In the second regression analysis, DUDIT scores were entered as the criterion variable and the model was statistically significant, $R^2=0.46$, $F(7, 201)=24.59$, $p<0.001$. After controlling for personality, anxiety, and depression, only attachment avoidance accounted for unique variance in DUDIT scores, $t(208)=-45.32$, $p<0.001$ (Table 4).

Moderation models

In the first moderation model, it was hypothesized that the nature

	AUDIT		DUDIT	
	r	β	r	β
Step 1				
Extraversion	-0.102	0.017	-0.314	-0.174*
Neuroticism	0.004	-0.316**	0.114	-0.298**
Openness	-0.035	0.013	0.040	0.131*
GAD_Scores	0.312	0.156	0.451	0.185
PHQ_Scores	0.396	0.471**	0.512	0.471**
		$R^2=0.25**$		$R^2=0.37**$
Step 2				
Extraversion	-0.102	-0.001	-0.314	-0.159*
Neuroticism	0.004	-0.292**	0.114	-0.313**
Openness	-0.035	-0.005	0.040	0.129*
GAD_Scores	0.312	0.152	0.451	0.181**
PHQ_Scores	0.396	0.496**	0.512	0.467
Social Loneliness	-0.006	-0.167*	0.168	-0.029
Family Loneliness	0.118	0.054	0.242	0.076
Romantic Loneliness	0.012	-0.004	-0.086	-0.084
		$\Delta R^2=0.02$		$\Delta R^2=0.01$

Note: * $p<0.05$, ** $p<0.01$

Table 3: Summary of hierarchical regression analyses for loneliness predicting AUDIT scores and DUDIT scores.

	AUDIT		DUDIT	
	r	β	r	β
Step 1				
Extraversion	-0.102	0.017	-0.314	-0.174*
Neuroticism	0.004	-0.316**	0.114	-0.298**
Openness	-0.035	0.013	0.040	0.131*
GAD_Scores	0.312	0.156	0.451	0.185
PHQ_Scores	0.396	0.471**	0.512	0.471**
		$R^2=0.25**$		$R^2=0.37**$
Step 2				
Extraversion	-0.102	-0.016	-0.314	-0.198*
Neuroticism	0.004	-0.258**	0.114	-0.180*
Openness	-0.035	-0.004	0.040	0.099
GAD_Scores	0.312	0.075	0.451	0.121
PHQ_Scores	0.396	0.483**	0.512	0.505**
Attachment Avoidance	-0.231	-0.280**	-0.272	-0.302**
Attachment Anxiety	0.109	0.087	0.036	-0.061
		$\Delta R^2=0.07**$		$\Delta R^2=0.09**$

Note: * $p<0.05$, ** $p<0.01$

Table 4: Summary of hierarchical regression analyses for attachment predicting AUDIT scores and DUDIT score.

	AUDIT		DUDIT	
	r	β	r	β
Step 1				
Attachment Avoidance	-0.229	-0.307**	-0.270	-0.328*
Attachment Anxiety	0.122	0.235*	0.044	0.150
Adaptive Coping	0.132	0.065	0.124	0.040
Maladaptive Coping	0.023	-0.022	0.027	0.022
		$R^2=0.12**$		$R^2=0.11**$
Step 2				
Attachment Avoidance	-0.229	-0.207*	-0.270	-0.235*
Attachment Anxiety	0.122	0.178*	0.044	0.084
Adaptive Coping	0.132	0.130	0.124	0.108
Maladaptive Coping	0.023	-0.023	0.027	0.023
Avoidance x Adaptive	-0.214	-0.277*	-0.234	-0.272*
Avoidance x Maladaptive	0.087	0.043	0.089	0.032
Anxiety x Adaptive	0.044	0.077	-0.001	0.005
Anxiety x Maladaptive	-0.149	-0.160*	-0.173	-0.208*
		$\Delta R^2=0.08*$		$\Delta R^2=0.09**$

Note: * $p<0.05$, ** $p<0.01$

Table 5: Summary of hierarchical regression analyses for the moderation of attachment style and Audit scores and Dudit scores.

of the relationship between loneliness and substance use would differ depending on scores on the coping measure. The interaction between chronic loneliness and coping style was assessed with a hierarchical regression analyses, and was only tested for alcohol use (AUDIT) since loneliness scores did not uniquely predict drug use (DUDIT). Two subscales were computed from the R-COPE for use in this analysis: adaptive coping and maladaptive coping. AUDIT scores were entered as the criterion variable, and the predictor variables included the three chronic SELSA-S scales, two R-COPE subscale (adaptive and maladaptive), and 6 interaction variables (SELSA-S by R-COPE scores). There were no significant interactions between loneliness scores and coping scores.

In the second moderation model, it was hypothesized that the nature of the relationship between attachment style and substance use would differ depending on scores on the coping measure. The interaction between loneliness and coping style was assessed through hierarchical regression, separately for alcohol (AUDIT) and drug use (DUDIT). First, AUDIT scores were entered as the criterion variable, and the predictor variables included the two ECR scale scores, two R-COPE subscale scores (adaptive and maladaptive), and four interaction variables. The overall model was statistically significant, $R^2=0.19$, $F(8, 197)=5.91$, $p<0.001$. There was a significant interaction between attachment avoidance and adaptive coping, $b=-.007$, $t(197)=-3.24$, $p=0.00$, which indicates that higher levels of attachment avoidance predict higher levels of alcohol use in individuals who are low on adaptive coping, but higher levels of attachment avoidance predict lower levels of alcohol use in individuals who are high on adaptive coping. There was also a significant interaction between attachment anxiety and maladaptive coping, $b=-.005$, $t(197)=-2.20$, $p=0.029$, which indicates that higher levels of attachment anxiety predict higher levels of drug use in individuals low on maladaptive coping, but higher levels of attachment anxiety predict lower levels of use use in individuals who are high on maladaptive coping (Table 5, Figures 1 and 2).

Next, DUDIT scores were entered as the criterion variable, and the predictor variables included the two ECR scale scores, two R-COPE subscale scores (adaptive and maladaptive), and four interaction variables. The overall model was statistically significant, $R^2=0.19$, $F(8, 197)=6.06$, $p<0.001$. There was a significant interaction between

attachment avoidance and adaptive coping, $b=-.007$, $t(197)=-3.19$, $p=0.002$, which indicates that higher levels of attachment avoidance predict higher levels of substance use in individuals who are low on adaptive coping, but higher levels of attachment avoidance predict lower levels of substance use in individuals who are high on adaptive coping. There was also a significant interaction between attachment anxiety and maladaptive coping, $b=-.007$, $t(197)=-2.87$, $p=0.005$, which indicates that higher levels of attachment anxiety predict higher levels of substance use in individuals low on maladaptive coping, but higher levels of attachment anxiety predict lower levels of substance use in individuals who are high on maladaptive coping (Table 5, Figure 3 and 4).

Discussion

Level of substance use was a primary concern in the present study. The high rate of alcohol use found in the current study is consistent with previous literature, which posits that alcohol use is a normative behaviour in young adults [6,36,39,81]. Furthermore, 58.4% of

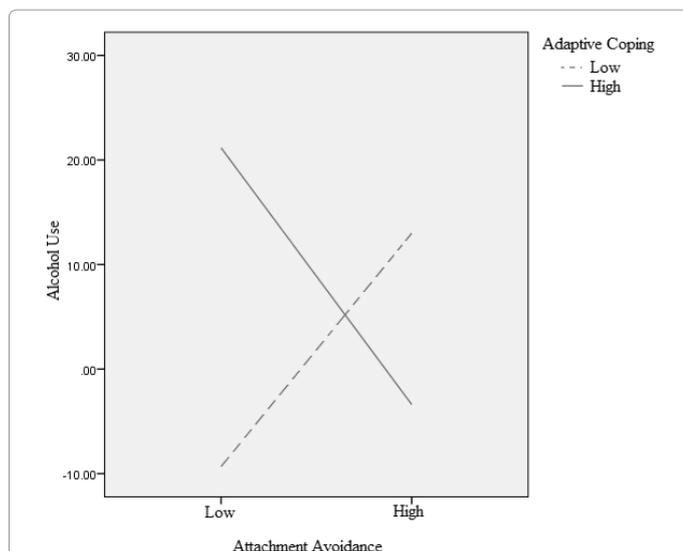


Figure 1: Interaction between attachment avoidance and adaptive coping in the prediction of alcohol use.

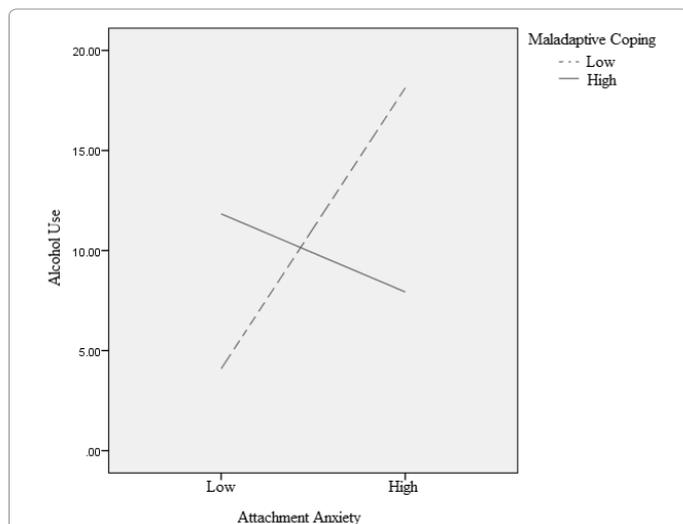


Figure 2: Interaction between attachment anxiety and maladaptive coping in the prediction of alcohol use.

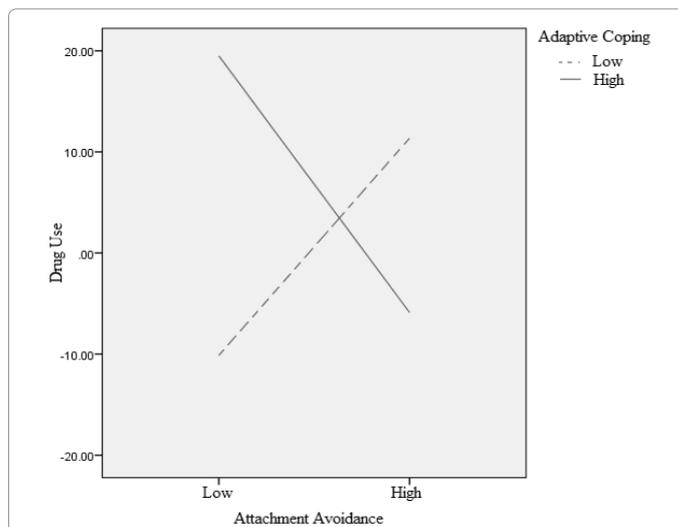


Figure 3: Interaction between attachment avoidance and adaptive coping in the prediction of drug use.

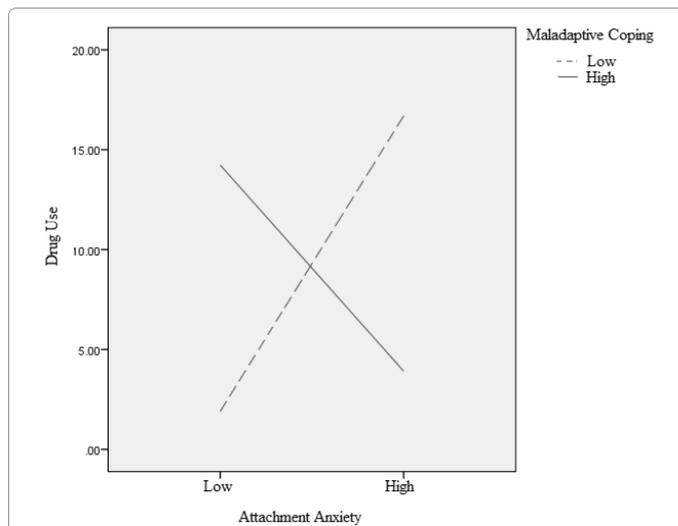


Figure 4: Interaction between attachment anxiety and maladaptive coping in the prediction of drug use.

participants met the criteria for alcohol misuse, which is in line with findings from the National Institute of Alcohol Abuse and Alcoholism (2012), which reports that 50% of young adults engage in binge drinking, a form of alcohol misuse. Alcohol consumption may be a normative behaviour in emerging adults, although quantity and frequency of use are still a concern given the physical, psychological, and emotional impairments associated with excessive substance use [6,39].

Cannabis was the most frequently reported substance of use, which is consistent with previous literature. In the current study, 49.8% of participants met the criteria for drug misuse, which seems disproportionate given that only 61.1% of participants reported using a drug other than alcohol at least once. This would indicate that almost all individuals who have tried drugs misuse them. Results from United States national surveys suggest that university students are at greater risk of drug misuse than their non-attending peers. The Monitoring the Future Survey (2011) reported that college students had higher levels of inhalant, hallucinogen, amphetamine, and steroid use than their non-attending peers [82]. Furthermore, The Core Alcohol and Drug Survey

2011 indicated that college students reported more frequent use of marijuana, cocaine, hallucinogens, and designer drugs than their non-attending peers [83].

The current study examined the association between attachment, chronic loneliness, and substance use, as well as the moderating effect of coping style within these associations. Overall, the relationship between loneliness and substance use was weak. It is important to note that mean loneliness scores in the current study corresponded to other studies examining loneliness in young adults [60]. Therefore, it is unlikely that the current findings resulted from uncharacteristically low scores on the loneliness scales. The present data, nevertheless, supported the idea that level of chronic social loneliness predicts level of alcohol use over and above personality, anxiety, and depression. This suggests that social loneliness could be a small, but distinct, risk factor for increased alcohol use in emerging adults. This could be because during emerging adulthood, forming social bonds tends to take precedence over other relationships [8,84-86]. Individuals in this age group may be more sensitive to the lack of, or perceived lack of, social relationships, and this distress may lead to increased alcohol use. Individuals who are socially lonely may engage in more recreational alcohol use in an attempt to forge new social bonds, and may drink in social settings as a means to increase their positive emotions [87,88].

The current study supported the idea that attachment avoidance predicts level of alcohol and drug use over and above personality, anxiety, and depression. An emerging body of research has investigated substance use within the context of adult attachment, and the nature of this relationship has been explored in the literature [89-91]. Early researchers suggested that there is a direct relationship between insecure attachment and substance use. Kohut [92] suggested that addiction can result when individuals have not formed, or failed to internalize, working models of attachment security. Walant [93] suggested that individuals who are predisposed to substance misuse have experienced a neglect of their attachment needs and subsequently use substances to compensate for a lack of closeness.

The first moderation model was not supported, indicating that coping style does not moderate the relationship between level of chronic loneliness and substance use. Research suggests that social drinking can have some benefits and can create opportunities for social bonding [94]. Therefore, increased alcohol use may not be reflective of maladaptive coping strategies in emerging adults, as this population may be using alcohol as a social activity, rather than as a means for dealing with perceived social isolation. Although this is the first study to investigate the moderating effect of coping styles on the level of substance use, research has highlighted the effect of motivation on substance use, particularly the effect of drinking to cope [87,88]. Cooper et al., [88] found that negative affect and alcohol use are linked by drinking to cope motives, and that adaptive coping strategies buffer against the negative effects of stress on drinking behaviour, reducing alcohol use [95,96]. Given that the current sample may not be engaging in alcohol use to manage negative affect, adaptive coping efforts would do little to decrease consumption. It would be of interest to investigate drinking motives in individuals both high and low in social loneliness, as they could be drinking for different reasons. Cooper [97] suggested four motives for drinking: drinking to cope, conformity, enhancement, and social. While individuals low in social loneliness could be drinking for social and enhancement purposes, individuals high in social loneliness could be drinking for conformity reasons, which could be detrimental, as coping and conformity motives have been associated with greater drinking problems [98-101].

The second moderation model was partially confirmed, indicating that coping style moderates the relationship between attachment style and substance use. There were significant interactions between attachment avoidance and level of adaptive coping in the prediction of both alcohol and other drug use, such that higher levels of adaptive coping buffered avoidant individuals from increased substance use. The relationship between substance use and attachment security has received more attention in the literature than substance use and loneliness; however, research generally focuses on motivation rather than specific coping styles. McNally, et al. [91] found that drinking to cope mediated the relationship between attachment security and alcohol use, suggesting that insecurely attached individuals use alcohol to cope with emotional distress. The authors proposed that insecure attachment is a risk factor for the adoption of less adaptive coping strategies (such as drinking to cope), as a means of regulating negative emotions. In the current study, individuals higher in attachment avoidance did report higher levels of substance use when they used lower levels of adaptive coping, however higher levels of adaptive coping were associated with lower levels of alcohol use. Therefore, insecure attachment may not necessarily lead to maladaptive coping styles, as individuals higher in attachment avoidance may learn more adaptive coping strategies which could protect against substance use as a means of coping.

The interaction between attachment anxiety and maladaptive coping appears more counterintuitive. In the current study, lower levels of maladaptive coping actually led to higher levels of substance use in anxiously attached individuals. One explanation is that individuals who are higher in attachment anxiety may seek out social forms of coping, such as social support, due to their perceived lack of closeness. Social forms of coping may actually lead to more substance use, if alcohol and drugs are used recreationally to fit in, or to feel closer to others. Alternatively, anxiously attached individuals may engage in increased substance use as a replacement for their lack of closeness to others, but once this void is filled, they may feel able to engage in more adaptive coping strategies. This particular finding is counter to the majority of literature regarding attachment and substance use [32,102]. It is, therefore, important to investigate this relationship further to discern whether this finding is replicable or anomalous.

The above discussion must be considered in light of certain limitations. The current study used self-report measures, and this may have influenced the quality of data. Furthermore, this study was cross-sectional; therefore causal relationships cannot be assumed. The misuse of alcohol and other drugs can affect the quality of social relationships, which in turn, may increase loneliness and use of substances. In the future, longitudinal research should be conducted to assess the causal links among attachment, loneliness, and substance use. Finally, the current sample was composed primarily of undergraduate students; which limits generalizability. Future studies should consider the current research questions within community and/or clinical samples, in order to better address the generalizability of the current findings.

An abundance of research has demonstrated that substance use has become a major public health concern in North America [103]. The current findings have important implications for individuals in treatment for substance misuse and for those who use substances to cope with interpersonal dissatisfaction. Prevention and intervention of substance use could be tailored, for example, to an individual's attachment pattern, such that individuals who are high in attachment avoidance can learn coping skills that promote greater awareness of internal states, and may lessen feelings of interpersonal distress.

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