

Social Anxiety and Coping Motivated Cannabis Use: The Moderating Effect of Negative Urgency *

Agata Kasprzyk¹ and Roisin M. O'Connor¹

1) Department of Psychology, Concordia University

According to self-medication hypothesis, those who score high in social anxiety (SA) may use cannabis/marijuana for its anxiolytic effects (i.e., to cope with negative affect). Coping-motivated substance use has been linked to an increased risk for negative consequences such as sensations of paranoia. However, the SA-cannabis coping motive association is unclear, with mixed empirical support. Negative urgency (NU; the tendency to act impulsively when distressed) has been linked with substance misuse and may moderate this association. The current study tested NU as a moderator of the SA-cannabis coping motives relation and examined the correlation between cannabis coping motives and negative consequences. Psychology undergraduates ($N=241$) completed online self-reports of SA, NU, and cannabis use motives and negative consequences of cannabis use. Results of multiple regression analyses revealed support for a first order effect of NU only, such that elevated NU was associated with increased cannabis coping motives. Moderation of NU on cannabis use for the relief of SA was not supported. Cannabis coping motives was supported as a positive correlate of negative consequences. Findings may inform future interventions by highlighting motivation for use as an individual-level risk factor for negative consequences and NU as a risk factor for coping motives.

In 2019, more than 5.1 million Canadian's reported using cannabis. Of these, 33.3% were young adults aged 18 to 24 years that reported consuming cannabis within the last 3 months [1]. Further, approximately 6% of Canadians aged 15 years or older reported using cannabis daily. Daily cannabis consumption is associated with negative health outcomes including lung damage, cognitive impairment, altered brain development, and worsened mental health [1-3]. Coping motivated cannabis use as a primary reason for use – i.e., use of cannabis to regulate or reduce negative affect – has been associated with negative consequences, such as dependence and increased sensations of anxiety [4-7]. One population that may use cannabis to cope is young adults with social anxiety (SA) [8].

Undergraduates report using substances and known to experience SA. SA is characterized by marked fear of being negatively evaluated by others in social situations [9]. Strahan reported 22% of 248 undergraduates demonstrated clinical levels of SA [10]. Undergraduate students are also known users of cannabis [11]. A large survey from 2019, based on a sample of 58 Canadian post-secondary institutions, found that almost half (44.4%) of college students had used cannabis during their lifetime, and 20.9% of students reported using cannabis within the last 30 days [12]. Substance use disorder involves heavy or frequent substance use. The comorbidity of substance use disorders and anxiety disorders is well established in the literature [13]. The National Epidemiological Survey on Alcohol and Related Conditions (NESARC) revealed that 17.7% of respondents with diagnosed substance use disorder also met criteria for an anxiety disorder [14]. Researchers have also found that elevated SA is associated with problematic and elevated cannabis use [15-

*Current version: October 08, 2021; Corresponding author: Roisin.Oconnor@concordia.ca

18]. In one sample of 8098 American adults, for example, individuals with SA were 7 times more likely to experience marijuana related impairment (e.g., cognitive impairments) and dependence when compared to the general population of marijuana users [19]. Therefore, marijuana related impairment and dependence has a lifetime prevalence of approximately 4.2% in those with SA [19].

An individual's motives for cannabis use are based on expectancies for the effects of use, previous experiences with cannabis, and situational variables [8]. According to stress-coping models of addiction, individuals consume substances to cope with stress, reduce levels of negative affect, and/or increase levels of positive affect [20]. Similarly, the self-medication hypothesis states that substance use and dependence is a way to "self-soothe" by modulating affect and reducing negative feelings, which may stem from distressing psychological states [21]. On the basis of this theory, individuals with SA may use cannabis to reduce the negative affect experienced as a result of their SA symptoms (such as fear of judgement). Cannabis indeed is used in a wide variety of settings for its anxiolytic properties. Some individuals even use cannabis as a sleep aid, while others use cannabis as a medicinal drug, listing anxiety or depression as their reason for use [6, 22]. While cannabis does indeed have anxiety reducing properties [8], it also is associated with increased anxiety [5].

Those who list "coping with negative affect" as a primary reason for their cannabis use are found to be at highest risk for negative consequences of cannabis use, such as dependence [4]. Other negative consequences include: psychological distress; panic attacks; increased paranoia; increased sensations of anxiety; inter- and intra-personal conflict; and risk-taking behaviours [6,7]. According to stress-coping models of addiction, individuals use substances such as cannabis to reduce their negative affect, and would therefore, theoretically, be deterred from using substances that would induce or intensify such negative affect. In one sample of cannabis dependent participants, those who were aware of and expected the negative consequences associated with cannabis use were less likely to use than those who had positive expectations [23]. Despite the potential negative consequences associated with cannabis use, some individuals with SA continue to consume the drug to cope; thus, they discount the potential risks. SA is therefore a significant predictor of coping motives for marijuana use as opposed to the many other possible motives for use (such as enjoyment, conformity, experimentation). That is, individuals with high levels of SA are more likely to report coping with negative affect as a main reason for cannabis use as opposed to other reasons [8]. Although the underlying moderators linking SA to coping motivated marijuana use are complex, mixed, and not entirely understood, one possible moderator may involve impulsivity: more specifically, negative urgency (NU).

Individuals that are impulsive and emotionally driven, are more likely to engage in risk-taking behaviors, including problematic substance use, when they experience extremely positive or negative emotions [24]. NU is a trait tendency for individuals to act impulsively when experiencing strong negative emotions. It has been theorised that certain individuals impulsively use substances, such as cannabis, to cope with their strong emotions [25]. For example, individuals with diagnosed substance use disorders have been found to be more likely to score high in NU as opposed to other measures of impulsivity such as sensation seeking [26]. Another study found that NU was a positive predictor of problems related to cannabis use and dependence [26]. Individuals with SA who demonstrate high NU may engage in rash judgement when emotionally distressed, and thus may be at risk for using cannabis to cope. This coping motivated cannabis use is maladaptive because it may contribute to the negative affect and anxiety that users are trying

to alleviate in the first place. Conversely, individuals with SA who are low in NU may be more likely to consider the negative consequences associated with cannabis use and may be deterred from use.

The goal of the current study was to test NU as a moderator of the relation between SA and use of cannabis for coping motives in an undergraduate sample. Two separate models were run with SA-specific cannabis coping motives as the outcome in one model, and broad cannabis coping motives in another model. The association between coping motives and negative consequences of cannabis use was also investigated. It was hypothesized that elevated SA would be associated with increased use of cannabis for coping motives, including use to cope specifically with SA, but that this effect would only be evident for those high on NU. It was also hypothesized that cannabis coping motives (including SA coping motives) would be positively correlated with negative consequences of cannabis use.

Method

Participants

A total of 277 undergraduates living in the Montreal, QC area took part in the study, however, only those with data on the current study measures were retained for analyses. The final sample included 241 undergraduate students fluent in English and between the ages of 18–25 years ($M = 21.19$; $SD = 1.71$). Both individuals who consumed and did not consume cannabis were eligible to participate. The current study obtained ethical approval from Concordia's Ethical Research Board.

Procedure

Data for the current study were drawn from a larger online study investigating beliefs about marijuana use. Participants from this study were recruited through the Concordia Psychology Participant Pool, and flyers advertising the study were posted on Concordia's Undergraduate Psychology Association's (CUPA's) Facebook page. Individuals eligible for the Concordia Psychology Participant Pool were compensated with course credit; and those who were not eligible for course credit were entered into a draw for one of two \$50 cash prizes. Data collection began in June 2020 and is ongoing.

Measures

Participants were asked to complete a battery of self-report questionnaires; that took approximately 1 hour. The questionnaires were hosted on Checkbox Survey.

Marijuana Consequences Questionnaire (MACQ). The MACQ was used to assess cannabis-related negative consequences [29]. This 50 item self-report measure asks participants to respond yes (scored as 1) or no (scored as 0) to a series of statements pertaining to marijuana related problems and consequences, which occurred in the last 6 months (e.g., "I have passed out from marijuana use"). Marijuana related problems include risk taking behaviors, intra- and inter- personal problems, signs of physical dependence, and difficulty controlling use. The derived final score for each participant was a sum of yes responses. The Cronbach alpha coefficient in our sample was .93.

Comprehensive Marijuana Motives Questionnaire (CMMQ). The CMMQ is made up of 36 items and 8 subscales [5]. Each item describes different reasons to use marijuana. The coping

subscale (3 items; e.g., To forget your problems) and the SA-specific coping subscale (3 items; e.g., “Because it makes you more comfortable in an unfamiliar situation”) were used to assess coping motives for cannabis use. The participants were asked to rate each item on a 5-point scale, ranging from almost never/never (scored as 1) to almost always/always (scored as 5), in terms of how often the item was their reason to use marijuana. The derived final scores for each subscale were summed scores of their responses. The Cronbach alpha coefficients in our sample were .92 for the both the coping subscale, and the SA subscale.

Liebowitz Social Anxiety Scale (LSAS). SA was assessed using the LSAS [30]. Each of the 24 items on the self-report questionnaire describes a different social situation (e.g., “Telephoning in public”). Participants were asked to rate each item on two different 4-point scales. On the first scale, participants indicated their level of fear or anxiety towards the situation ranging from none (scored as 0) to severe (scored as 3). Next, the participants were asked to indicate their level of avoidance for that same situation, ranging from never 0% (scored as 0) to usually 67-100% (scored as 3). The derived global score for each participant was a summed score of their responses. The Cronbach alpha coefficient in our sample was .96.

Urgency, Premeditation, Perseverance and Sensation Seeking Impulsive Behaviour Scale (UPPS-P). NU was measured using the NU subscale on the UPPS-P [31]. The UPPS-P consists of 59 items while the NU subscale is made up of 12 items. Each item describes a different impulsive behaviour or belief (e.g., “I often make matters worse because I act without thinking when I am upset”). Participants were asked to rate each item on a 4-point scale ranging from agree strongly (scored as 1) to disagree strongly (scored as 4). The derived final scores for each subscale were summed scores of their responses. The Cronbach alpha coefficient in our sample was .89.

Data Analysis

All statistical analyses were conducted using IBM SPSS Statistics 27.0 software. The statistical level at which we determined significance was $p < .05$. Effect sizes, as per Cohen (1992), were small at $R^2 = .02$, medium at $R^2 = .13$, and large at $R^2 = .26$ [32]. A multiple linear regression analysis was used to test the moderation hypothesis. Two separate models with SA-specific cannabis coping motives as the outcome in one model, and broad cannabis coping motives in another model were run. Coping motives were regressed on the first order effects of SA and NU, and the 2-way interaction between SA and NU. The predictor variable (SA) and moderator (NU) were centered to reduce multicollinearity [28]. Additionally, to test the relation between cannabis coping motives and the negative consequences of cannabis use, a Pearson correlational analysis was conducted. The strength and direction of the Pearson correlation was observed, and a 95% confidence interval was used.

The rate of missing data for the current sample was 14.94%. Those with complete data ($N = 241$) did not significantly differ from those with incomplete data ($n = 36$) in terms of age, $t(275) = 0.96$, $p = .34$ or gender $\chi^2(3, n = 275) = 3.703$, $p = .30$. A single participant did not complete one response for one item on the LSAS and so that data point was imputed and replaced with that participant's mean score on that measure.

Results

Descriptive Statistic

At baseline, 202 (83.8%) participants identified as women, 31 (12.9%) as men, and 6 (2.5%) as

non-binary. The majority of the sample (63.1%) identified as Caucasian. Descriptive statistics are presented in Table 1. Our sample's mean scores of for NU ($M = 27.01$) and SA ($M = 60.63$) were considered to be "average" and in-line with the samples these measures were normed on [30-31]. Our sample's mean scores of coping motives ($M = 5.28$), SA coping motives ($M = 4.76$), and negative consequences ($M = 5.35$) were considered to be low [5,29].

Table 1

Correlations, Means, and Standard Deviations for All Analyses

Variables	1	2	3	4	5
1. Coping motives	—				
2. SA coping motives	.480	—			
3. Negative Urgency	.328	.220	—		
4. Social Anxiety	.138	.100	.273	—	
5. Negative Consequences	.600	.460	.316	.011	—
<i>M</i>	5.278	4.764	27.008	60.629	5.349
<i>SD</i>	3.152	3.102	7.467	27.865	6.985

Note. $N = 241$; SA = Social Anxiety; NU = Negative Urgency; M = Mean; SD = Standard Deviation.

Data Integrity

We tested the assumptions for multiple linear regression. The data set did not include multi-variate outliers, as defined by z-scores exceeding $|3.29|$ standard deviations beyond the mean [33]. The assumption of linearity was met, which was assessed by visually inspecting partial regression plots and a plot of studentized residuals against the predicted values. Furthermore, the residuals were independent, as assessed by Durbin-Watson statistics of 2.008 (for the coping motives model) and 1.951 (for the SA coping motives model). Additionally, there was no evidence of multicollinearity. That is, bivariate correlations between variables were less than 0.9, tolerance values were higher than 0.1, and the conditioning indexes were less than 30, with two variance proportions less than .5 [33]. The assumption of homoscedasticity was also not met, as assessed by visual inspection of a plot of studentized residuals versus unstandardized predicted values. The data were normally distributed for SA and NU but were not for coping motives or for SA coping motives, as assessed by a Q-Q Plot. Coping motives and SA coping motives were right skewed and a floor effect was observed. No transformations were performed on the data. Given that the skewed variables were outcome variables and there were no issues with the predictor variables, we chose to continue with the analysis despite some assumptions being violated. We must therefore interpret findings with caution.

The assumptions for Pearson correlations were also tested. There were linear relationships between the variables and there were no outliers. The data were not normally distributed for coping

motives, for SA coping motives, or for negative consequences, as assessed by a Q-Q Plot. Variables were right skewed and a floor effect was observed in each one. We chose to move forward with the analysis in their original units of measurement despite some assumptions being violated. Therefore, caution must be taken when interpreting these findings.

Multiple Linear Regression Analysis of Predictors of Coping Motives

A multiple linear regression was run to predict cannabis coping motives. Entered into the model was the predictor variables NU, SA, and the interaction term NU \times SA. Results are presented in Table 2. The model significantly predicted cannabis coping motives, $F(3, 237) = 10.00, p < .001$. Further, 11.2% of the variation in cannabis coping motives was explained by the variation in the predictors, SA and NU, $R^2 = .11, 95\% \text{ CI } [.04 - .18]$. This effect size was considered to be small. The first order effect of SA ($p = .37$) and the interaction term ($p = .049$) on coping motives were not statistically significant. However, the first-order effect of NU emerged as a statistically significant predictor of cannabis coping motives. An increase by one unit in NU resulted in a .13 unit increase in cannabis coping motives ($p < .001$). As the interaction term's regression coefficient was below our predetermined cut-off of $p < .05$, we did not continue with simple slopes analysis and did not condition the model at high and low NU.

Table 2

Results of Multiple Linear Regression Analysis of Predictors of Coping Motives

Predictor	<i>B</i>	<i>SE B</i>	95% CI for <i>B</i>		β	<i>t</i> (238)	<i>p</i>
			<i>LL</i>	<i>UL</i>			
Constant	5.24*	.199	4.848	5.631		26.372	.000
NU	.129*	.027	.076	.183	.306	4.749	.000
SA	.006	.007	-.008	.021	.057	.892	.373
NU \times SA	.001	.001	-.001	.002	.049	.782	.435

Note. $N = 241$; $R^2 = .112, 95\% \text{ CI } [.042 - .182]$; *B* = unstandardized regression coefficient; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit; *SE B* = standard error of the coefficient; β = standard coefficient

* $p < .05$.

Multiple Linear Regression Analysis of Predictors of SA Coping Motives

A multiple linear regression was run to predict cannabis SA coping motives. Entered into the model was the predictor variables NU, SA, and the interaction term NU \times SA. Results are presented in Table 3. The model significantly predicted SA coping motives, $F(3, 237) = 4.24, p = .006$. Further, 5.1% of the variation in SA coping motives was explained by the variation in SA and NU, $R^2 = .051, 95\% \text{ CI } [.005 \text{ to } .11]$. This effect size was considered to be small.

Table 3*Results of Multiple Linear Regression Analysis of Predictors of SA Coping Motives*

Predictor	<i>B</i>	<i>SE B</i>	95% CI for <i>B</i>		β	<i>t</i> (238)	<i>p</i>
			<i>LL</i>	<i>UL</i>			
Constant	1.743*	.202	4.345	5.142		23.461	.000
NU	.085*	.028	.030	.139	.205	3.071	.002
SA	.005	.007	-.009	.020	.046	.691	.490
NU×SA	.000	.001	-.001	.002	.026	.402	.688

Note. $N = 241$; $R^2 = .051$, 95% CI [.005 – .105]; *B* = unstandardized regression coefficient; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit; *SE B* = standard error of the coefficient; β = standard coefficient

* $p < .05$.

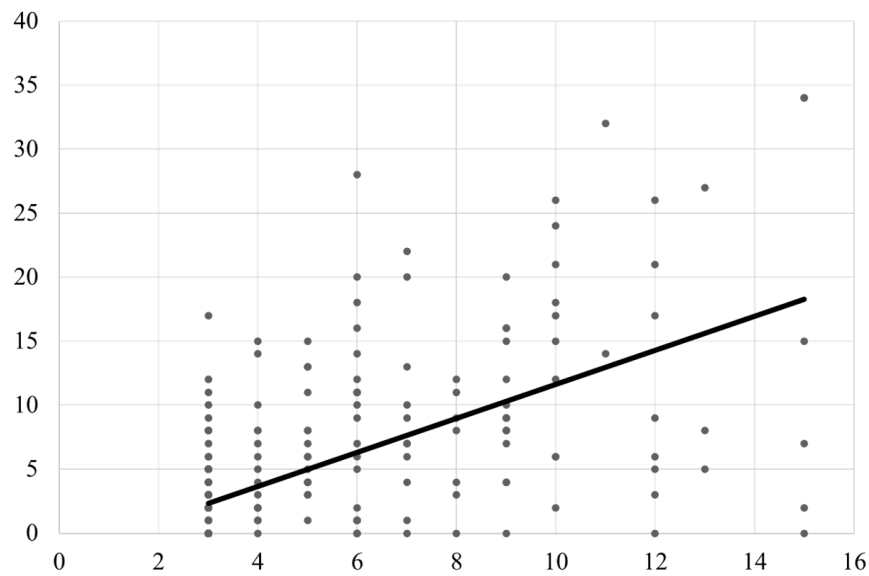
The first-order effect of SA ($p = .49$) and the interaction term ($p = .69$) were not statistically significant. However, the first-order effect of NU emerged as a significant predictor of SA cannabis coping motives. An increase by one unit in NU resulted in a .085 unit increase in SA cannabis coping motives ($p = .002$). As the interaction term's regression coefficient was below our predetermined cut-off of $p < .05$, we did not continue with simple slopes analysis and did not condition the model at high and low NU.

Correlations between Coping Motives and Negative Consequences

A Pearson correlation was run to examine the association between cannabis coping motives and the negative consequences of cannabis use. There was a significant positive correlation between the variables, $r(239) = .60$, $p < .001$, with cannabis coping motives explaining 36% of the variation in negative consequences of cannabis use. A scatterplot summarizes the results in Figure 1. Another Pearson correlation assessed the relation between cannabis SA coping motives and the negative consequences of cannabis use and there was a significant positive correlation between the variables, $r(239) = .46$, $p < .001$, with cannabis SA coping motives explaining 21.20% of the variation in negative consequences of cannabis use. A scatterplot summarizes the results in Figure 2.

Figure 1

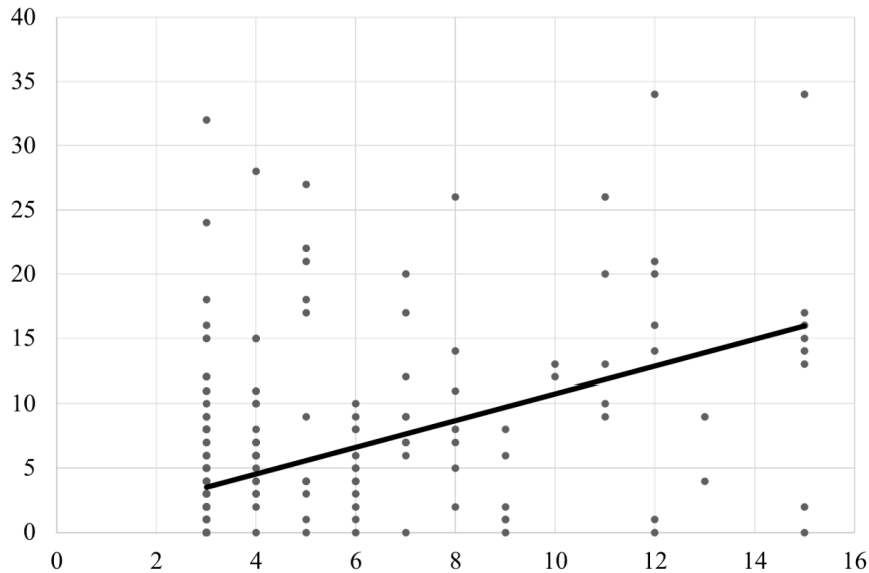
Scatterplot Depicting the Correlation between Coping Motives and Negative Consequences



Note. Scatterplot depicting association between total coping motives scores and total negative consequences scores; Pearson's $r(239) = .60$, $p < .001$

Figure 2

Scatterplot Depicting the Correlation between SA Cope Motives and Negative Consequences



Note. Scatterplot depicting association between total SA cope motives scores and total negative consequences scores; Pearson's $r(239) = .46$, $p < .001$

Discussion

Buckner and colleagues (2007) suggest that SA predicts coping motivated cannabis use [8]. Researchers have also reported that individuals who primarily use cannabis to cope are more likely to have negative consequences as a result of their cannabis use [4-7]. Despite the risk of these negative consequences, certain individuals with SA continue to use the substance. The mechanisms underlying this behaviour are not entirely understood, with mixed empirical support. Researchers have found that those high in NU are more likely to impulsively use substances to cope with their distress and may be discounting the potential negative consequences associated with their substance use [24-27]. We aimed to examine whether SA acts as a predictor in coping motivated cannabis use and whether NU was a moderator in this relation. We also investigated the relation between coping motivated cannabis use and the negative consequences associated with its use. SA was not found to significantly predict an individual's motivation to cope using cannabis nor predict an individual's motivation to cope using cannabis specifically for SA. There is mixed support for the link between SA and cannabis use in the literature. Previous literature suggests that those with SA are more likely to use cannabis to cope [8], however, our results did not support this association in undergraduate students. Those who use cannabis to cope are also more likely to experience the negative consequences associated with cannabis use [4]. While some individuals with SA might be deterred from coping motivated cannabis use when faced with potential negative consequences, others will continue to use cannabis to cope despite the risks.

NU significantly predicted both an individual's motivation to cope using cannabis, as well as an individual's motivation to cope using cannabis specifically for SA. This is in-line with what previous researchers have hypothesized, in that those high in NU may be impulsively using substances while they are distressed as a form of coping with negative emotions, such as fear of negative evaluation [24]. There was no observed interaction effect between SA and NU in predicting coping motives or SA coping motives in the regression models. Therefore, NU was not a significant moderator in the relation between SA and coping motives or SA and SA coping motives. Thus, suggesting there was no difference in the motivation to use cannabis to cope between anxious or non-anxious individuals, whether or not they were high or low in NU. Though this finding was not consistent with our hypothesis or expected results, there are several possible explanations for this outcome.

Typically, alcohol and drug expectancies can be dichotomized as positive or negative. Positive expectancies (e.g., I expect to feel joyful if I use cannabis) are thought to motivate substance use, while negative expectancies (e.g., I expect to feel embarrassed the day after using cannabis) may motivate individuals to restrict their substance use [34]. Previous research points to the role of positive marijuana expectancies when considering links between impulsivity (sensation seeking) and marijuana use disorder symptoms (such as urge to use) [35]. If individuals high in SA have negative expectancies towards cannabis use, they may not engage in coping motivated use. Those high in NU are also often impulsively engaging in poly-substance use (i.e., the use of multiple substances), such as alcohol or stimulants (e.g., Cocaine), which are influenced by different expectations [24]. That is, those high in SA and NU may not be drawn to cannabis, as they may not expect it to provide them with the social lubrication they desire or expect to get from other substances [5]. Future researchers may benefit from investigating more complex models that incorporate variables such as expectancies of use and poly-substance behaviours.

Lastly, consistent with our hypothesis and existent literature, cannabis coping motives as well

as SA cannabis coping motives were positively correlated with negative consequences associated with cannabis use. This means that the more an individual used cannabis to cope with negative affect, the more they experienced negative consequences associated with cannabis use (such as panic attacks). Although we cannot infer directionality or causation, one potential explanation for this may be that the individuals experiencing negative consequences may be led to use cannabis to cope because they lack alternative, more effective coping strategies or skills. Co-currently investigating other coping strategies of participants in regard to managing negative emotions may be beneficial. Alternatively, coping motivated use of cannabis may lead to increased frequency of use, which in itself can lead to negative consequences such as “passing out” or not remembering what happened while you were under the influence [4].

The results of the current study should be interpreted considering its limitations. First, convenience sampling was used. Participants were primarily recruited from Concordia University’s psychology participant pool, the majority being psychology students and therefore lacking generalizability to other students. The sample was also overwhelmingly WEIRD (western, educated, industrialized, rich, and democratic), female, and white. The findings of the study may not be generalizable to broader university populations and may not truly represent the cannabis coping motives of young adults more broadly. Future researchers may benefit from collecting data from more diverse samples, encouraging participation from more men and People of Colour especially. Second, this study was conducted during the COVID-19 global pandemic. There were decreased in-person social gatherings and interaction at varying points throughout data collection due to Montreal’s government enforced lockdown as a result of the pandemic. Thus, the experiences of SA of participants may have been impacted by these measures, as opportunities where participants may have felt socially anxious were somewhat limited. As such, the results from the present study may not be entirely representative of, or generalizable to, levels of SA and motivation for substance use pre- and post- pandemic. Conducting data collection post-COVID-19 may be beneficial. Comparisons of pre, during and post COVID-19 results could also be conducted to confirm if SA and substance use were, in fact, affected.

It should also be noted that the current study used a questionnaire to assess SA as opposed to participants reporting a diagnosis of Social Anxiety Disorder (SAD). This lack of formal diagnosis means results may not be reflective of those living with SAD. Lastly, the frequency of negative consequences and both coping motives and SA coping motives, had high rates of zero in the dataset. This made it more complicated to assess the association of our predictors to our outcomes. This may have been due to the fact we used a convenience sample of undergraduate students, and this population may, for example, experience fewer negative consequences as opposed to clinical populations. Future researchers may wish to perform statistical transformations or analyses better suited for such distributed data.

Despite the limitations of the current study, results still provide researchers insight into cannabis coping motives and the mechanisms, which underlie the associations between coping motives and NU. We found that NU may help predict coping motives and that coping motives and negative consequences were positively correlated with one another. Clinicians and intervention workers could potentially apply these results by screening undergraduates for their reasons for cannabis use and impulsivity. They could, for example, flag those who primarily use cannabis to cope as being at risk for experiencing negative consequences, and flag those with high scores in NU as at risk for using cannabis to cope. Such strategies could provide students with appropriate supports (e.g., counsellors) where they could learn alternative coping strategies, aimed at decreasing the

likelihood of experiencing negative consequences while using cannabis.

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