Personality Factors and Motives Related to Marijuana Use in Undergraduate Students

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Acknowledgements

Abstract

This study investigated the association between personality traits (i.e., anxiety sensitivity, sensation seeking, impulsivity, and hopelessness) and motives for marijuana use (i.e., enhancement of positive affect, expansion of experiential awareness, coping, social conformity, and social cohesion) in undergraduate students. It was hypothesized that anxiety sensitivity would predict coping, conformity, and social cohesion motivated use, that hopelessness would predict coping and conformity motivated use, and that impulsivity and sensation seeking would predict enhancement, expansion, and social cohesion motivated use. The sample consisted of 137 undergraduate students (110 female), with an average age of 22 years old. Anxiety sensitivity and hopelessness were found to predict coping, social cohesion, expansion, and enhancement motivated use, impulsivity was found to predict enhancement motivated use, and sensation seeking was found to predict enhancement, expansion, and social cohesion motivated use. These findings allow implications for substance use prevention and early intervention programs that address specific personality-motive patterns, to be made.

Keywords: youth adults, personality, marijuana, motivation

Personality Factors and Motives Related to Marijuana Use in Undergraduate Students

Thirty-three percent of undergraduate students report using marijuana at least once in the past year (Centre for Addiction and Mental Health [CAMH], 2008). Among undergraduate users, 54.3% report using less than once a month, 20% report weekly or monthly use, and 6.3% report daily use (Adlaf, Demers, & Gliksman, 2004). A study of marijuana use among high school students reported 22% of students using marijuana at least once in the past year, with use rising with grade from 2.4% in Grade 7, to 36% in Grades 11 and 12 (Paglia-Boak, Adlaf, & Mann, 2011). In this study of Ontario high school students, Paglia-Boak et al. (2011) found that 7.8% of students used marijuana for the first time in the past 12 months, with an average age of initiation of 14 years old. In terms of frequency and amount of use, 19% of students who used marijuana in the past month smoked one joint. This study found that 55.5% of high school students believe there is great harm associated with regular marijuana use, but this belief decreases with age and grade (Paglia-Boak et al., 2011). That is, as the belief of risks associated with marijuana use decreases, the use of marijuana increases. Over 2% of all high school students report symptoms of marijuana dependence (e.g., feeling that their marijuana use is out of control, worrying about their marijuana use, wishing they could stop using marijuana), which accounts for 10.2% of high school students using marijuana (Paglia-Boak et al., 2011).

Sixty to 73% of university students report lifetime marijuana use (McMillan & Conner, 2002), while only 34% of adults report using marijuana at least once in their lifetime (CAMH, 2008). Although this relationship between age and marijuana use may represent a cohort effect, it is necessary nevertheless, to understand not only how many undergraduate students are using

marijuana, but also when and why they began using, their motives for current use, the personality factors associated with use, and the negative consequences that can result.

Marijuana-Related Negative Outcomes

Studies show that marijuana use relates to several negative outcomes such as physical health problems (e.g., respiratory cancer; Tashkin, 1990), psychological symptoms (e.g., depressive and anxiety symptoms, such as depressed mood or fatigue; Bonn-Miller, Zvolensky, Leen-Feldner, Feldner, & Yartz, 2005), and psychological disorders (e.g., depression and anxiety; Patton et al., 2002), as well as social, educational, and occupational impairment (e.g., poor grades, difficulty finding employment; Lynskey & Hall, 2000). While the knowledge that marijuana use can lead to significant negative outcomes exists, many choose to ignore the risks.

Several negative outcomes relate particularly to adolescent marijuana use; specifically, outcomes related to occasional or acute marijuana use and early initiation of use. Acute marijuana intoxication is found to increase a motor vehicle driver's risk for vehicle crashes and other accidental injuries (Hall, 2009). A study by Asbridge, Poulin, and Donato (2005) found that drivers who report using marijuana are twice as likely to report being involved in motor vehicle accidents than drivers who do not use marijuana. Hall (2009) has also found anxiety and panic reactions to be common in occasional marijuana users. Because the majority of undergraduate marijuana users report using the drug less than once a month (Adlaf et al., 2004) and most past month users smoked one joint (or less; Paglia-Boak et al., 2011), they can be categorized as occasional, acute users, which puts them at a high risk for marijuana intoxicated vehicle crashes, and anxiety and panic reactions.

Ellickson, Martino, and Collins (2004) found that the worst health outcomes are commonly associated with early onset of frequent marijuana use. Caldeira, O'Grady, Vincent, and Arria (2012) found similar results in post-college health outcomes (i.e., functional impairment due to injury, general health rating, psychiatric symptoms, health-related quality of life, and service utilization for physical and mental health problems) while holding health measures and demographics constant. This study found that individuals who did not consistently use marijuana had significantly better health outcomes (Caldeira et al., 2012).

Marijuana abuse and dependence is a serious potential outcome that can result from chronic marijuana use. Anthony (2006) found the risk of marijuana dependence to be 9% among individuals who have ever previously used the drug, with this number increasing to 17% among individuals who initiate marijuana use during adolescence. Several recent studies have also investigated early onset marijuana use and its association to psychosis-related outcomes (Arseneault et al., 2004; Fergusson, Horwood, & Swain-Campbell, 2003; Hall, 2009). Studies found marijuana use to causally relate to psychosis-related outcomes (Semple, McIntosh, & Lawrie, 2005) and those with early onset psychotic symptoms were also likely to report early marijuana use (McGrath et al., 2010). Older studies found links between marijuana use and schizophrenia as well (Andreasson, Engstrom, Allebeck, & Rydberg, 1987); this study is one of the earliest on marijuana use and schizophrenia. The study found that individuals who initiated marijuana use by age 18 were over two times more likely to be diagnosed with schizophrenia than individuals who had not (Andreasson et al., 1987). This risk also increased with frequency of marijuana use and was found to be statistically significant after adjusting for confounding variables. Anxious and depressive symptoms or disorders are also common in adolescents and

young adults (American Academy of Child and Adolescent Psychiatry [AACAP], 1998;

Woodward & Fergusson, 2001) and this symptomology is associated with a higher risk of

substance use disorders (Rao et al., 1999). Negative emotional states and anxiety in particular,

appear to present a significant risk for use (Patton et al., 2002).

Motivations for Marijuana Use

People use drugs for many different reasons such as curiosity or experimentation, to

celebrate, to socialize, to deal with social pressures, physical pain and/or emotional pressures,

because of media and advertising, or because of previous drug use and dependence (Health

Canada, 2000). Motivational models of substance use presuppose that there is a relationship

between individuals' motivations to attain specific outcomes and their engagement in substance

use to achieve these goals (Fox, Towe, Stephens, Walker, & Roffman, 2011). There are several

common motivations for using marijuana among undergraduate students: (a) enhancement of

positive affect, (b) expansion of experiential awareness, (c) coping, (d) social conformity, and (e)

social cohesion (Simons, Correia, Carey, & Borsari, 1998). Enhancement motives include using

for pure enjoyment or to get high; expansion motives include using to expand awareness or

creativity; coping motives include using to feel better when depressed or anxious; conformity

motives include using because friends pressure use; social cohesion motives include using to

make social gatherings more fun (Simons et al., 1998). These motives are differentially related to

outcomes; some motives are associated with little risk for future problems, while other motives

are associated with higher risk (Simons et al., 1998).

Marijuana use motives are also differentially related to frequency of use. The coping and

enhancement motives for marijuana use are positively associated with past 30-day use, while

conformity motives for use are negatively associated with past 30-day use (Bonn-Miller, Vujanovic, Feldner, Bernstein, & Zvolensky, 2007). One study found that males using marijuana for enhancement reasons and females using for expansion reasons used more often, with 24% of the variance of frequency of marijuana use in males related to enhancement motives and 26.5% of the variance of frequency of marijuana use in females related to expansion motives (Chabrol, Duconge, Casas, Roura, & Carey, 2005). Expansion motives have been found to be predictors of heavy marijuana use in youth (Simons et al., 1998). These motives for using are very distinct and are theorized to relate to different patterns of use and risks for substance use problems (Newcomb, Chou, Bentler, & Huba, 1988).

Social motives appear to be associated with relatively less frequent and less problematic substance use (Cooper, 1994), which makes them less risky motivations for using marijuana. Using marijuana for social cohesion reasons has not been found to relate to negative marijuana use or higher frequency of use. Coping and enhancement motives however, have been found to relate to increased levels of marijuana use and coping, along with enhancement and conformity motives, have been closely related to heavy and/or problem use (Simons et al., 1998). Increasing endorsement of conformity motives are associated with greater problem use and dependence symptoms, while coping shows the strongest and most consistent relationship with adverse consequences (Fox et al., 2011).

Those who use substances to change internal states (mental or bodily sensations), tend to use marijuana more heavily, more frequently, and more permanently than others (Tate, Pomerleau, & Pomerleau, 1994) and using substances for negative reinforcement reasons may represent a fairly maladaptive style of use that results in problems (Cooper, 1994; Simons et al.,

1998). Using marijuana for the expectation that it will reduce negative affect is commonly seen

among undergraduate students (Schafer & Brown, 1991); in fact, marijuana users often report

relief from tension as their most common reason for use (Hathaway, 2003). Marijuana users also

report increased use during times of affective distress (Kaplan, Martin, Johnson, & Rogers,

1986). Adlaf, Gliksman, Demers, and Newton-Taylor (2001) found that in general, 42% of

university students reported elevated distress while 17% of Ontario adults reported distress.

These rates of distress relate to levels of marijuana use and may provide a motive for use.

Personality Factors

While a number of personality-substance theories have been proposed (e.g., Bonn-Miller,

Zvolensky, & Bernstein, 2007; Comeau, Stewart, & Loba, 2001), four personality traits have

been shown to relate to motives and outcomes, at least in alcohol literature (Conrod, Castellanos-

Ryan, & Strang, 2010). Anxiety sensitivity (fear of anxiety-related bodily sensations), sensation

seeking (propensity to seek out novel and intense experiences), impulsivity (tendency to value

immediate reward, and decreased ability to anticipate punishment and delay behavioural

responses accordingly), and hopelessness (predisposition toward depressive and pessimistic

thoughts) are personality factors that have been found to relate strongly to alcohol use and

smoking and are expected to relate similarly to marijuana use (Conrod et al., 2010). Anxiety

sensitivity, hopelessness, sensation seeking, and impulsivity are positively associated with both

marijuana use problems and dependence symptoms (Fox et al., 2011).

Buckner et al. (2008) found that marijuana dependence is associated with high rates of

social anxiety and the National Comorbidity Study (NCS) found that individuals with social

anxiety are seven times more likely to experience marijuana-related impairment compared to the

general population (Agnosti, Nunes, & Levin, 2002). Adolescent social anxiety disorder is linked to greater rates of marijuana dependence at the age of 30 (Buckner et al., 2008), and undergraduate students with greater social anxiety symptoms demonstrate greater numbers of marijuana use problems (Buckner, Mallott, Schmidt, & Taylor, 2006). Furthermore, perceived ability to cope with stress has been found to moderate the relationship between marijuana use problems and social anxiety among undergraduate students (Buckner, Mallott et al., 2006).

While social anxiety is significantly correlated with marijuana use problems, a significant correlation has not been found between social anxiety and the frequency of marijuana use (Buckner, Bonn-Miller, Zvolensky, & Schmidt, 2007). Bonn-Miller, Vujanovic et al. (2007) found that marijuana users with high levels of anxiety sensitivity are more likely to use drugs due to their belief that it can reduce or manage negative emotional distress. Emotionally vulnerable individuals high in anxiety sensitivity are particularly likely to use marijuana for coping reasons (Bonn-Miller, Vujanovic et al., 2007). As defined in models of anxiety-substance use comorbidity (Otto, Safren, & Pollack, 2004; Zvolensky et al., 2006), in the absence of adaptive coping strategies, high anxiety sensitive marijuana users may learn to rely on this drug use to manage anxiety states and fears of bodily sensations in the short term (Bonn-Miller, Vujanovic et al., 2007).

Compared to non-users, marijuana users showed higher psychopathology, more negative life events (i.e., major personal illness or injury, the illness, injury, or death of a friend or family member, a change of residence, or breaking up with a significant other), and more psychosocial distress (Brodbeck, Matter, Page, & Moggi, 2007). Marijuana users also report less positive health behaviours and a higher indifference toward health in general (Brodbeck et al., 2007).

Relationship Between Motivations and Personality Factors

The relationship between motives for marijuana use and personality factors is crucial to consider when identifying which undergraduate users are at risk of problem marijuana use or dependence. The five marijuana use motives correlate with various personality factors, with the coping motive appearing to have the most significant relationship with personality factors, usually anxiety sensitivity and hopelessness (Bonn-Miller, Zvolensky et al., 2007). Within young adults, using marijuana to cope with negative affect is associated with anxiety sensitivity (Bonn-Miller, Vujanovic et al., 2007; Zvolensky et al., 2007). This use of marijuana to cope however, has not been found to interact with anxiety sensitivity or hopelessness to predict even greater negative consequences, but instead using marijuana to cope appears to matter most when anxiety sensitivity and hopelessness are less evident (Fox et al., 2011).

Fox et al. (2011) found that high levels of anxiety sensitivity or hopelessness are associated with a higher number of dependence symptoms, regardless of coping motive level. This finding suggests that coping as a motivation for use does not necessarily point to negative use consequences. Marijuana users without anxiety sensitivity or hopelessness appear to be at a greater risk for dependence symptoms when they use marijuana to cope with relatively transitory negative affective states and situations (Fox et al., 2011). Only when individuals are using marijuana to cope with common life events does the use appear to become problematic. Coping motives also appear to interact with the frequency of marijuana use (Bonn-Miller, Zvolensky, Bernstein, & Stickle, 2008). Marijuana motive measures show a small to moderate intercorrelation and association with anxiety sensitivity and hopelessness. However, there is no

evidence that impulsiveness or sensation seeking interact with coping motives in the prediction

of negative consequences (Fox et al., 2011).

A study by Comeau et al. (2001) found that personality risk factors of anxiety sensitivity

and sensation seeking are associated with risky reasons (coping, enhancement, and/or conformity

motives) for adolescent marijuana use. Demographics and personality measures predicted 18%

of the variance in conformity motives. The variance due to demographics was attributable to

lower family income and lower grade level in school and the variance due to personality

measures was attributable to higher levels of anxiety sensitivity (Comeau et al., 2001). Other

studies have also investigated this relationship between conformity motives for marijuana use

and anxiety sensitivity and the possible risks associated with this type of use. Buckner, Schmidt,

Bobadilla, and Taylor (2006) found that socially anxious undergraduates with the highest number

of substance using friends demonstrate higher rates of marijuana use problems. Socially anxious

students may be using marijuana to cope with the fear they have of their anxiety-related bodily

sensations. Zvolensky, Marshall, Johnson, and Hogan (2009) explain that it is possible for

marijuana users high in anxiety sensitivity to feel more fear about the negative effects of their

anxiety symptoms while in public, and may therefore use marijuana in group-oriented settings to

conform with their drug-using peers.

Because anxiety sensitivity involves this social concerns component, individuals who

fear anxiety may be motivated to use marijuana for conformity reasons (Comeau et al., 2001).

Comeau et al. (2001) has used modified versions of the Childhood Anxiety Sensitivity Index

(CASI) and the State Trait Anxiety Inventory for Children (STAIC) to assess similar traits in

young adults, finding significant correlations. CASI scores were found to positively correlate

with conformity motives and to some extent, coping motives. These motives have also shown a

positive correlation with STAIC scores; enhancement motives have shown a negative correlation

with CASI scores (Comeau et al., 2001). Another study also found social anxiety to significantly

correlate with coping and conformity motives (Buckner, Bonn-Miller et al., 2007). Brodbeck et

al. (2007) however, found that individuals who use marijuana for social reasons are not more

socially distressed than non-users; in fact, coping motivated users were the only users who had

lower mental health, higher psychopathology, more psychosocial distress, and had experienced

more life events than non-users. This suggests that while socially anxious students report

conformity as their motivation for marijuana use, this anxiety is not a significant source of

distress when compared to those students who do not use marijuana. Interventions that reduce

anxiety sensitivity or intensity seeking have however, been found to reduce adolescents' risky

motives for use, which may in turn reduce their risk for developing heavy substance use and/or

related problems (Comeau et al., 2001).

     Studies have also found that coping motives are shown to relate to the correlation

between social anxiety and marijuana use problems, suggesting that the relationship between

social anxiety and marijuana use problems may be stronger in coping motivated users (Buckner,

Bonn-Miller et al., 2007). Coping motives mediate this relationship through the use of marijuana

to cope with anxiety that occurs in social situations (Stewart, Zvolensky, & Eifert, 2002).

Anxiety sensitivity has been found to account for 7.8% of the variance in coping motives (Bonn-

Miller, Zvolensky et al., 2007).

Gaps in Research

The degree to which anxiety sensitivity relates to conformity motives for marijuana use remains to be entirely investigated (Simons et al., 1998) and it has not been made entirely clear whether social anxiety is related to a greater frequency of marijuana use (Buckner, Bonn-Miller et al., 2007). Buckner, Bonn-Miller et al. (2007) believe that socially anxious individuals may be vulnerable to using marijuana for coping, but studies have not been entirely conclusive. It is also necessary to discover whether conformity motivated marijuana use provides a reason for socially anxious individuals to begin using marijuana (Buckner, Bonn-Miller et al., 2007). On this same topic, it is necessary to understand why some socially anxious individuals do not use marijuana and what factors protect these individuals (Buckner, Bonn-Miller et al., 2007).

Associations between impulsivity and sensation seeking behaviours and substance use is well known, but relationships between these behaviours and marijuana use motives have been less studied (Fox et al., 2011); where studies have been conducted, results have not been conclusive (Comeau et al., 2001; Simons, Gaher, Correia, Hansen, & Christopher, 2005). The degree to which sensation seeking may be related to undergraduate students' use of marijuana for enhancement motives is unknown and future research is necessary to explore whether sensation seeking related to enhancement motives only occurs in certain social situations (Comeau et al., 2001).

Hypotheses

The current study will examine relations between personality traits and motives for marijuana use among undergraduate students. It is hypothesized that anxiety sensitivity will predict coping, conformity, and social cohesion motivated use, that hopelessness will predict

coping and conformity motives, and that impulsivity and sensation seeking will predict

enhancement, expansion, and social cohesion motives. Implications for substance use prevention

and early intervention programs that address specific personality-motive patterns will be

considered.

Method

Participants

The sample consisted of 137 undergraduate students (110 females) from Lakehead

University. Participants were required to be fluent in English and to be at least 18 years old. The

mean age of this sample was 22.15 (SD = 6.25), with most of the students in their first year of

study (47.4% first year, 21.2% second year, 13.9% third year, 13.9% fourth year, 1.5% fifth

year). Approximately 83% of participants identified as Caucasian, 4.4% identified as First

Nations, 2.9% identified as Asian, 2.2% identified as African-American, and 7.5% as identified

as another ethnicity. Sixty-five percent of the sample reported lifetime marijuana use and on

average, participants reported first using the drug when they were 16.04 (SD = 2.97) years old.

Procedure

Participants were recruited through flyers placed around the Thunder Bay Lakehead

University campus, through communication within courses, and also through Lakehead

University's weekly Communication Bulletin email. These communications indicated that

students could earn a bonus mark in their Introductory Psychology courses or be entered in a

draw to win $100 if they were ineligible for the bonus marks (or if they chose not to receive

bonus marks), as an incentive to participate. The study information was accessible on Lakehead

University's SONA system as well, which is an online database and registration tool for research

currently being conducted at the university, requiring participants. Interested participants who

contacted the research team were scheduled an appointment at Lakehead University to complete

a questionnaire. Upon arrival, participants provided written informed consent followed by

completion of a series of self-report questionnaires. After the questionnaires were completed,

participants were debriefed and thanked for their time and effort. The study was approved by the

Research Ethics Board of Lakehead University.

Measures

  Demographics. Demographic information was collected from participants, which

included age, sex, ethnicity, and education level, as well as relationship, employment, and

financial statuses.

  Marijuana consumption measure. Marijuana, cannabis, and hashish use was measured

using a survey created by the National Institute on Alcohol Abuse and Alcoholism (National

Institute on Alcohol Abuse and Alcoholism [NIAAA], 2003). This is a self-report instrument that

includes items pertaining to age of initiation, past seven day use, past 30-day use, past 12 month

use, lifetime marijuana use, and the frequency of use during these time periods. Self-report

measures of marijuana use have been found to have good reliability (Cohen's kappa $\varkappa = 0.91$;

Kedzior, Badcock, & Martin-Iverson, 2006).

  Mood and Anxiety Symptom Questionnaire - Anxious Arousal subscale (MASQ-AA;

Watson & Clark, 1998). Anxiety sensitivity was measured using the Anxious Arousal subscale

of the MASQ (Watson & Clark, 1998). This self-report instrument includes a list of nine

feelings, sensations, problems, and experiences that people sometimes have (e.g., "felt like a

failure," "was unable to relax," "felt inferior to others"). Participants rated their experience of

these things during the past seven days on a Likert response scale, with options ranging from

"not at all," to "extremely." The MASQ-AA is found to have high discriminant validity, which is

not gained with a loss of convergent validity; this anxious arousal scale is a good marker of

anxiety (Reidy & Keogh, 1997).

Center for Epidemiologic Studies Depression scale (CES-D; Radloff, 1977).

Hopelessness was measured using the CES-D (Radloff, 1977). This measure asks participants to

respond to a series of ten statements about feelings experienced during the past week (e.g., "I felt

hopeful about the future," "my sleep was restless," "I felt fearful"), with response options

ranging from "rarely or none of the time," to "most or all of the time." Santor, Zuroff, Ramsay,

Cervantes, and Palacios (1995) found the CES-D to be desirable for investigating individual

differences in student populations, where small differences must be detected. Original testing by

Radloff (1977) found the CES-D to have significant internal consistency ($\alpha = .85$ in the general

population), moderate test-retest reliability (.40 or above), and good validity in the general

population.

Barratt Impulsivity Scale - Brief (BIS-B; Patton, Stanford, & Barratt, 1995).

Impulsivity was measured using the brief version of the Barratt Impulsivity Scale (Patton et al.,

1995). This questionnaire contains nine statements about different ways of thinking (e.g., "I am a

careful thinker," "I say things without thinking," "I act on the spur of the moment") with a Likert

type scale of four options ranging from "rarely/never," to "almost always/always." This scale has

been found to have acceptable internal consistency for applied use (Patton et al., 1995).

Arnett Inventory of Sensation Seeking (AISS; Arnett, 1994). Sensation seeking was

measured using the AISS (Arnett, 1994). This includes ten statements such as "when I listen to

music, I like it to be loud," " I stay away from movies that are said to be frightening or highly

suspenseful," and "it would be interesting to see a car accident happen," with four response

options ranging from "does not describe me at all," to "describes me very well." This scale has

good internal consistency and criterion related-validity (Arnett, 1994), and has been found to

have acceptable factorial and concurrent validity with measures of alcohol and drug use (Stewart

et al., 2001).

      Marijuana Motives Measure (MMM; Simons et al., 1998). Marijuana use motives

were measured using the MMM (Simons et al., 1998). This instrument lists 25 statements based

on the five marijuana use motives such as "I use marijuana to fit in with the group I like" or "I

use marijuana to forget my worries." It uses a Likert type scales with response options ranging

from "almost/never" to "almost always/always." The MMM has been shown to have high levels

of internal consistency for all five marijuana use motives (range of α coefficients: .86 to .93) and

is successful in finding motivations for using marijuana (Chabrol et al., 2005). Zvolensky et al.

(2007) have also found the MMM to have good reliability.

Results

      Eighty-nine of 137 participants (65%) reported using marijuana at least once in their

lifetime. The average age of initiation of marijuana use was 16 ($SD = 2.97$), with a range from 12

to 35 years old. From this sample, 68 individuals (76%) reported their frequency of marijuana

use. Six students (6.7%) reported daily marijuana use, with an average of 3.42 uses per day (SD

$= 2.45$) and a range from one to eight times per day. Thirteen students (14.6%) reported weekly

marijuana use, with an average of 3.77 uses per week ($SD = 1.24$) and a range from three to

seven times per week. Twelve students (13.5%) reported monthly marijuana use, with an average

of 1.83 uses per month (*SD* = 0.94) and a range from one to four times per month. Thirty-five

students (39.3%) reported yearly marijuana use, with an average of 2.84 uses per year (*SD* =

2.04) and a range from one to 10 times per year. Age and grade level were not found to correlate

with frequency of use. Sex was found to significantly correlate with frequency of marijuana use,

with males using more frequently, both daily and weekly (*r* = -.814, *p* < .05; *r* = -.786, *p* < .001,

respectively). Higher family income was found to significantly correlate with weekly marijuana

use (*r* = .626, *p* < .05).

Relationships with Frequency of Use

Associations between marijuana use motives and frequency of daily and yearly marijuana

use were first examined (see Table 1). Significant negative associations were evident between

daily marijuana use and enhancement (*r* = -.893, *p* < .05), expansion (*r* = -.858, *p* < .05), and

coping motivated marijuana use (*r* = -.848, *p* < .05). Significant positive associations were

evident between yearly marijuana use and enhancement (*r* = .505, *p* < .01), expansion (*r* = .436,

p < .01), coping (*r* = .534, *p* < .001), and social cohesion motivated marijuana use (*r* = .619,

p < .001). Age of marijuana use initiation was examined as well in association with frequency

and motives for use. Age of initiation showed a significant negative association with expansion

motivated use (*r* = -.252, *p* < .05).

Associations between personality scales and daily and yearly marijuana use were also

examined (see Table 2). Significant negative associations were evident between daily marijuana

use and CES-D scores (*r* = -.895, *p* < .05). No other significant associations were found between

frequency and personality scales. Age of marijuana use initiation was examined as well in

association with frequency and personality scales. Age of initiation showed no significant

correlations with personality factors.

Personality Factors Predicting Marijuana Use Motives

The various personality factors were examined in terms of predicting which marijuana

use motives undergraduate students endorse, using simple linear regressions (see Table 3). In

these models, each personality measure was entered and compared with each marijuana use

motive separately. This model allows an evaluation of the variance accounted for in each

marijuana motive by the four personality factors. Anxiety sensitivity and hopelessness

significantly predicted enhancement, expansion, coping, and social cohesion motivated

marijuana use; impulsivity significantly predicted enhancement motivated marijuana use, and

sensation seeking significantly predicted enhancement, expansion, and social cohesion motivated

use.

Discussion

There are several negative health outcomes (Arseneault et al., 2004; Bonn-Miller et al.,

2005; Lynskey & Hall, 2000; Hall, 2009; etc.) and also negative behavioural outcomes (Asbridge

et al., 2005) associated with marijuana use. Understanding which undergraduate students are at

risk of developing these problems is important for intervention and treatment purposes.

Motivational models of substance use have found relationships between motivations to attain

outcomes and the use of substances to attain these goals (Fox et al., 2011). Five motives for

marijuana use have been identified and are found to relate differentially to outcomes in relation

to frequency of use (Simons et al., 1998). The present study has found significant negative

associations between daily marijuana use and enhancement, expansion, and coping motivated

marijuana use; that is, these motivations for use have a relationship with less frequent daily marijuana use. These findings may result from the relatively small sample of students who report using marijuana daily, but are important to note nonetheless. Because frequent use is where most problems arise particularly when associated with expansion motives (Simons et al., 1998), it is a positive finding that this sample is not using more frequently for expansion reasons. Coping and enhancement motives have also been found to relate to increased levels of marijuana use in the literature (Simons et al., 1998) and have been related to problem substance use (Cooper, 1994). In this particular sample, coping and enhancement were related to less frequent daily use, which suggests that this sample may be at a lower risk for developing problems related to their use. Coping shows the strongest relationship with adverse consequences (Fox et al., 2011), which makes this result very positive. This may signify that this particular population of undergraduate users is at a fairly low risk of developing problem use. This could also be due to the fact that the sample is a fairly non-frequent marijuana using group.

The present study has also found significant positive associations between yearly marijuana use and enhancement, expansion, coping, and social cohesion motivated use, which shows that these motives have a relationship with more frequent yearly marijuana use. Social reasons for substance use are associated with less frequent and less problematic use (Cooper, 1994), which is consistent with this study's findings; social cohesion motivated marijuana users tend to use more frequently yearly, rather than monthly, weekly, or daily. These results are important to this study because they signal that this population of undergraduate students is not using marijuana frequently, for any particular reason. This sample tends to be a light marijuana using sample, which suggests that undergraduate populations may not be at a high risk for

marijuana use problems. However, this also presents a limitation to the study; because the sample contains a population of high achieving undergraduate students, the results may be skewed towards less frequent marijuana use.

There are four personality factors that predict specific motivations for alcohol use (Conrod et al., 2010) and these personality factors are positively associated with both marijuana use problems and dependence symptoms (Fox et al., 2011). Little research has investigated the relationship between these personality factors and their ability to predict marijuana use motives. Understanding which personality factors predict specific motivations for marijuana use helps to identify which users are at the greatest risk for developing problems related to this use in the future. The present study sought to investigate this gap in research by searching for relationships between the four personality factors and the five marijuana use motives. Consistent with hypotheses, anxiety sensitivity was found to predict coping and social cohesion motivated marijuana use, hopelessness was found to predict coping motivated use, impulsivity was found to strongly predict enhancement motivated use, and sensation seeking was found to predict enhancement, expansion, and social cohesion motivated use. Inconsistent with hypotheses, anxiety sensitivity and hopelessness did not predict conformity motivated use, and impulsivity did not predict expansion or social cohesion motivated use. In addition to the hypotheses made, anxiety sensitivity and hopelessness were found to predict expansion and enhancement motivated use, with hopelessness also predicting social cohesion motivated marijuana use.

Consistent with past findings, anxiety sensitivity does not correlate significantly with frequency of marijuana use, but anxiety sensitivity has been found to significantly correlate with marijuana use problems in literature (Buckner et al., 2007). Because of the potential for problem

use in anxiety sensitive individuals, it is important to understand why they may be using

marijuana. This study found anxiety sensitivity to predict coping and social cohesion motivated

use as expected, but it also predicted expansion and enhancement motivated use; that is,

individuals who have a fear of anxiety-related bodily sensations are using marijuana to feel better

when they are experiencing anxiety, to make social gatherings more fun, to expand their

awareness, and also for pure enjoyment. Using marijuana to cope with anxiety and to make

social gatherings more fun is expected in anxiety sensitive individuals because anxiety sensitivity

is more prevalent and may produce stronger feelings in social situations (Zvolensky et al., 2009).

Using marijuana to expand awareness or for pure enjoyment however, is not expected in anxiety

sensitive individuals. These results can be explained by the fact that individuals experiencing

anxiety sensitivity in this sample, are experiencing it at a fairly low level. An undergraduate

student sample is not expected to have high levels of anxiety sensitivity, which could cause this

personality factor to have higher correlations with motives than would be seen in a general

sample of the population. Also, most marijuana using individuals in the particular sample tend to

report their main motives for use as expansion and enhancement, so these motives are seen

resulting from almost all of the personality factors.

It was predicted that anxiety sensitivity would predict conformity motivated marijuana

use, however this result was not identified; in fact, conformity motivated use was not predicted

by any of the personality factors. While it was predicted that those with a fear of their anxiety-

related bodily sensations would use marijuana to fit in with their friends, this may not be seen

because this particular sample may be immune to this type of peer pressure. The sample

consisted of a fairly high achieving group of individuals, which may provide a response to this

issue. Most of the participants in this study took part to receive bonus marks in their courses, which may indicate that they are conscientious individuals who do not feel the need to conform to their peers, but this is something that could be investigated in the future. It is also a possibility that conformity is not common in undergraduate students, or that the need to conform is no longer common in students in general. As society places more emphasis on being different and unique, the motive of conformity may become less common and possibly even unnecessary to include in the future, but this is yet to be investigated. A study by Tate et al. (1994) found that anxiety sensitivity may be influenced by external environmental cues and by internal factors which relate to conformity motives for use. It is possible that the external cues are not being recognized by the anxiety sensitive individuals in the sample, and therefore are not motivated by conformity to use marijuana. The endorsement of conformity motives is associated with problem use and dependence symptoms in individuals (Fox et al., 2011), which makes a non-significant level of conformity motivated use a very positive result. This result may also relate to the past finding that socially anxious undergraduate students with a high number of substance using friends have higher rates of marijuana use problems (Buckner et al., 2006). Because anxiety sensitive individuals in this sample are not using for conformity reasons could signal that they do not have as many substance using friends, which would lower their risk for this type of substance use problem.

In the present study, hopelessness was significantly negatively correlated with daily marijuana use. This shows that higher scores on the measure of hopelessness, result in lower daily frequency of marijuana use. This is an interesting finding because hopelessness was expected to result in more frequent use. It is possible that the predisposition toward depressive

and pessimistic thoughts result in less frequent marijuana use in the current sample, because most undergraduate students do not have high levels of this trait. Most students in this sample are expected to have fairly regular and stable thoughts, which would mean that the more frequent marijuana using sample will also likely have regularly stable thoughts.

This study found hopelessness to predict coping motivated use as expected, but it also predicted expansion and enhancement motived use; that is, individuals who have a predisposition towards negative thoughts are using marijuana not only to feel better, but also to expand their awareness and for simple enjoyment. Using marijuana to cope is expected in hopeless individuals and has been found in past literature (e.g., Fox et al., 2011). Using marijuana for expansion and enhancement reasons however, is not expected in hopeless individuals. This result can be explained for similar reasons as with anxiety sensitivity; the individuals in this sample are experiencing hopelessness at a fairly low level and because many undergraduates report using for expansion and enhancement reasons in general, many personality factors will relate to these motives for use.

Using marijuana to cope has been found in both anxiety sensitive and hopeless individuals in this sample. While coping as a motivation for marijuana use shows the strongest and most consistent relationship with adverse consequences, this type of use has not been found to interact with anxiety sensitivity and hopelessness to predict greater negative consequences in past studies (Fox et al., 2011). Using to cope however, does seem to have a larger effect when anxiety sensitivity and hopelessness are less obvious (Fox et al., 2011), which could represent an indication of problem use for this sample. Because this sample is relatively low in anxiety sensitivity and hopelessness, but are still strongly reporting coping as a motivation for use may

indicate that undergraduate students are using marijuana to cope with transitory situations or life

events. Fox et al. (2011) identified that this type of coping use puts individuals at a greater risk

for dependence symptoms and this is something that should be investigated in future studies. It is

necessary to uncover whether or not these individuals are using marijuana to cope with their

anxiety sensitivity and hopelessness specifically, or if they are simply using it to cope with day-

to-day events. If the latter is the case, these individuals could be putting themselves at risk for

marijuana dependence which can have serious negative health implications.

This study found impulsivity to predict enhancement motivated use as expected; that is,

individuals with a tendency to value immediate reward are using marijuana for pure enjoyment.

Impulsive individuals also have a decreased ability to anticipate punishment and delay

behavioural responses accordingly, which is reasonable in an individual using marijuana solely

for fun, as they will not be thinking about possible negative health or behavioural outcomes in

that moment. This type of use has been found to relate to increased levels of marijuana use in

past studies (Simons et al., 1998), and has also been found to relate to problem substance use

(Cooper, 1994). While impulsivity was not found to relate to increased levels of use in this study,

this result raises a particular concern with this sample because impulsivity very strongly

predicted enhancement motivated marijuana use. It was hypothesized that impulsivity would

predict expansion and social cohesion motivated use, however these results were not seen.

Because impulsive individuals value immediate reward, it was expected that use to expand

awareness and to make social gatherings more fun would relate, however it is possible that

impulsive individuals are using mainly for expansion reasons, leaving less variance in this

personality factor to be accounted for by other motives for use.

The present study also found sensation seeking to significantly predict enhancement, expansion, and social cohesion motivated use, as expected; that is, individuals with the propensity to seek out novel and intense experiences use marijuana for enjoyment, to expand their awareness, and to make social gatherings more fun. These three motives for marijuana use fit in well with what is known about sensation seeking and again, some of these motives for use, particularly enhancement, can lead an individual to increased levels of marijuana use and have been related to problem use (Simons et al., 1998). While these motives in this particular sample have not been found to relate to increased frequency of marijuana use, undergraduate students may be at risk for problem use due to their high endorsement of the enhancement motive. Sensation seeking individuals however, are likely at a lower risk for developing problems because this motivation for use did not result in more frequent use.

This study also found that males tend to use marijuana more frequently, both daily and weekly, than females. Past research has found that males using most often tend to state enhancement as their motivation, while females tend to report expansion as their motive for frequent use (Chabrol et al., 2005). The present study found no significant relationships between sex and motives for use, although a fairly uneven sample of males and females was received. The result of males using more frequently provides even more insight into use because of the uneven gender sample that was used. Understanding that males are using marijuana more frequently suggests that they may be at a higher risk for problem use in the undergraduate sample.

Higher family income was also found to correlate with more frequent weekly marijuana use, which is inconsistent with past findings. Comeau et al. (2001) found that the variance in frequency of marijuana use due to demographics resulted from lower family income and lower

grade level however, the present study found higher family income to be associated with more

frequent weekly use, and found no significant relationship with grade level. It was originally

assumed that family income was showing an inverted u-shaped curve, with daily frequency and

yearly frequency relating to lower income, and weekly and monthly frequency relating to higher

income, however this was not the case. It seems higher family income is more closely related

with all frequencies, and this is something that should be investigated in the future. The sample

investigated by Comeau et al. (2001) however, consisted of secondary school students with a

fairly low rate of marijuana use. The lower occurrence of marijuana use in this sample could

result in a very different relationship with family income. Also, students in the present study

most likely have a smaller range of family income situations than would secondary school

students. University education is expensive, which may result in a university sample having a

higher average family income than the common secondary school student. It is possible that this

could reflect a different relationship between marijuana use and family income and should be

investigated in the future.

Another interesting finding is that age of initiation showed a significant negative

association with expansion motivated use; that is, individuals who use marijuana to expand their

awareness or creativity, tend to begin using marijuana at a younger age. This is an expected

result however, it is not entirely clear whether this type of use at a young age relates to problem

use. It has been found in previous studies that the worst health outcomes are associated with

early onset of use and frequent use (Ellickson et al., 2004), in the present study however, early

initiation was not found to correlate with frequency of use. Early onset marijuana use has also

been found to relate to psychosis outcomes, such that individuals reporting early onset psychotic

symptoms were also reporting early onset marijuana use (McGrath et al., 2010). Andreasson et

al. (1987) also found that initiation of marijuana use prior to age 18 increased an individual's

likelihood to be diagnosed with schizophrenia by 2.4 times compared to those who had not used

marijuana. This particular sample had a fairly low age of initiation of use, which may put them at

a risk for these types of negative outcomes.

Summary

While most research on marijuana use focuses on the possible negative health and

behavioural outcomes associated with use, it is necessary that further research clarifies how

frequent these negative effects are. It is becoming increasingly known that the effects of

marijuana are not always negative. A study by Fried, Watkinson, James, and Gray (2002) for

example, found that current marijuana use had a negative effect on IQ scores, but only in

individuals who smoke five or more joints per week. This same effect on IQ scores is not seen in

past heavy users and gains in IQ scores were actually shown in light users, former users, and

non-users (5.8, 3.5, and 2.6 point increase in IQ scores respectively; Fried et al., 2002).

The present study found that undergraduate students are at a particular risk for negative

outcomes related to some of their motives for use. Enhancement is a common motive given for

use among undergraduate students and this type of use is strongly related to problem use in

marijuana literature (Simons et al., 1998). Students have also identified coping as a frequent

motive for use and because this sample is fairly low in anxiety sensitivity and hopelessness, this

type of use may lead to problems (Fox et al., 2011). Males and individuals from higher income

families report more frequent marijuana use, and frequent use is where problem use often arises.

A relationship was found in the present study between a younger age of initiation and expansion

motivated use; this type of relationship has been found to relate to frequent use and also to psychotic symptoms and schizophrenia in past literature (Andreasson et al., 1987; McGrath et al., 2010). Prevention research and methods in the future should focus on identifying enhancement and coping motivated users, particularly enhancement motivated frequent users. Individuals low in anxiety sensitivity and hopelessness specifying coping as their motive for use should also be the focus of prevention and intervention strategies. Males and individuals from higher income families should be considered as target groups for prevention research in the future, as well as early onset users of marijuana with expansion motivated use.

The present study also found some positive implications. This particular sample of undergraduate students seemed to be a fairly infrequent using sample, with low ratings for particularly risky motives in association with frequency, such as coping and enhancement. Conformity as a motive for marijuana use also showed no significant relationship with any personality factors or frequency of use, and this is a very positive finding. Conformity is associated with problem use (Fox et al., 2011), but this does not appear to be a concern in this undergraduate sample. When referring to undergraduate populations, frequency of marijuana use and conformity motivated use appear to be non-problem areas that need not be focused on with prevention programs. Marijuana use appears to be most negatively associated with large frequency of use and it seems as though this sample is at a fairly low risk for serious problem developments.

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Table 1

Descriptive Data and Zero-Order Relations of Marijuana Use Motives

	Age of initiation	Daily use	Yearly use	Enhancement	Expansion	Coping	Conformity	Social	*M* (*SD*)
Age of initiation	1	-.423	-.308	-.176	-.252*	-.167	.043	-.179	16.04 (2.97)
Daily use		1		-.893*	-.858*	-.848*	-.482	-.768	3.42 (2.55)
Yearly use			1	.505**	0.436**	.534***	.026	.619***	2.84 (2.05)
Enhancement				1	.711***	.625***	.217*	.728***	13.12 (6.48)
Expansion					1	.579***	.168	.691***	9.61 (6.12)
Coping						1	.229*	.713***	7.33 (4.94)
Conformity							1	.323**	5.99 (1.84)
Social								1	11.24 (6.09)

Note. Age of initiation = age of first usage of marijuana; daily use = frequency of daily use;

yearly use = frequency of yearly use; enhancement, expansion, coping, conformity, and social =

Marijuana Motives Measure subscales (Simons et al., 1998).

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 2

Descriptive Data and Zero-Order Relations of Personality Measures

	Age of initiation	Daily use	Yearly use	MASQ-AA	CES-D	BIS-B	AISS	*M* (*SD*)
Age of initiation	1	-.423	-.308	-.135	-.207	-.04	-.087	16.04 (2.97)
Daily use		1		-.512	-.895*	-.067	.562	3.42 (2.55)
Yearly use			1	.191	.051	-.22	.254	2.84 (2.05)
MASQ-AA				1	.500***	.218**	-.019	35.48 (9.35)
CES-D					1	.418***	-.076	6.87 (5.10)
BIS-B						1	.230**	16.53 (3.81)
AISS							1	51.96 (8.06)

Note. Age of initiation = age of first usage of marijuana; daily use = frequency of daily use;

yearly use = frequency of yearly use; MASQ-AA = Mood and Anxiety Symptom Questionnaire,

Anxious Arousal subscale (Watson & Clark, 1998); CES-D = Centre for Epidemiologic Studies,

Depression scale (Radloff, 1977); BIS-B = Barratt Impulsivity Scale - Brief (Patton et al., 1995);

AISS = Arnett Inventory of Sensation Seeking (Arnett, 1994).

* *p* < .05. ** *p* < .01. *** *p* < .001.

Table 3

Simple Linear Regression Analyses Predicting Marijuana Use Motives

Predictors	R^2	Adj. R^2	β	F	df
Enhancement of Positive Affect Motive					
Anxiety Sensitivity (MASQ-AA)	.102	.091	.319**	9.302	1, 83
Hopelessness (CESD)	.063	.051	.250*	5.611	1, 85
Impulsivity (BIS-B)	.119	.109	.345***	11.486	1, 86
Sensation Seeking (AISS)	.076	.065	.275**	6.962	1, 86
Expansion of Experiential Awareness Motive					
Anxiety Sensitivity (MASQ-AA)	.117	.106	.342***	10.862	1, 83
Hopelessness (CESD)	.089	.078	.299**	8.226	1, 85
Impulsivity (BIS-B)	.030	.019	.174	2.642	1, 86
Sensation Seeking (AISS)	.088	.077	.296**	8.153	1, 86
Coping Motive					
Anxiety Sensitivity (MASQ-AA)	.209	.200	.458***	21.708	1, 83
Hopelessness (CESD)	.155	.145	.394***	15.411	1, 85
Impulsivity (BIS-B)	.011	.000	.107	0.978	1, 86
Sensation Seeking (AISS)	.029	.018	.171	2.558	1, 86
Social Conformity Motive					
Anxiety Sensitivity (MASQ-AA)	.013	.001	.114	1.075	1, 83
Hopelessness (CESD)	.015	.003	.121	1.258	1, 85
Impulsivity (BIS-B)	.016	.004	.125	1.354	1, 86
Sensation Seeking (AISS)	.001	-.010	.039	0.127	1, 86
Social Cohesion Motive					
Anxiety Sensitivity (MASQ-AA)	.130	.119	.361***	12.253	1, 83
Hopelessness (CESD)	.063	.052	.252*	5.683	1, 85
Impulsivity (BIS-B)	.033	.022	.182	2.916	1, 86
Sensation Seeking (AISS)	.111	.100	.333**	10.604	1, 86

Note. MASQ-AA = Mood and Anxiety Symptom Questionnaire, Anxious Arousal subscale

(Watson & Clark, 1998); CES-D = Centre for Epidemiologic Studies, Depression scale (Radloff,

1977); BIS-B = Barratt Impulsivity Scale - Brief (Patton et al., 1995); AISS = Arnett Inventory

of Sensation Seeking (Arnett, 1994).

*p < .05. ** p < .01. *** p < .001.