Substance use motives and personality traits among a First Nation treatment-seeking population

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Abstract

Problematic substance use is one of the top disparities affecting Indigenous people. Among non-Indigenous people, specific personality traits and drinking motives are associated with problematic patterns of alcohol use. The Modified Drinking Motives Questionnaire – Revised (MDMQ-R) is a measure for examining drinking motives among youth and adults. Despite cross-cultural use, the MDMQ-R demonstrated a different factor structure among Indigenous youth in Canada (Mushquash et al., 2014). The MDMQ-R has also been examined in relation to personality traits, where findings suggest that specific personality traits and drinking motives together are associated with problematic patterns of alcohol use. This study examined the factor structure of the MDMQ-R in a substance use treatment-seeking sample of Indigenous adults. Additionally, this study sought to understand how personality traits are related to substance use motives. Sex differences regarding substance use motives were investigated as well. As hypothesized, a three-factor structure solution received support, consistent with findings among Indigenous youth. Hypotheses regarding personality traits were supported, whereby positive reinforcement motives were associated with impulsivity and sensation-seeking traits, and negative reinforcement motives were associated with hopelessness and anxiety sensitivity traits. Sex was not predictive of higher scores on any MDMQ-R subscales. Examining the MDMQ-R structure may provide culturally relevant information about the use of this measure with Indigenous populations in Canada. These findings may inform future research led by Indigenous communities to understand better the needs of their members facing problematic substance use.

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List of Abbreviations

ARTC	Adult Residential Treatment Centre
DMQ – R	Drinking Motives Questionnaire – Revised
FN	First Nations
FNIM	First Nations, Inuit, and Métis
HHQ	Health History Questionnaire
IRS	Indian Residential School
LHIN	Local Health Integration Network
MDMQ-R	Modified Drinking Motives Questionnaire – Revised
NNADAP	National Native Alcohol and Drug Abuse Program
OCAP	Ownership, Control, Access, and Possession
RHS	Regional Health Survey
SURPS	Substance Use Risk Profile Scale

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Substance use motives and personality traits among a First Nation treatment-seeking population

Indigenous people in Canada[1] are among the most affected by health and social disparities such as social, economic, cultural, and political inequalities, lower life expectancy, higher incarceration rates, poverty, and chronic health conditions (First Nations Centre, 2005; Lavalley et al., 2020). Rates of chronic health conditions such as type 2 diabetes, obesity, high blood pressure, tuberculosis, HIV/AIDs, cancer, arthritis/rheumatism, and heart disease are greater among Indigenous people than non-Indigenous peoples. Mental health difficulties such as depression, anxiety, and suicide are also higher among Indigenous people than non-Indigenous peoples (First Nations Governance Information Centre [FNIGC], 2005, 2018; Kumar & Tjepkema, 2019). Compared to the general Canadian population, Indigenous people in Canada experience more significant health concerns, which appear to be stable over time, despite trajectories for the health outcomes mentioned above improving for non-Indigenous populations in recent decades (Statistics Canada, 2018).

Social determinants of health, such as education, employment, income, and gender, have shaped a wide range of health capacities and vulnerabilities for Indigenous people (Canadian Public Health Association, 2019; Lavalley et al., 2020; Reading & Wien, 2009). In Canada, being Indigenous is considered a social determinant of health (Mikkonen & Raphael, 2010; Toombs et al., 2019). This population is at an increased risk for lower socioeconomic status, lower education, unstable housing, and increased malnutrition (Statistics Canada, 2017; Statistics

[1] The term Indigenous in this paper refers to a specific group of Canadians who identify as First Nations (status and non-status), Métis, or Inuit (FNIM). Although there are many distinct groups and communities within Canada, the term Indigenous acknowledges and respects the shared values, historical experiences, and contemporary struggles followed by the aftermath of oppression and assimilation. The term Aboriginal has historically been used interchangeably with First Nations and will only be used when cited literature includes this term.[1]

Canada, 2018), all of which can increase risk for infectious diseases, delayed development in childhood, substance-use related concerns, and prevalence of lifetime diseases (including diabetes, hypertension, cardiovascular diseases, and chronic renal diseases; Gracey & King, 2009). Indigenous people are more likely to be confronted with experiencing stressful events such as witnessing traumatic events (e.g., violence, assault, homicide), experiencing poverty, and unemployment than their non-Indigenous counterparts (Bombay et al., 2011; Statistics Canada, 2018).

Health disparities are both directly and indirectly associated with social determinant inequities, leading to a disproportionate burden of ill health and social suffering among Indigenous populations in Canada (Adelson, 2005). These disparities are associated with increased prevalence rates of substance use among First Nations communities and disrupt community wellness. For example, in 2009, First Nations communities in Northwestern Ontario declared a state of emergency due to the long-term use and effects of prescription drugs in many remote First Nations communities (Nishnawbe Aski Nation, 2009). These data demonstrate the heightened health disparities endured by Indigenous populations in Canada, such as physical and mental health illnesses and social suffering, which non-Indigenous Canadians experience at much lower rates. These disparities and community-level suffering evoke the need for attention and research to address and reduce the disproportionate burden Indigenous populations in Canada are facing.

Intergenerational Trauma and Adversities Faced by Indigenous People

The disproportionate burden of mental and physical illnesses among Indigenous populations in Canada cannot be understood outside of the context of colonization (Lavalley et al., 2020; Truth and Reconciliation Commission of Canada [TRCC], 2015). The creation of the

reserve system forced relocation of communities to new and unfamiliar areas, as well as the forced removal and subsequent placement of children into institutions far away from their families and communities through assimilation policies (i.e., Indian Residential School (IRS) system and the Sixties Scoop). These events have influenced generations of Indigenous people in Canada (Adelson, 2005). Many Indigenous people who endured the Sixties Scoop and the Indian Residential School system experienced childhood maltreatment including neglect, physical, sexual, and psychological abuse, and active discipline of children for participation in cultural or spiritual activities, such as speaking one's Indigenous language (TRCC, 2015). Increased isolation from family, attachment difficulties, parenting challenges, and loss of cultural identity stem from the oppressive acts of residential schools (Hackett et al., 2016; RHS National Team, 2007; Ross et al., 2015), all of which have ramifications to physical, social, emotional, and mental well-being across generations (Bombay et al., 2009; Gracey & Kind, 2009).

Individuals who attended Indian Residential School are more likely to suffer from various mental and physical health problems compared to Aboriginal adults who did not attend (Bombay et al., 2014; FNIGC, 2005). Children of those who attended Indian Residential School are at a greater risk for poor well-being (Bombay et al., 2014). Indeed, the Regional Health Survey (RHS)[2], completed by the Assembly of First Nations/First Nations Information Governance Centre, found that 37.2% of adults, who had at least one parent who attended Indian Residential School, thought about committing suicide in their lifetime (25.7% of those who did not have a parent attend Indian Residential School; FNIGC, 2018). The persistent effects of trauma experienced from residential school attendance coupled with the current health conditions and

[2] The RHS is a national health survey conducted by and for First Nations to capture the health and wellness of First Nations people living on reserves across Canada (FNIGC, 2018).

continued discrimination experienced by Indigenous people contribute to a transmission of health concerns experienced across generations (Bombay et al., 2009). As a result, Indigenous populations are more likely to experience poor physical and mental health when compared to other Canadians (Bombay et al., 2009; Bombay et al., 2014; Maxwell, 2014; Nelson & Wilson, 2017).

Intergenerational trauma has been described as the transmission of historical oppression and has negative consequences across generations (Bombay et al., 2009). Intergenerational trauma has profound effects on health, affecting individuals' lifespan and the generations to follow (Bombay et al., 2014; Marsh et al., 2015). The Regional Health Survey found that approximately one-third of individuals (31.9%) who reported attending treatment for alcohol use had attended a residential school (FNIGC, 2005). First Nations adults with a parent or grandparent who attended a residential school were more likely to report higher rates of prescription substance use, non-prescription substance use, cannabis use, and binge drinking[3] (FNIGC, 2018). Similar effects are documented for depressive symptoms of adults whose parents attended residential schools (Bombay et al., 2011). First Nations youth with a parent or grandparent who attended residential school are more likely to report higher rates of suicidal ideation (Elias et al., 2012). Poor mental health outcomes, including high substance use and addictions, are a result of these health disparities within Indigenous populations in Canada and can make treatment of these issues challenging. The unique adversities Indigenous people in Canada have faced, such as Indian Residential School attendance and other systemic acts to colonize Indigenous populations, creates a need for unique assessment approaches.

[3] Binge drinking, also known as heavy episodic drinking, can be operationally defined as consuming four (women) or five (men) drinks on one occasion (Wechsler and Austin, 1998; FNIGC, 2018).

Substance Use Among Indigenous People

In comparison to the general Canadian population, Indigenous people in Canada experience higher rates of problematic substance use (i.e., alcohol, recreational, illicit drug use; Fish et al., 2017; FNIGC, 2005; FNIGC, 2018; National Institute on Alcohol Abuse and Alcoholism [NIAAA], 2006). Problematic alcohol use has been deemed a preventable cause of death and influences the development of alcohol-related consequences. Notably, First Nation people experience six times the number of alcohol-related deaths and three times the number of drug-induced deaths than the general population (FNIGC, 2005). Adelson (2005) found that 61.1% of surveyed Indigenous people residing in Canada suffered from alcohol abuse, making it the most significant health problem within these communities (Adelson, 2005); the second greatest health problem was drug abuse (47.9%; Adelson, 2005). Those who engage in problematic alcohol use are more likely to experience social consequences such as unemployment, unstable housing, discrimination, and violent victimization.

Among those who misuse alcohol, health consequences such as high blood pressure, arthritis, cardiovascular-related issues, lower life expectancy rates, and psychological difficulties (i.e., major depressive disorder, anxiety disorders, and suicide) are more likely (Adelson, 2005; Hautala et al., 2019; NIAAA, 2017). Problematic substance use can lead to health consequences such as unsafe sex, risky drug use practices, and subsequent vulnerability to sexually transmitted diseases/infections such as HIV (Pearce et al., 2018). Substance misuse can also lead to problems with relationships, legal problems related to use, feelings of anxiety, irritability, emptiness, and loss of hope (Herie et al., 2010). Although substance misuse has been deemed a problem for Indigenous communities in Canada, there is little research on the consequences of drug use for this specific population. The substance use crisis among Indigenous people in Canada and its

consequences are devastating on both individual and communal levels. Understanding underlying motives for substance use can clarify essential targets for intervention.

The consequences of long-term maladaptive drinking and substance use are apparent on an individual level (i.e., acute illnesses, chronic illnesses, psychiatric illnesses, injuries, etc.) and at a community level. For example, Indigenous populations engaging in long-term maladaptive substance use are at a heightened risk for experiencing higher rates of co-morbid health concerns (FNIGC, 2005, 2018; Hautala et al., 2019). For example, Hautala and colleagues (2019) utilized longitudinal data of youth (M_{age} for waves 1 = 11.08, 14.25, 16.23, and 18.26) and their caregivers in four United States reservations and four Canadian First Nation reserves in Ontario. They found that Indigenous youth began using substances earlier and moved more quickly into regular use than non-Indigenous youth (Hautala et al., 2019).

More recently, the Regional Health Survey data demonstrated that addiction[4] and/or substance abuse[5] was the primary challenge to on-reserve community wellness (FNIGC, 2018). According to the Regional Health Survey, 83% of First Nation individuals described addiction as the most serious concern within their communities, rated higher than housing (71%) and employment (66%; FNIGC, 2018). Due to the detrimental effects of addiction within these communities, significant social consequences for communities exist, such as higher rates of co-morbid health concerns compared to non-Indigenous people (FNIGC, 2018). Despite having higher rates of substance use-related concerns and difficulties than other Canadians, Indigenous populations in Canada are less likely to seek out and complete treatment. The Regional Health Survey also indicated that treatment-seeking rates were low (4.4%) for First Nation individuals

[4] Addiction is commonly characterized by compulsive engagement in rewarding stimuli despite adverse consequences (Herie et al., 2010).
[5] Substance abuse is a term used to describe a pattern of using a substance that causes significant problems or distress (Herie et al., 2010).

who reported illicit drug use in 2018 (ranging from 5.6% to 12.1% of the population, depending on the substance used; FNIGC, 2018).

Given the significant substance use-related health consequences for Indigenous people, a better understanding of factors that may affect problematic substance use is needed. Understanding the unique predispositions that Indigenous people face regarding heavy drinking and alcohol- and substance use-related problems may offer interventions that may lead to better well-being (Mushquash et al., 2007; Toombs et al., 2019). Identifying the motives behind substance use is essential in providing appropriate interventions and continuing care regimens for individuals who are at risk (Callaghan, 2003). Substance use motives and the contributing personality risk factors among Indigenous people have received much less attention than the general population and may be a valuable area to explore. Therefore, personality traits and substance-use motives that may contribute to maladaptive substance use are potential areas for further understanding.

Risky Personality Traits

Personality traits such as anxiety sensitivity, sensation seeking, impulsivity, and hopelessness are associated with heightened substance misuse and risky motivation for substance use (Conrod et al., 2000; Woicik et al., 2009). Anxiety sensitivity involves a fear that anxiety-related sensations will lead to adverse outcomes (Conrod et al., 2000). Sensation seeking refers to the propensity to seek out novel and intense experiences (Conrod et al., 2000). Impulsivity is a tendency to value immediate reward and a decreased ability to anticipate punishment and delay behavioural responses accordingly (Conrod et al., 2000). Lastly, hopelessness predisposes an individual to experience depressive and pessimistic thoughts (Conrod et al., 2000). Utilizing a

personality dimension model to explore reasons for substance misuse may be beneficial for Indigenous populations who experience more significant consequences for their substance use.

The Substance Use Risk Profile Scale (SURPS) identifies traits associated with risky drinking patterns. The SURPS has demonstrated good psychometric properties for use in different languages: English (Castellanos-Ryan et al., 2013; Krank et al., 2010; Woicik et al., 2009), Dutch (Malmberg et al., 2010), Sinhala (Chandrika Ismail et al., 2009), French-Quebequois (Castonguay-Jolin et al., 2013), and Spanish-speaking Mexican (Robles-García et al., 2014). The SURPS has also demonstrated adequate psychometric properties for adolescent samples (between 11 and 18 years old; Woicik et al., 2009; Jurk et al., 2015) and adults (Jurk et al., 2015). The SURPS has been validated cross-culturally in a Bulgarian population (Long et al., 2018), a United Kingdom sample (Castellanos-Ryan et al., 2013), a Canadian population (English and French; Castonguay-Jolin et al., 2013; Krank et al., 2010), a Sri Lankan population (Chandrika Ismail et al., 2009), a sample from China (Siu, 2011), an Australian adolescent population (Newton et al., 2015), and a Mexican adolescent population (Robles-Garcia et al., 2014). Despite its cross-cultural validation and use, there is a lack of evidence for its utility among Indigenous adult populations in Canada.

Specific personality traits identified by the SURPS are associated with specific drinking motives for adolescents and young adults (Woicik et al., 2009). For example, all four personality dimensions were found to be related to enhancement, coping, and conformity motives. Specifically, anxiety sensitivity and hopelessness personality dimensions were positively associated with coping motives for alcohol use in young adults and conformity motives in adolescents and inversely associated with enhancement motives (young adults) and social motives (adolescents; Woicik et al., 2009). Sensation seeking was exclusively related to positive

reinforcement motives, enhancement and social motives, in adolescent drinkers, and high school and college students (Woicik et al., 2009). Lastly, the hopelessness personality dimension was associated with the coping motive among adolescents and young adults (Woicik et al., 2009). However, this finding has not been replicated in Indigenous adults living in Canada. A personality-motivation model of alcohol misuse is noted among the majority culture (Woicik et al., 2009) and Canadian Aboriginal youth (Mushquash et al., 2014). The personality-motive relationships may provide further insight into underlying reasons regarding substance misuse for an adult Indigenous population, thereby providing information to tailor treatments, interventions, and prevention programs.

Substance Use Motives

According to Cox and Klinger's (1988) motivational theory, substance use behaviours are driven by psychologically distinct need states and dispositions, also known as substance use motives. This motivational theory led to the development of Cooper's (1994) four factor drinking motives model and the inception of the Drinking Motives Questionnaire – Revised (DMQ-R; Cooper et al., 1995). Cooper and colleagues (1994) speculated that individuals typically drink to regulate and influence emotional experiences, such as to cope with negative emotions or enhance positive ones. A motivational model of alcohol use assumes that drinking behaviour represents multiple psychologically distinct behaviours defined by the different underlying functions they serve (Cooper et al., 1995). For example, individuals who use alcohol to cope with psychological distress, and situational or environmental stressors have presumably learned to do so because they lack other adaptive coping methods (Cooper et al., 1995). Cooper and colleagues (1994) adapted Cox and Klingers' (1988) model to characterize drinking motives along two underlying dimensions. These dimensions are valence (positive or negative reinforcement) and source

(internal or external), which reflect the outcomes an individual might hope to achieve by drinking (Cooper et al., 1994). A four-factor model that crosses valence by source emerges whereby individuals may drink to obtain a favourable outcome (positive reinforcement) or to avoid a negative outcome (negative reinforcement), and by which they may drink to achieve an internal reward (e.g., change in affective state) or an external reward (i.e., change in a social environment; Cooper et al., 1994). Each of these four factors represents a distinct motive for drinking (enhancement, coping, social, and conformity; Cooper et al., 1994).

Individuals drink for different reasons (Mushquash et al., 2007). The incentives derived from using alcohol may be critical factors differentiating non-problematic drinking from risky drinking and the development of substance-use-related consequences (Bresin, 2021; Mushquash et al., 2007). Most of the motives (i.e., enhancement, coping, and conformity) assessed by the DMQ-R are positively associated with increased alcohol use and drinking problems (Bresin, 2021). Investigating alcohol-use motives has offered insight into drinking for self-medication and social integration in older adults from the general population (Gilson et al., 2013). For example, Gilson et al. (2013) examined the factor structure of the Drinking Motives Questionnaire – Revised in a sample of older adults (M_{age} = 71). They found that the highest endorsement was for celebratory and social motives followed by enhancement motives, suggesting participants considered drinking an enjoyable pastime. However, among this older adult sample, drinking for social reasons was a strong predictor of binge drinking and drinking problems compared to drinking to enhance positive feelings (Gilson et al., 2013). Examining drinking motives among adults who misuse substances can aid in the understanding of what is driving these individuals to use substances. As substance use and addiction are reported health concerns for many Indigenous communities, examining drinking motives among treatment-

seeking Indigenous adults in Canada may provide insight into what is contributes to substance misuse.

The motivational model identified four specific reasons or "motives" to explain why people drink alcohol: enhancement motives (i.e., drinking to enhance positive mood), coping motives (i.e., drinking to manage negative emotions), social motives (i.e., drinking to obtain positive social rewards) and conformity motives (i.e., drinking to avoid social rejection/disapproval). Following the initial construction of the DMQ-R, additional motives (i.e., cannabis use motives; Simons et al., 1998) and a distinction of two subtypes of the coping motives were developed: coping with depressive feelings and coping with anxiety feelings (Blackwell & Conrad, 2003; Grant et al., 2007). Using substances to cope with depressive or anxious feelings differentially predicts patterns of substance use, for example, coping with depressive feelings is related to consumption quantity while coping with anxious feelings is negatively associated with consumption quantity and frequency (Blackwell & Conrad, 2003; Grant et al., 2007; Morris et al., 2005). This prompted the development and validation of the 28-item Modified Drinking Motives Questionnaire – Revised (MDMQ-R; Blackwell & Conrad, 2003; Grant et al., 2007). The MDMQ-R has been validated in young adults and adults (Grant et al., 2007; Mezquita et al., 2011).

Consistently, these motives are identified in the majority culture (Kuntsche et al., 2008). The DMQ-R is a valid and reliable measure in a study of over 1,000 Black and White adolescents, and the four-factor structure was invariant across gender, age, and race (Cooper, 1994). Across demographic subgroups, internal consistency estimates were essentially equivalent. Additionally, a cross-national validation study in Switzerland, Canada, and the United States found the DMQ-R to be valid, reliable, and have good internal consistency

(coefficient alpha ≥.82 for each subscale) and invariant factor structure (Kuntsche et al., 2008; Skewes & Blume, 2015). The four-factor structure also has consistency in the United States (Cooper, 1994), Spain (Mezquita et al., 2011), Sweden (Comasco et al., 2010), Italy (Mazzardis et al., 2010), and the Netherlands (Crutzen & Kuntsche, 2013). However, a different factor structure emerged in one community sample of First Nation youth (M_{age} = 16.3) in Canada (Mushquash et al., 2008). Specifically, a three-factor structure emerged that combined social and enhancement motives (Mushquash et al., 2008). This factor represented a risky drinking motive rather than a protective motive, as it was defined primarily by loadings from the enhancement motives subscale (Mushquash et al., 2008).

Although the four motives predict drinking behaviour and alcohol outcomes, the different motives have unique relationships with drinking antecedents, patterns, contexts, and consequences (Carey & Correia, 1997; Cooper et al., 1995; Skewes & Blume, 2015). Enhancement motives are the strongest predictors of drinking behaviour, such as heavy drinking (Cooper et al., 1995) and are positively linked to violent behaviours in adolescents (Kuntsche & Kuntsche, 2009). Among a small community sample of older adults, there was a substantial endorsement for enhancement motives, suggesting that drinking alcohol was considered an enjoyable pastime (Gilson et al., 2013). Although enhancement motives did not predict drinking quantity in this study, it was a significant predictor of drinking frequency (Gilson et al., 2013). Since enhancement motivation was not predictive of drinking quantity for older adults (Gilson et al., 2013), it may not be indicative of heavier styles of drinking as reported in younger age groups (Cooper, 1994; Kuntsche et al., 2006).

Motives related to coping compared to other motives are consistently associated with more severe alcohol consequences even after controlling for alcohol consumption (Cooper et al.,

1995; Kuntsche, 2007) or high-risk drinking (Carey & Correia, 1997). There is evidence that the coping motive may play an influential role in the development of dependence (Carpenter & Hasin, 1998), especially when combined with a history of parental alcohol use problems (Bernstein et al., 2011; Chalder et al., 2006). The coping motive is positively associated with academic problems and risky sexual intercourse for adolescents (Kuntsche & Kuntsche, 2009). Clinical samples, when compared to general population samples, are more likely to endorse coping motives and these samples are more likely to engage in polysubstance use (i.e., multiple drugs on the same occasion or on recent but separate occasions; Crummy et al., 2021; Mahu et al., 2021). In a cross-sectional sample of older adults, endorsement of the coping motive was the strongest predictor of drinking quantity and directly and indirectly predicted drinking problems (Gilson et al., 2013).

Social motives are frequently endorsed by those who drink in social settings and are negatively associated with drinking alone (Cooper, 1994), which is a style of drinking that is associated with depression, suicidal ideation, alcohol problems, and symptoms of alcohol dependence (Gonzalez, 2012; Gonzalez & Skewes, 2013). However, in a sample of older adults, the social motive was a significant predictor of drinking problems but only when associated with alcohol use (Gilson et al., 2013). In this study, social motives were the strongest predictors of binge drinking and were the second strongest predictor of drinking quantity (Gilson et al., 2013).

Lastly, conformity motives directly predict more significant alcohol problems (Cooper, 1994). Interestingly, conformity motives are typically lower among adult samples and generally highly endorsed among adolescents. Among Canadian adolescents, drinking to get into a “party mood” was the most prevalent reason for drinking (Feldman et al., 1999), whereas adolescents in Hong Kong mainly drank alcohol to “have fun” (females) and to “feel the effects of alcohol”

(males; Lo & Globetti, 2000). This finding allows for speculation that drinking motives may change throughout the lifespan and perhaps differ based on sex and culture. Motives underlying drinking are qualitatively different and thus may require different treatment approaches and frameworks of understanding (Skewes & Blume, 2015).

Drinking motives may differ based on age. In older adults, drinking quantities tend to decline, yet frequency increases (Gilson et al., 2013). Research on alcohol consumption suggests that as people age, alcohol problems increase, and motives may be different from that of younger populations (Gilson et al., 2013). Gilson and colleagues (2013) examined the DMQ-R for use with older adults and found that two items from the enhancement factor (*to get high* and *because it is exciting*) and one item from the coping factor (to *relax*) were not endorsed. These enhancement motives (i.e., *to get high and because it is exciting*) were viewed by the participants as confusing and irrelevant, suggesting this item was not perceived in the same way as other enhancement motives and supporting the notion that adults may use substances for different reasons (Gilson et al., 2013). There is evidence that older adolescents score higher on enhancement and social motives than younger adolescents (Cooper, 1994; Kuntsche & Kuntsche, 2009; Kuntsche et al., 2005). Regarding sex differences, Kuntsche and Kuntsche (2009) found that adolescent male participants scored lower on coping motives and higher on social and conformity motives compared to adolescent female participants. Furthermore, a study with a sample of older adults found significant differences in the scores for enhancement, coping, and social motives across men and women, indicating gender differences among motives (Gilson et al., 2013).

Research on drinking motives utilizing the DMQ-R has been done with college/undergraduate students (Mackinnon et al., 2017; Skewes & Blume, 2015), adolescents

(Hudson et al., 2015; Mezquita et al., 2018; Mushquash et al., 2013; Mushquash et al., 2008), couples (Kehayes et al., 2019), older adults (Gilson et al., 2013), and cross-culturally (Mezquita et al., 2018; Mushquash et al., 2013; Mushquash et al., 2008), yet no studies to date have investigated these motives for Indigenous adults in Canada. Canadian First Nation youth may be motivated by a desire to enhance a positive affective experience (i.e., enhancement motive) rather than being motivated by social affiliation (i.e., social motive; Mushquash et al., 2014). This finding contrasts Cooper et al.'s (1994) finding that enhancement and coping motives had both direct and indirect effects, and social and conformity motives only had indirect effects on alcohol consequences (Skewes & Blume, 2015).

Studies examining adult drinking motives have fewer investigations than those with college/undergraduate students and adolescents. However, research among Indigenous populations has demonstrated higher binge drinking rates. For example, Walls and colleagues (2013) found that First Nation adults between the ages of 21 and 25 experienced the highest binge drinking compared to First Nation youth ranging from 12-25 years old. As well, clinical samples' motives for using substances differ from the general population yet remain understudied (Mahu et al., 2021). Most cross-cultural research has not included Indigenous adults. Since certain drinking motives predict drinking patterns and related problems such as binge drinking, alcohol dependence, depression, and suicidal ideation, these motives must be understood for clinical samples of Indigenous populations in Canada, who continue to struggle with substance use-related problems.

Risky Personality Traits, Motives, and Substance Use

According to the motivational model, decisions to use substances are based on historical factors, socio-cultural factors, past reinforcement from drinking, and personality characteristics

such as impulsivity, sensation seeking, non-conformity, extraversion, or self-derogation (Kuntsche et al., 2005). Personality traits (i.e., anxiety sensitivity, sensation seeking, impulsivity, and hopelessness) are uniquely related to alcohol-use motives in the majority culture (Stewart et al., 2001). Generally, youth higher in sensation seeking drink to enhance positive mood and well-being (enhancement motive; Stewart et al., 2001; Mushquash et al., 2014). Meanwhile, youth high in anxiety sensitivity or hopelessness often drink to manage negative emotions (coping) and fit in (conformity motive; Stewart et al., 2001; Mushquash et al., 2014). Lastly, adolescents and young adults who are higher in impulsivity tend to drink for a variety of reasons since this personality trait is linked to all drinking motives (i.e., enhancement, social, conformity, and coping motives; Stewart et al., 2001; Mushquash et al., 2014; Woicik et al., 2009). Woicik et al. (2009) results suggested that in a sample of adolescents and young adults, impulsivity may not be related to one, specific motive but is consistently related to frequency and severity of alcohol and illicit drug use. As personality traits and motives underlying maladaptive substance use are intrinsically related, it is critical to determine whether these personality-motivation relationships apply to Indigenous adults in Canada.

The general category “Indigenous” places limitations as this ethnicity encompasses a complex combination of various factors, including language, tribe, reserve, region, and ancestry, which may have distinct associations with motives and personality traits associated with maladaptive substance use. However, this study aims to understand the motives and traits underlying substance use for a specific population to target prevention, intervention, and treatments for this population. Understanding the motives and patterns underlying substance use by Canadian Indigenous populations is particularly important in Northwestern Ontario as the district services multiple reserves and regions. Personality traits and drinking motives

independently and in conjunction with each other influence the reasons why individuals drink and lead to different health outcomes (Stewart et al., 2001; Mushquash et al., 2014; Woicik et al., 2009).

Gaps in the Literature

Although there has been growing consensus about the magnitude of substance misuse and its consequences for Indigenous communities in Canada, there remain few attempts to understand the motives that lead to substance use for this population. Indeed, despite the growing body of research pertaining to the ongoing intergenerational effects of colonial acts and speculations regarding the psychological effects these events have had, limited research that assesses motives with respect to an Indigenous-specific context is done. Research regarding substance use among Indigenous populations in Canada is needed to serve community-specific needs best. Since Indigenous adults experience heightened substance-use-related consequences, it is essential to investigate whether the links between personality dimensions and substance-related behaviours exist for this population. As problematic alcohol-use rates are higher for youth and adult Indigenous populations, other substances, such as cannabis or crack cocaine (the two most frequently reported non-prescription drugs used among First Nation adults; FNIGC, 2018), are left uninvestigated. Additionally, mainstream assessment measures, such as the DMQ-R and the SURPS, are valid predictors for the general population and have been cross-culturally validated for some cultures yet have shown a different factor structure for First Nation youth in Canada. Assessment measures must capture cultural differences to create accurate interventions and programs to decrease the burden of substance use disparity. Lastly, much of the literature regarding alcohol-use motives did not investigate age or sex differences

within a sample. If there are specific sex-based and age-based motives, future research may be able to target this for intervention development.

Method

This community-based research study was established within Dilico Anishinabek Family Care (Dilico), a First Nations community-governed organization that provides culturally centred wrap-around supports through child welfare, health services, and mental health and addictions to support individual, family, and community needs across First Nations communities residing in the Robinson-Superior Treaty Area. The initiation of this project came from the Director and Assistant Director of Mental Health and Addictions at Dilico, who were looking to better support clients experiencing ongoing difficulties concerning childhood adversity attending their Adult Residential Treatment Centre (ARTC) for substance use difficulties.

The Adult Residential Treatment Centre (ARTC) is a National Native Alcohol and Drug Abuse Program (NNADAP; Indigenous Services Canada) with funding from both NNADAP and the Local Health Integration Network (LHIN). The ARTC is a 22-bed residential treatment facility located on Fort William First Nation near Thunder Bay, Ontario. The facility hosts 4-5 week of single and mixed-gender treatment cycles aimed at supporting adults experiencing difficulties with substance use through the integration of local cultural teachings and healing practices (e.g., Sweat Lodge, Elders, traditional practices) with Western biomedical approaches to addiction treatment (e.g., access to nursing/medication management, opioid agonist therapy, etc.). Each year, the residential treatment centre provides approximately nine 4-5-week cycles that admit 18-22 clients. The ARTC receives various referral streams through corrections, child welfare, community social or health service providers, or self-referrals. The ARTC accepts both Indigenous and non-Indigenous adults into treatment with the intent to support anyone who can

benefit from their culturally based treatment program. Dilico has a longstanding organizational research protocol used to carry out valuable research endeavours guided by community needs, maintaining that all projects follow Ownership, Control, Access, and Possession (OCAP™) principles. These principles include standards for collecting, protecting, using, and sharing First Nations data. They also include that First Nations control their data collection processes in their community (FNIGC, 2014). Dilico Anishinabek Family Care and the communities they serve own all knowledge, data, and information collected from this study. Novel research projects, like the present study, are first proposed to Dilico's Research Advisory, which is composed of individuals who demonstrate an understanding of the First Nation peoples serviced in the Robinson-Superior Treaty Area and Dilico's organizational mandates and policies. The Research Advisory deemed this project aligns with the values of the organization and the mandate from the governing First Nations.

Dilico's Board of Directors, including members from involved First Nations communities (e.g., band councillors, chiefs of community, community members), approved this project. These members regularly communicate with their community to represent broad community needs at Board of Director meetings. Once the Board of Directors approved this project, Dilico's Research Advisory Board decided upon all data collection methods. Data collection methods included administering various self-report questionnaires completed at two separate points during the treatment cycle. A detailed overview of data collection is provided in the Procedures section.

The Research Advisory Board met on a quarterly basis to allow for ongoing updates by the research team on study methodology, maintaining that Dilico retained control over research processes at every stage. The research team comprised a tenured faculty lead, two doctoral

students and three research assistants (present author included). Regular meetings with ARTC leadership and staff also provided relevant information and updates from the study, thus allowing ongoing organizational access to de-identified data and valuable information for the involved communities. This was an avenue to provide staff with data from the study they could use to provide more informed clinical care. Finally, in keeping with OCAP™ principles, Dilico controlled possession of the collected data including how it is evaluated and disseminated. In addition to community partner ethical approval, the present study received approval from Lakehead University's Research Ethics Board (protocol number: 1466763).

Research Questions

This study aimed to examine the structure of substance use motives in Indigenous treatment-seeking adults. The present study examined three research questions:

1. What is the factor structure of the Modified Drinking Motives Questionnaire – Revised (MDMQ-R) among treatment-seeking adults?
2. Do personality traits related to substance use predict alcohol and substance use motives?
3. Are there sex differences regarding alcohol and substance use motives among treatment-seeking adults?

Hypotheses

H1: The DMQ-R will have a three-factor substance use motive model for First Nation treatment-seeking adults.

H2: Personality traits identified by the SURPS will predict alcohol and substance use motives identified by the DMQ-R. Specifically, positive reinforcement motives (i.e., enhancement and social motives) will be associated with impulsivity and sensation-

seeking traits. In contrast, negative reinforcement motives (i.e., coping and conformity motives) will be associated with hopelessness and anxiety sensitivity traits.

H3: Alcohol and substance use motives will differ based on sex. Specifically, female participants will be higher on internalizing motives (i.e., coping motive), and male participants will be higher on externalizing motives (i.e., enhancement motive).

Participants

Participants in the study included 255 adults receiving treatment for substance use problems at Dilico Anishinabek Family Care's (Dilico) Adult Residential Treatment Centre (ARTC). Data collection occurred over 3.25 years (January 2019 – April 2022) across 28 treatment cycles. The mean age of the sample was 34.91 years (SD = 9.676; age range = 19 to 65 years). Table 1 outlines relevant participant demographic information. Participants had to be 18 years of age or older, be clients of ARTC at the time of participation, be fully capable of providing consent and participate in all study procedures, and read, speak, and understand English to meet the criteria for the study. Exclusion criteria included individual with a mental illness with psychotic symptoms or those with a significant diagnosed brain injury (aside from FASD) who could not participate in the study. Table 2 provides an overview of relevant substance use variables.

Table 1

Participant Demographics

Variable		Total (N=255; %)
Sex	Male	138 (54.1)
	Female	116 (45.5)
Gender identity	Male	136 (53.3)
	Female	114 (44.7)
	Transgender	1 (.4)
	Gender queer	1 (.4)
	Gender fluid	1 (.4)
Indigenous	Indigenous	193 (75.7)
	Non-Indigenous	58 (22.7)
	Did not disclose	4 (1.6)
Education	Some high school	92 (36.1)
	High school graduate or GED	80 (31.4)
	Some college	63 (24.7)
	University	11 (4.3)
	Middle school	5 (2.0)
	Elementary	2 (.8)
	Professional degree	1 (.4)
Marital status	Single	132 (51.8)
	Common law	45 (17.6)
	Separated	27 (10.6)
	Serious relationship	22 (8.6)
	Married	12 (4.7)
	Widowed	10 (3.9)
	Divorced	7 (2.7)
Annual income	< $10 000	100 (39.2)
	$10 001 to $19 999	67 (26.3)
	$20 000 to $29 999	30 (11.8)
	$30 000 to $39 999	14 (5.5)
	$40 000 to $ 60 000	13 (5.1)
	> $60 000	13 (5.1)
Employment status	Unemployed	42 (16.5)
	Full time	37 (14.5)
	Retired	23 (9.0)
	Sick leave	14 (5.5)
	Home/parenting	14 (5.5)
	Part time	13 (5.1)
	Student	10 (3.9)
	Disability (ODSP, OW)	2 (.8)

Table 2

Participant Substance Use

Variable		Total (N=255; %)
Primary substance used	Alcohol	115 (45.1)
	Crack cocaine	60 (23.5)
	Amphetamines	20 (7.8)
	Opioids	19 (7.5)
	Cocaine	16 (6.3)
	Cannabis	5 (2.0)
	Benzodiazepines	1 (.4)
Drinks per day (prior to treatment)	1 – 5 drinks	47 (18.4)
	6 – 10 drinks	49 (19.2)
	11 – 15 drinks	23 (9.1)
	16 – 20 drinks	15 (5.9)
	> 20 drinks	19 (7.6)
Binge drinking episodes[a] (past 30 days)	1 – 5 days	55 (21.5)
	6 – 10 days	22 (8.7)
	11 – 15 days	3 (1.2)
	16 – 20 days	13 (5.1)
	21 – 25 days	1 (.4)
	26 – 31 days	16 (6.3)
Previous treatment attendance		136 (53.3)

[a] Binge drinking was defined as consuming 5 or more drinks on one occasion.

Procedure

Recruitment

The research team (two doctoral and two master's students) conducted a group session at the Adult Residential Treatment Centre (ARTC) during the first 2-7 days of each cycle. Potential participants were provided with an explanation of the study (see Appendix E for verbal script) and an informational letter (see Appendix F) and assured that their decision to take part or not to take part in the study, or to drop out of the study later, would not affect their access to services or the care provided by the staff at ARTC or Dilico. Participants were informed that their data would be anonymous and confidential. It was also explained that participation would involve

access to their ARTC intake form to collect demographic information. Further, participants were explained that data collection would occur at two time points and that the second time point would involve more sensitive questions to be completed with the support of their counsellor and/or the clinical coordinator. If they indicated they would like to participate, they were then given a consent form (see Appendix G) to sign.

Data Collection

Data collection occurred within the first 2-7 days of the treatment cycle, immediately after participants had provided informed consent. Participants individually completed the following self-report measures at this phase: Adult Residential Treatment Centre (ARTC) Intake Measure (Appendix A), demographic questions from the Health History Questionnaire (HHQ; Appendix B), the Drinking Motives Questionnaire - Revised (DMQ-R; Appendix C) and the Substance Use Risk Profile Scale (SURPS; Appendix D). Participants had the option to withdraw from the study at any point as well as request that their data be removed at any time. The DMQ-R and SURPS data were collected and provided back to the clients as a graphic representation of individualized substance use motives and personality traits that relate to substance use to serve as psychoeducation. This was requested by the community organization as a way for our research team to be able to give data back to the clients for participating in the study. All physical data, including signed consent forms and paper participant de-identified measures, were stored in a restricted, secure area within Dilico and will remain there for five years, consistent with OCAP™ principles, Lakehead University's Research Ethics Board, and in accordance with the Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (TCPS 2; Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, and Social Sciences and Humanities Research Council of Canada, 2014).

Impact of COVID-19 Pandemic

Due to the development of the COVID-19 pandemic, data collection was halted in March 2020 as the Adult Resiential Treatment Centre (ARTC) suspended admissions and clients residing at the centre were asked to leave the treatment centre. The residential treatment program did not resume until June 2020, with substantially fewer clients (7-10 clients per cycle versus 18-22) to ensure provincial mandates and safe distancing could be maintained. Moreover, in November and December 2020, Lakehead University suspended in-person research with human participants due to the pandemic, which ultimately impacted data collection. Unfortunately, these factors impacted the anticipated sample size for this study. However, Dilico maintained the value in resuming data collection as soon as possible as it was safe to do so, and as a result comprehensive organizational health and safety protocols were modified to support data collection methods. In January 2021, the University Research Ethics Board granted special permission to re-commence research at Dilico's discretion. Ultimately, a sample size of 255 participants allowed for the analyses and provided a foundation for future research examining substance use motives and personality traits related to substance misuse within this population. Moreover, it was sufficient to provide valuable feedback to the community partner, who used the findings to inform treatment considerations.

Measures

Adult Residential Treatment Centre (ARTC) Intake Measure (Appendix A). The ARTC intake measure is a clinical tool used by the treatment centre to assess substances used, age of first substance use, age of regular substance use, previous treatment attendance, days sober previous post-treatment, and other clinically relevant information of clients at the time of intake into residential treatment.

Family Health History Questionnaire (HHQ; Appendix B). This study only utilized portions of the HHQ as this study is a part of a more extensive study conducted at ARTC. Demographic items, such as age, sex, gender, and socioeconomic status, and items related to substance use and mental health (e.g., previous diagnoses of mental disorders) were examined for this study.

Modified Drinking Motives Questionnaire – Revised (MDMQ-R; See Appendix C). The Drinking Motives Questionnaire-Revised (DMQ-R; Cooper, 1994) is a 20-item self-report measure of the relative frequency of drinking for four distinct motive dimensions (enhancement, social, conformity, and coping motives). The DMQ-R was modified (MDMQ-R) by Blackwell and Conrad (2003) to include 28 items. This was done to account for a five-factor model of drinking motives, where coping motives are separated into two scales: drinking to cope with depressive feelings and drinking to cope with anxious feelings. The MDMQ-R was initially validated in a sample of Canadian undergraduate student drinkers (Grant et al., 2007) and then in Spanish adults (Mezquita et al., 2011).

The DMQ-R is reliable and valid in both majority culture cross-culturally among Canadian Aboriginal (Cooper, 1994; Grant et al., 2007; Mushquash et al., 2008; Stewart et al., 2011), Canadian (Kuntsche et al., 2008; Mackinnon et al., 2017), Swiss (Kuntsche et al., 2008; Mackinnon et al., 2017), Swedish (Nehlin & Öster, 2019), Brazilian (Hauck-Filho et al., 2012; Mackinnon et al., 2011), American (Kuntsche et al., 2008; Mackinnon et al., 2017), Spanish (Mackinnon et al., 2017; Mezquita et al., 2018), Portuguese, Mexican, Hungarian, Irish, British, and Dutch (Mackinnon et al., 2017) youth. The DMQ-R has been validated in both clinical and general populations (Mezquita et al., 2011), older adults (Gilson et al., 2013), undergraduate students (Grant et al., 2007; Mackinnon et al., 2017; Stewart et al., 1996). As well, the DMQ-R

has good predictive validity in adolescents and young adults for a variety of alcohol-related outcomes (e.g., drinking frequency and quantity; Comeau et al., 2001; Cooper, 1994; Kuntsche et al., 2006). Cronbach's alphas of the enhancement, conformity, coping, and social motives scales were .90, .90, .89, and .86, respectively (Hudson et al., 2015).

The Modified DMQ-R (MDMQ-R; Blackwell & Conrad, 2003; Cooper, 1994; Grant et al., 2007) has been further revised to also assess motives for using all substances. Previous research has also adapted the wording in the DMQ-R for a variety of substances such as cannabis (Simons et al., 1998), tobacco, cocaine, and polysubstance use (Cooper, 1994; Gavrilova et al., 2021). To revise the Modified DMQ-R, the paragraph that introduces the measure was slightly modified to include the text in italics: Below is a list of reasons people sometimes give for drinking *alcohol or using drugs*. Thinking of all the times you drink alcohol *or use drugs*, how often would you say that you drink*/use* for each of the following reasons? Respondents rate their frequency of drinking or using substances of each indicated reason on a 5-point Likert scale (1= "Almost Never/Never" to 5= "Almost Always/Always"). An example item of enhancement motives is "*Because I like the feeling*". An example item of social motives is "*As a way to celebrate*". An example item of conformity motives is "*To be liked*". An example item of coping with depressive symptoms is "*To cheer me up when I'm in a bad mood*". An example item of coping with anxiety symptoms is "*To relax*".

Substance Use Risk Profile Scale (SURPS; See Appendix D). The SURPS is a 23-item self-report measure of four personality traits associated with increased risk for substance use, including anxiety sensitivity (AS), sensation seeking (SS), impulsivity (IMP), and hopelessness (H; Woicik et al., 2009). The 23 items consist of 5 items for AS, 6 for SS, 5 for IMP, and 7 for H. Each item is scored on a 4-point Likert scale with anchors of 1 (Strongly Disagree) and 4

(Strongly Agree). An example of an AS item is *"It's frightening to feel dizzy or faint".* An example of an SS item is "*I would like to skydive"*. An example of an IMP item is "*I often don't think things through before I speak"*. Lastly, an example of an H item is "*I am happy".*

The SURPS is suitable for self-administration by adolescents (Ali et al., 2016; Castellanos-Ryan et al., 2014; Castonguay-Jolin et al., 2013; Chandrika Ismail et al., 2009; Jurk et al., 2015; Krank et al., 2011; Malmberg et al., 2010; Memetovic et al., 2014; Newton et al., 2016; Robles-Garcia et al., 2014; Siu, 2010; Woicik et al., 2009), undergraduate and graduate college students (Omiya et al., 2015), and adults (Canfield et al., 2015; Hopley & Brunelle, 2016; Saliba et al., 2014; Schlauch et al., 2015; Woicik et al., 2009). The SURPS is valid and reliable in both majority culture and cross-culturally among Canadian Indigenous (Mushquash et al., 2014; Stewart et al., 2011; Woicik et al., 2009), Sri Lanken (Chandrika Ismail et al., 2009), Irish, German, French (Jurk et al., 2015), Chinese (Wang et al., 2022), Japanese (Omiya et al., 2015), and Australian (Newton et al., 2016) adolescents, Korean and Australian adults (Saliba et al., 2014), and Bulgarian substance-dependent individuals (Long et al., 2018)). Additionally, the SURPS has a stable four-factor structure (Castonguay-John et al., 2013; Chandrika Ismail et al., 2009; Robles-Garcia et al., 2014; Woicik et al., 2009) and the four scales show good internal consistency (a =.70 - .90), test-retest reliability (r = .51 - .80), and concurrent (Woicik et al., 2009), convergent (Castellanos-Ryan et al., 2013; Castonguay-John et al., 2013; Krank et al., 2010; Malmberg et al., 2010; Woicik et al., 2009) and predictive validity concerning alcohol misuse and drug use 12 to 18 months later (Castellanos-Ryan et al., 2013; Hudson et al., 2015; Krank et al., 2010). The SURPS has good incremental validity over the NEO-Five Factor Inventory (NEO-FFI) personality scales in predicting drinking problems (Woicik et al., 2009),

reflecting a strong relationship between the SURPS-specific traits and substance use (Castellanos-Ryan et al., 2013).

Data Analysis

All analyses utilized the computer software program Statistical Package for the Social Sciences - Version 25 (SPSS-25). To explore the factor structure of the DMQ-R to satisfy H1 (the DMQ-R will have a three-factor drinking motive model for adults), a principal components analysis (PCA) was conducted. Sample size recommendations indicated studies should have approximately five to 10 participants per item to detect an effect and for model structure (Comrey & Lee, 1992; Hatcher, 1994). Therefore, the sample size for this study should be in the range of 140 (5 participants per variable) to 280 (10 participants per variable) participants. Generally, a sample size of 150 or more is suggested for highly correlated data (Comrey & Lee, 1992; Hatcher, 1994). Sample size recommendations for PCA range from 100 to 500 (Comrey & Lee, 1992; Hatcher, 1994; Hutcheson & Sofroniou, 1999; MacCallum et al., 1999). To attain the recommended sample size, data from previous cycles that have been collected as part of a larger study were utilized in conjunction with new data that was collected beginning in January 2021.

The remainder of the hypotheses (H2 and H3) were analyzed using linear regression. Based on previous findings from Mushquash et al. (2014) and an a-priori power analysis, a minimum sample size of 39 is required for both hypotheses (Soper, 2021). The second hypothesis (specific personality traits identified by the SURPS will predict specific alcohol and substance motives identified by the DMQ-R) were examined through four linear regression analyses to identify whether impulsivity predicts enhancement. Mushquash et al. (2014) demonstrated a significant small correlation of .21, $p < .01$, $R^2 = .13$ between the enhancement motive and the impulsivity trait. The third hypothesis (sex will predict specific alcohol and

substance motives identified by the DMQ-R) was examined using linear regression. Demographic information was analysed through descriptive statistics.

Pre-Analysis Issues

Missing values

Within this study, missing values largely involved errors in completing the Likert-type scale questionnaires, where a single item contributing to an overall subscale was skipped. Additionally, full sections of measures (i.e., Drinking Motives Questionnaire – Revised (DMQ-R) and Substance Risk Profile Scale (SURPS)) were not completed due to participant attrition and/or participants not completing specific measures. To assess the randomness of the missing values, two methods were used. Results of Little's MCAR test showed a lack of significance ($p = .307 - .467$), indicating that no pattern is observed, thus the data is missing at random (Little, 1988). The missing data pattern analysis function of SPSS also used and the potential patterns among the missing values of data were examined. The patterns were found to be insignificant, and the missing data were deemed to be random. As some participants did not complete measures within the battery due to different variables (i.e., does not use substances), the data was deemed missing at random, instead of missing completely at random. This randomness of the missing values establishes that there is a low likelihood of bias in terms of which data are missing. According to Tabachnick and Fidell (2014) due to this randomness, missing cases can be deleted from the dataset if a small amount have missing data and they seem to be a random subsample of the whole sample. Therefore, participants who did not complete full measures required for analyses were excluded from the relevant analyses (this included the removal of 10 cases). Missing values analysis and patterns of missing values indicated that item-level missing data could be deleted listwise.

Outliers

To address potential univariate outliers, z-scores were calculated for each variable. Values less than -3.29 or greater than 3.29 were determined as outliers. Ultimately, no univariate outliers were found. Additionally, Cooks Distance was calculated to determine if any outliers were influential. Cooks Distance values did not reach the cut-off scores of 1 or 0.5 and therefore deemed no influential outliers. Meanwhile, to assess for multivariate outliers, Mahalanobis Distances were calculated, which takes the covariances of each variable's distributions into consideration in a multivariate analysis using linear regression. From there, the Mahalanobis Distances were compared to a chi-square distribution with same degrees of freedom. This determines multivariate outliers as any new probability cases that are less than 0.01, which is a very conservative probability estimate for outliers (Tabachnick & Fidell, 2014). Ultimately, no multivariate outliers were found.

Normality

To assess the normality of continuous variables, skewness and kurtosis were analyzed. Skewness may distort the mean and standard deviation, ultimately skewing bivariate statistics. While skewness involves the symmetry of the distribution, kurtosis represents the peakedness of the distribution. Non-normal kurtosis may create an underestimate of the variance in each variable. For skewness, each variable was assessed to determine skewness as greater than 0.80. No variables were determined to be skewed. Meanwhile, for kurtosis, output was examined to see if it is clustering close to zero. No significant kurtosis was found across variables. Additionally, homoscedasticity and heteroscedasticity were examined through regression analyses to test for normality. Residuals were distributed normally and identically. Graphs were created to compare normality from standardized and unstandardized residuals. Shapiro-Wilks

results and visual examination of graphs indicated that residuals were normally and identically distributed, suggesting that the variances were equal.

Linearity

Scatterplots were examined between all independent variables to identify linear relationships. Scatterplots identified no non-linearity patterns such as exponential or parabolic patterns and therefore, the dataset met linearity assumptions.

Multicollinearity

To assess multicollinearity of the predictor variables, a variance inflation factor (VIF) was calculated for each variable. The VIF is the ratio of variance in a model with multiple predictors, divided by the variance of a model with one predictor alone (Tabachnick & Fidell, 2014). A calculator of the VIF provides a number for the severity of multicollinearity associated with each predictor by quantifying how much the variance of each predictor in the regressions is inflated. A VIF between 5 and 10 indicates high collinearity, while a more conservative approach suggests VIF values greater than 2.50 are of concern. All VIFs examined were lower than 2.50 suggesting no significant multicollinearity among multivariate predictors.

Results

Hypothesis Set 1: MDMQ-R Factor Structure

The first hypothesis involved examining the factor structure of the Modified Drinking Motives Questionnaire - Revised (MDMQ-R). As no prior work has been done with the MDMQ-R in an adult First Nation population, a principal components analysis (PCA) was conducted to explore the factor structure. As well, oblique rotation was used because of the previously observed intercorrelation of the factors on this measure in adolescents (Cooper, 1994; Mushquash et al., 2008) and young adults in the majority culture (Simons et al., 1998; Stewart et

al., 1996). In the present study, there were mild to moderate correlations (three-factor solution: .224 - .469; four-factor solution: .283 - .579) between the factors. Internal consistency of the MDMQ-R was examined through Cronbach alphas, and the measure was determined to be in the above acceptable range (α = .945)

Kaiser's eigenvalue > 1 criterion for factor extraction supported a four-factor solution (four eigenvalues greater than 1.00; Table 3). When a four-factor solution was examined, 64.72% of the variance was accounted for, but the structure matrix was not interpretable within the DMQ-R framework. A factor made completely of coping motives loaded on the same factor (1; 41.08% variance explained). This suggests that items on both subscales of the coping motive correlate with each other, forming one factor instead of two. As well, as coping accounted for the most variance, participants endorsed this variable the most. The remaining three factors were composed of items from other motives, with one factor made of social, enhancement, and coping motives (2; 10.96% variance explained), one factor made of entirely conformity motives (3; 8.11% variance explained), and the last factor made of mostly enhancement motives (4; 4.57% variance explained). Based on the overall distribution and cross-over of motives across factors, the four-factor solution did not reflect the DMQ-R and showed poor simple structure (Thurstone, 1947). The simple structure criteria is a pattern of results whereby each variable loads highly onto only one factor (Thurstone, 1947). A strict criterion of loadings > .60 was considered salient to ensure the solution's reliability.

Table 3

Eigenvalues for Obliquely-rotated Factor Analysis

	Eigenvalues		
Component	Total	% of Variance	Cumulative %
1	11.502	41.080	41.080
2	3.068	10.957	52.037
3	2.271	8.112	60.149
4	1.279	4.567	64.715
5	.998	3.563	68.278

When a three-factor structure was forced, utilizing Oblimin with Kaiser Normalization rotation (Tabachnick & Fiddell, 2007), slightly less variance was accounted for (60.15%), but the factor solution better reflected the DMQ-R. As with the four-factor solution, Factor 1 accounted for the most variance and was composed of coping motive items. Again, items on both coping subscales correlated with each other, creating one factor instead of two. Since coping accounted for most of the variance, it can be assumed that participants endorsed the coping motive most. Factor 2 was composed of items from both social and enhancement motives. Factor 3 was made up of items from the conformity motives (Table 4). Thus, the three-factor solution was theoretically interpretable, reflecting the theorized model most (Cooper, 1994), and showed good simple structure (Thurstone, 1947).

When a five-factor solution was forced (as per Mezquita et al.'s (2011) findings), the last factor did not reach the eigenvalue criterion of > 1. Therefore, a five-factor solution was not supported. The Modified DMQ-R (MDMQ-R) posits a five-factor model where coping motives are separated based on depressive and anxiety symptoms (Blackwell & Conrad, 2003; Grant et al., 2007). In this sample, all coping motives appear to load onto a singular factor. When a two-factor solution was forced (as per Mushquash et al.'s (2008) findings), the first factor contained items mostly from coping motives and the second factor comprised social, enhancement, and

conformity motives. The two-factor structure was theoretically non-interpretable and showed poor simple structure. A single-factor solution was not examined as it would reflect a general motivation to drink or a proxy measure of drinking frequency (Mushquash et al., 2008).

Table 4

Structure Matrix for Obliquely-rotated, Four-factor Solution (N = 255)

MDMQ-R Item		Factor 1	Factor 2	Factor 3	Factor 4
	Coping Motives Subscale				
2.	To relax	.196	**.695**	-.132	.064
5.	To forget my worries	**.627**	.058	-.016	.243
8.	Because I feel more self-confident or sure of myself	.218	.466	.196	.149
11.	Because it helps me when I am feeling nervous	.520	.480	.014	-.003
14.	To cheer me up when I'm in a bad mood	.487	.206	.025	.301
16.	To numb my pain	**.814**	-.156	-.041	.158
17.	Because it helps me when I am feeling depressed	**.829**	-.097	-.055	.134
19.	To reduce my anxiety	**.757**	.127	-.033	-.039
20.	To stop me from dwelling on things	**.804**	.072	.004	.033
21.	To turn off the negative thoughts about myself	**.882**	.068	.036	-.126
22.	To help me feel more positive about things in my life	.677	.534	.426	.386
23.	To stop me from feeling so hopeless about the future	**.712**	.095	.141	-.060
27.	To forget painful memories	**.754**	-.141	.120	.020
	Social Motives Subscale				
1.	As a way to celebrate	.215	**.695**	-.132	.064
4.	Because it is what most of my friends do when we get together	-.033	**.742**	.135	.066
7.	To be social	.001	**.667**	.191	.077
10.	Because it is customary on special occasions	.057	**.795**	.058	-.137
13.	Because it makes a social gathering more enjoyable	-.065	**.725**	.066	.224
	Conformity Motives Subscale				
15.	To be liked	.347	.515	**.799**	.323
18.	So that others won't kid me about not using	.078	.061	**.700**	-.076
24.	Because my friends pressure me to use	.061	-.098	**.836**	-.030
25.	To fit in with a group I like	-.023	-.018	**.898**	.037
28.	So I won't feel left out	-.050	-.029	**.880**	.069
	Enhancement Motives Subscale				
3.	Because I like the feeling	.071	.057	-.037	**.813**
6.	Because it is exciting	-.052	.276	.151	**.629**
9.	To get a high	.169	-.216	.063	**.682**
12.	Because it's fun	-.206	.395	.112	.582
26.	Because it makes me feel good	.580	.528	.252	**.780**

Extraction Method: Principal Components Analysis
Rotation Method: Oblimin with Kaiser Normalization
Bolded loading > .60

Table 5

Structure Matrix for Obliquely-rotated, Three-factor Solution (N = 255)

MDMQ-R Item		Factor 1	Factor 2	Factor 3
Coping Motives Subscale				
2.	To relax	.485	**.672**	.140
5.	To forget my worries	**.762**	.499	.181
8.	Because I feel more self-confident or sure of myself	.501	**.704**	.441
11.	Because it helps me when I am feeling nervous	**.674**	**.661**	.336
14.	To cheer me up when I'm in a bad mood	**.712**	**.632**	.247
16.	To numb my pain	**.827**	.313	.114
17.	Because it helps me when I am feeling depressed	**.844**	.349	.127
19.	To reduce my anxiety	**.772**	.411	.238
20.	To stop me from dwelling on things	**.840**	.439	.240
21.	To turn off the negative thoughts about myself	**.843**	.362	.280
22.	To help me feel more positive about things in my life	**.652**	.486	.403
23.	To stop me from feeling so hopeless about the future	**.748**	.404	.354
27.	To forget painful memories	**.749**	.261	.256
Social Motives Subscale				
1.	As a way to celebrate	.432	**.715**	.204
4.	Because it is what most of my friends do when we get together	282	**.759**	.422
7.	To be social	.313	**.736**	.457
10.	Because it is customary on special occasions	.261	**.662**	.379
13.	Because it makes a social gathering more enjoyable	.304	**.820**	.347
Conformity Motives Subscale				
15.	To be liked	.312	.457	**.781**
18.	So that others won't kid me about not using	.264	.310	**.728**
24.	Because my friends pressure me to use	.261	.249	**.798**
25.	To fit in with a group I like	.256	.360	**.873**
28.	So I won't feel left out	.237	.355	**.845**
Enhancement Motives Subscale				
3.	Because I like the feeling	.496	**.678**	.050
6.	Because it is exciting	.405	**.759**	.422
9.	To get a high	.467	.416	.058
12.	Because it's fun	.256	**.750**	.246
26.	Because it makes me feel good	**.610**	**.668**	.142

Extraction Method: Principal Components Analysis
Rotation Method: Oblimin with Kaiser Normalization
Bolded loading > .60

Hypothesis Set 2: Associations Between SURPS Subscales and MDMQ-R Subscales

Four linear regression analyses assessed whether participants' SURPS subscale scores predicted outcomes in substance use motives on each MDMQ-R subscale. The independent variables for the linear regressions were the SURPS subscales, and each MDMQ-R subscale was the dependent variable for each respective analysis (Tables 6-9). Overall, higher scores on the SURPS Hopelessness subscale predicted higher scores on the MDMQ-R Conformity subscale. Higher scores on the SURPS Anxiety Sensitivity subscale predicted higher scores on both MDMQ-R Enhancement and Coping subscales. Higher endorsement on the SURPS Impulsivity subscale predicted higher scores on the MDMQ-R Coping, Social, and Conformity subscales. Lastly, higher scores on the SURPS Sensation Seeking subscale predicted higher scores on the MDMQ-R Enhancement, Social, and Conformity subscales.

Table 6

Linear regressions of SURPS Subscales Predictors and DMQ-R Enhancement Subscale Outcome

Predictor variable	Outcome variable	*B*	SE *B*	β	*t*	*p*-value
SURPS Hopelessness	MDMQ-R Enhancement	.098	.087	.079	1.126	.262
SURPS Anxiety Sensitivity	MDMQ-R Enhancement	.227	.107	.154	2.116	**.036***
SURPS Impulsivity	MDMQ-R Enhancement	.167	.120	.106	1.390	.166
SURPS Sensation Seeking	MDMQ-R Enhancement	.214	.090	.175	2.370	**.019***
R^2	R^2	.103				
	R^2 *Adjusted*	.086				

* $p < .05$

Table 7

Linear regressions of SURPS Subscales Predictors and DMQ-R Coping Subscale Outcome

Predictor variable	Outcome variable	*B*	SE *B*	β	*t*	*p*-value
SURPS Hopelessness	MDMQ-R Coping	.104	.084	.085	1.236	.218
SURPS Anxiety Sensitivity	MDMQ-R Coping	.264	.105	.179	2.521	**.012***
SURPS Impulsivity	MDMQ-R Coping	.296	.117	.189	2.534	**.012***
SURPS Sensation Seeking	MDMQ-R Coping	.155	.088	.127	1.754	.081
R^2	R^2	.142				
	R^2 *Adjusted*	.126				

* $p < .05$

Table 8

Linear regressions of SURPS Subscales Predictors and DMQ-R Social Subscale Outcome

Predictor variable	Outcome variable	*B*	SE *B*	β	*t*	*p*-value
SURPS Hopelessness	MDMQ-R Social	.114	.091	.087	1.261	.209
SURPS Anxiety Sensitivity	MDMQ-R Social	.204	.112	.129	1.811	.072
SURPS Impulsivity	MDMQ-R Social	.335	.126	.200	2.670	**.008***
SURPS Sensation Seeking	MDMQ-R Social	.207	.095	.159	2.191	**.030***
R^2	R^2	.137				
	R^2 *Adjusted*	.120				

* $p < .05$

Table 9

Linear regressions of SURPS Subscales Predictors anId DMQ-R Conformity Subscale Outcome

Predictor variable	Outcome variable	*B*	SE *B*	β	*t*	*p*-value
SURPS Hopelessness	MDMQ-R Conformity	.219	.088	.171	2.494	**.013***
SURPS Anxiety Sensitivity	MDMQ-R Conformity	.267	.109	.173	2.453	.052
SURPS Impulsivity	MDMQ-R Conformity	.250	.122	.153	2.054	**.041***
SURPS Sensation Seeking	MDMQ-R Conformity	.204	.092	.160	2.224	**.023***
R^2	R^2	.154				
	R^2 *Adjusted*	.138				

* $p < .05$

Hypothesis Set 3: Associations Between DMQ-R Subscales and Sex

Linear regressions were used to assess whether participant sex predicted higher scores on each MDMQ-R subscale. The independent variable for the linear regression was sex, and each MDMQ-R subscale served as the dependent variable (Table 10). Ultimately, sex did not predict higher scores on any MDMQ-R subscales.

Table 10.

Linear Regressions with Sex as Predictor and DMQ-R Subscales as Outcome

Predictor variable	Outcome variable	*B*	SE *B*	β	R^2	*t*	*p*-value
Sex	MDMQ-R Enhancement	-.716	.603	-.075	.006	1.187	.236
Sex	MDMQ-R Coping	-.309	.598	-.033	.001	-.517	.605
Sex	MDMQ-R Social	1.014	.626	.102	.000	1.620	.106
Sex	MDMQ-R Conformity	.105	.622	.011	.010	1.69	.866

* $p < .05$

Discussion

This thesis aimed to examine the relationship between substance use motives and personality traits related to substance misuse in a First Nation adult treatment-seeking population. Potential mechanisms or pathways that lead to substance abuse may be identified by

considering these relationships, providing clinical utility to the partnering community organization. To date, there is a lack of research examining the utility of the MDMQ-R for Indigenous adults experiencing chronic substance use problems. Indigenous peoples in Canada experience high rates of chronic substance use which may in part be due to the intergenerational transmission of adversities resulting from colonization, including the residential school system, mass removal of Indigenous children into the child welfare system, loss of culture, and other ongoing forms of discrimination, marginalization, and poor living conditions inflicted on Indigenous peoples (Bombay et al., 2011). Additionally, Indigenous populations experience higher rates of substance use compared to the general Canadian population (FNGIC, 2018). As such, examining substance use motives and personality traits that relate to substance misuse is a foundational study aimed at identifying adequate measurement tools for a population of Indigenous peoples who attend a community residential treatment centre.

The hypothesized three-factor MDMQ-R model emerged within the present study, which was expected given Mushquash et al.'s (2008) findings in an Indigenous adolescent sample. A three-factor structure solution, as opposed to the original four- or modified five-factor structure solution, may better represent the First Nation adults who attend this residential substance use treatment centre. The factor that accounted for the most variance was the coping motive, which consisted of both coping subscales. As this is a treatment-seeking sample, with the highest concentration of adults (45.1%) attending treatment for alcohol misuse, motivations are expected to differ from the general population. Understandably, this population is predominantly focused on coping with psychological distress as a consequence of intergenerational trauma and heightened rates of adverse childhood experiences (ACEs; average 5 ACEs (Lund, 2021)), as opposed to using substances for social reasons.

The factor that accounted for the second most variance was a factor comprised of combined social and enhancement motives. Like Indigenous adolescents (Mushquash et al., 2008), it may be that within this group, there is an association of drinking in social contexts with enhancement motives leading to confounding of social and enhancement motives. Mushquash and colleagues (2008) addressed this finding as partially a result of cultural heterogeneity whereby Indigenous cultures have different languages, resulting in gaps in communication and understanding of some items, such as those on the social motive subscale. As well, conversations with Mi'Kmaq youth highlighted that consuming alcohol for social reasons was not related to peer affiliation or being social but was more demonstrative of enhancement-motivated drinking (Mushquash et al., 2008). For example, youth described the social drinking context as high risk and resulting in heavy intoxication, instead of nonproblematic and light drinking that is commonly observed with those who endorse the social motive in majority culture (Mushquash et al., 2008). This qualitative evidence suggests that social motives are more accurately captured by enhancement motives in Indigenous youth (Mushquash et al., 2008). The present study did not collect anecdotal evidence and therefore, it is unclear whether the findings were related strictly to problems with inappropriate wording and language or if the three-factor structure solution was related to a structural difference in substance use motives in this sample.

A study by Skewes and Blume (2015) with Alaska Native students identified important considerations in understanding the differences between Indigenous and non-Indigenous students' alcohol consequences and drinking motives. Indigenous students may misperceive social drinking norms as their non-Indigenous counterparts often overestimate the quantity of alcohol typically consumed by their peers. This speculation may explain the unique endorsement of the conformity and social motives for Indigenous populations. Additionally, stereotypes and

prejudice may play a role in the endorsement of the coping motive among Indigenous populations. Gonzalez et al. (2021) suggested that belief in a myth that Indigenous peoples have a biological vulnerability to alcohol problems (the *"firewater myth"*; in contrast to substance use problems stemming from historical trauma) was positively associated with depressive symptoms, which predicted greater drinking to cope. Therefore, stereotypes may contribute to unique motivations to use substances. Unfortunately, very little research on substance use motives has been done among Indigenous samples, making it difficult to provide potential explanations for the different factor structure.

To better understand the connection between personality traits related to substance misuse and substance use motives, linear regressions examined the predictive ability for each SURPS subscales on individual DMQ-R subscales. Ultimately, hypotheses were supported. High scores on the SURPS Hopelessness subscale predicted a greater likelihood of endorsing using substances for conformity motives. In general, Canadian adolescent samples who endorse high rates of hopelessness often use substances to fit in (i.e., conformity motive), which appears to be the case for this group of participants attending residential treatment. Interestingly, this finding was not true for Indigenous youth (Mushquash et al., 2014). This finding may indicate that adults at the residential treatment centre who endorse high ratings of hopelessness may use substances to avoid social rejection/censure. High scores on the SURPS Anxiety Sensitivity subscale predicted a greater likelihood of endorsing using substances for coping and enhancement motives. This finding may indicate that the First Nation adults with anxiety may use substances to cope with their anxiety symptoms. Further, individuals may attempt to internally regulate negative affective states, such as anxiety, leading to endorsement of the enhancement motive. In a sample of Indigenous adolescents, anxiety sensitivity predicted conformity but not coping

motives (Mushquash et al., 2014), which is inconsistent with the findings of this study. High scores on the SURPS Impulsivity subscale predicted a greater likelihood of endorsing using substances for conformity, social, and coping motives. Previous research found that impulsivity is related to all four drinking motives (Woicick et al., 2009). Individuals in this sample may experience an urgency to relieve negative affective states and therefore use substances to cope. The negative urgency or tendency to act rashly when experiencing negative emotions is related to binge drinking (Adan et al., 2017; Shin et al., 2012; Shin et al., 2015). This is inconsistent with previous findings among Indigenous adolescents, whereby impulsivity predicted enhancement motives (Mushquash et al., 2014). Lastly, high scores on the SURPS Sensation Seeking predicted a greater likelihood to endorse using substances for conformity, social, and enhancement motives. Those who engage in sensation-seeking generally crave adventure and excitement, prefer unforeseeable situations and friends, and willingly take risks simply for the experience of living them (Adan et al., 2017). Individuals who endorse higher rates of sensation seeking tend to be susceptible to boredom (Adan et al., 2017). Therefore, it is logical that participants with this personality trait would be motivated to use substances to enhance well-being and positive mood (e.g., enhancement motive). Researchers have also theorized that individuals high in sensation seeking are sensitive to positive reinforcement and the rewarding outcomes of substance use which relates to the enhancement and social motives for substance use (Sznitman & Engel-Yeger, 2017). The inconsistencies in the literature regarding substance use motives in Indigenous populations requires greater attention as this population faces the greatest disparities related to mental health and addiction, most likely because of colonization and oppression, despite their resilience and resistance (Marsh et al., 2015).

The predictive ability of participant sex was examined on drinking motives. Ultimately, no significant associations were found between sex and DMQ-R subscales. In previous research, sex significantly predicted conformity motives, with males demonstrating significantly higher conformity motives (Mushquash et al., 2014). These results are unlike those of Grant et al. (2007), who found higher social motives in Canadian undergraduate males than in undergraduate females, and Cooper et al. (1992), who found higher social, enhancement, and coping motives in men than in women in a general American population. Conversely, a study by Mezquita and colleagues (2011) found no significant differences across gender in any drinking motive subscales among adults from the general population. The lack of predicative ability of sex on substance use motives identified in this study may reflect the severity of one's substance use, as participants endorsed heightened ratings on motive subscales in which subscale means and standard deviations were consistently high. The limited variability on motives among this clinical sample may be implicated in the lack of differences observed between sexes with respect to substance use motives.

Shortcomings of the Present Study

While there are strengths to this study, there are limitations to consider. One of the main limitations of this study is related to the generalizability of the results to Indigenous populations in Canada. Despite being an Indigenous treatment program, 22.7% of the sample did not identify as Indigenous, and thus generalizability across Indigenous adults with substance use difficulties is cautioned. However, at the inception of the project, the community partner requested that findings be representative of the typical clients seen within the residential treatment program to make the findings directly applicable and helpful to informing their intervention program. Therefore, all participants (Indigenous and non-Indigenous) were included in all analyses.

Another limitation was that substance use motives and personality traits were based on retrospective and self-reported measures. This requires cautious interpretation due to potential bias in response (Rosenman et al., 2011).

Additionally, the DMQ-R has been mainly used for adolescents and young adults, while the Modified Drinking Motives Questionnaire – Revised (MDMQ-R) has only been validated in non-clinical normative samples, such as a sample of Canadian young adults (Grant et al., 2007) and Spanish adults (Mezquita et al., 2011). This study consisted primarily of an adult and older adult sample, with no participant being under 18 years of age. Following the proposal of this study, research regarding the utility of the MDMQ-R among clinical samples, who engage in both alcohol-only and polysubstance use, has been brought into question (Gavrilova et al., 2021). Gavrilova and colleagues (2021) conducted a confirmatory factor analysis (CFA) on the MDMQ-R with a psychiatric sample of young adults attending a partial hospitalization treatment program. Despite all items loaded on their respective latent factors with factor loadings ranging between good and excellent, results revealed that model fit for both a five-factor and four-factor structure were poor, meaning the factor structure of the MDMQ-R did not replicate (Gavrilova et al., 2021). These findings may be explained by participants using substances for more than one reason (e.g., to cope with both anxiety and depression) or for reasons that are not captured by this measure (e.g., boredom; Gavrilova et al., 2021). The findings from this study agree with research suggesting that individuals who engage in polysubstance use endorse different motives for using specific substances (Gavrilova et al., 2021; Villarose-Hurlocker et al., 2019). Although the findings of the present study have demonstrated acceptable internal consistency and good model fit for the three-factor solution among a sample of treatment-seeking adults, the results from Gavrilova et al. (2021) challenge the validity. Dedicated research is required to assess the

validity of this measure in clinical samples, whereby polysubstance use is common, more conclusively.

Lastly, a portion of the study was disrupted due to the corona virus disease (COVID-19) pandemic. As a protective measure against COVID-19, ARTC had to close during one treatment cycle as per government health mandates and participants were unable to complete data collection. Then, Lakehead University suspended in-person research with human participants due to the pandemic, which in turn impacted the number of participants in this study. Once the treatment centre was allowed to re-open and in-person research was allowed to resume, the number of clients allowed to attend the centre was reduced, which also impacted the sample size of this study.

Recent research by Rodriguez et al. (2020) highlighted the way in which the COVID-19 pandemic influenced individuals' motivations for substance use. They examined the associations between COVID-19-related psychological distress and drinking behaviours in American women and men (Rodriguez et al., 2020). Results demonstrated that psychological distress related to the COVID-19 pandemic was related to women's alcohol use indices, such as number of drinks consumed during the recent heaviest drinking occasion and number of drinks consumed during a typical evening (Rodriguez et al., 2020). It should be noted that while men display the usual pattern of drinking more than women at low levels of COVID-related psychological distress, as women face stressors (such as the pandemic), their drinking patterns "catch up" with that of the men (Rodriguez et al., 2020). Ultimately their results suggest that both women and men drink more often (in general and heavy drinking) in response to experiencing pandemic-related stress (Rodriguez et al., 2020). The results of the present study demonstrated a combined coping motive which accounted for most of the variance in the principal components analysis (PCA).

However, it is unclear whether coping endorsements were in part a result of increased stress derived from the pandemic or a result of being a clinical sample.

Despite these limitations, this study provided a comprehensive foundation for the relationship between substance use motives and personality traits related to substance use within an Indigenous treatment program which can be used to inform future research pursuits and clinical intervention efforts.

Implications and Future Directions

The present study offers direct implications to the organization in partnership and to the greater body of literature for Indigenous populations in Canada. First, clients received information regarding motives for substance use and personality traits that heighten the risk for substance misuse during a psychoeducational session. The information was presented in an easy-to-read format, and graduate students working on this project were available if the clients or counsellors had questions about the information. Clients could use the information regarding their substance use motives and personality traits as a tool for relapse prevention. Two studies (Banes et al., 2014; Blevins et al., 2016) have demonstrated the utility of responding to substance-related motives as a potential treatment component that effects substance use habits. Banes and colleagues (2014) found that identifying motives as a treatment component led to a reduction in all motives, with exception of the conformity motive, at the 3-month follow-up. Specifically, reductions in the coping motive were associated with better treatment outcome and led to outcomes such as reductions in using substances to cope, decreases in cannabis use frequency, dependence symptoms and problems (Banes et al., 2014). Blevins and colleagues (2016) found that significant reductions in motives for using cannabis significantly predicted change in problematic outcomes. Therefore, targeting motives in interventions may improve

treatment outcomes (Banes et al., 2014; Blevins et al., 2016). Secondly, as the study was developed in collaboration with the community organization, the organization will utilize the findings for future cycles and be better equipped to treat substance use problems for the specific population they treat.

On a much larger scale, research among Indigenous people in Canada is limited; therefore, this study adds to the literature available for Indigenous populations residing in Canada. The current study identifies which personality traits predict substance use motives for a specific population attending a residential treatment centre which may assist in better serving this unique population in one of the most significant health disparities they are currently facing. Additionally, this is a replication of Mushquash et al. (2014) study where results indicated that First Nation youth tend to endorse a 3-factor structure when administered the DMQ-R. Similar findings were derived from this study whereby First Nation adults seeking substance use treatment endorsed a three-factor structure solution. Motives may dictate what type of treatment will be most effective (Gierski et al., 2022), especially for Indigenous populations (Skewes & Blume, 2015). For example, individuals who endorsed coping motives may require more intensive treatment as this motive has been associated with heightened drinking problems. As well, programs aimed at preventing or treating substance use in individuals with comorbid mental health conditions, or those who endorse coping with depressive feelings or anxious feelings, may benefit from including information about substance use motives to improve outcomes (Gierski et al., 2022). Such information may allow more accurate and tailored treatment provision for this population (Gierski et al., 2022; Skewes & Blume, 2015). For example, harm reduction or interventions for substance use might include skills training to teach alternative ways of coping with distress (Skewes & Blume, 2015). Lastly, drinking motives may

be connected to intergenerational trauma regarding the increased rates of drinking-related problems (Bombay et al., 2014; FNIGC, 2018; Marsh et al., 2015). The effects of colonization resulted in trauma being passed down over generations. Many of those affected have turned to substances to cope with the shame, guilt, low self-esteem, confusion, and internalized oppression (Marsh et al., 2016). This has led to a deep and pervasive community-level suffering. Considering the significant role that intergenerational trauma plays in the lives of Indigenous peoples in Canada, it is critical that their mental health struggles, such as substance use, are viewed in a contextual lens with respect to the historical and political impacts of colonization. Examining the factor structure may help ensure that the measure accurately captures the motives of an Indigenous adult population in Canada.

Future research pursuits may employ other data collection and assessment methods such as longitudinal designs and informant reports to supplement self-report data. Additionally, individuals attending treatment may be more likely to experience positive help-seeking attitudes, influencing how clients respond to self-report questionnaires. Conversely, some clients at the treatment centre must undergo substance detoxification and/or withdrawal due to the region's lack of addiction services. Therefore, self-report questionnaires may be biased depending on their physical and mental state at the time of completion. Future research may investigate substance use motives and personality traits before treatment to better understand motivations and traits.

Future research may also investigate age differences among substance use motives. Mezquita et al. (2011) investigated differences in substance use motives by age and found that coping motives were related to alcohol use in middle-aged adults. Their findings raise the possibility that drinking to deal with stress and unpleasant feelings of tension and worry may

become more relevant in predicting alcohol frequency and quantity during the transition from young adulthood to middle age, as drinkers gain more experience with the anxiety-reducing effects of alcohol use (Mezquita et al., 2011).

Conclusion

Indigenous people in Canada face more significant health disparities than non-Indigenous Canadians, with alcohol and substance use ranking as one of the greatest disparities for Indigenous populations in Canada. Substance use motives and personality traits are often investigated in treatment settings to understand better what is driving the individual to use. The DMQ-R is a measure used to determine underlying motives for drinking yet has not been examined for its use with First Nation adults. Additionally, the SURPS is a frequently used measure that determines personality traits that may influence substance use that may be associated with motives identified by the DMQ-R. The present study identified a 3-factor structure solution for the MDMQ-R in First Nation adults seeking substance use treatment. Together, understanding both underlying motives and traits related to substance misuse for this unique population will help researchers and front-line clinicians in the provision of treatment for Indigenous people in Canada. Moreover, this research may provide information to assist in the cultural adaptation of treatments and interventions for substance use for Indigenous people, given the different factor structure of the MDMQ-R.

References

Adan, A., Forero, D. A., & Navarro, J. F. (2017). Personality traits related to binge drinking: A systematic review. *Frontiers in Psychiatry, 8*, 11. https://doi.org/10.3389/fpsyt.2017.00134

Adelson, N. (2005). The embodiment of inequity: Health disparities in Aboriginal Canada. *Canadian Journal of Public Health*, *96*(S2), S45–S61. https://doi.org/10.1007/BF03403702

Allan, B. & Smylie, J. (2015). *First Peoples, second class treatment: The role of racism in the health and well-being of Indigenous peoples in Canada*. https://www.wellesleyinstitute.com/wp-content/uploads/2015/02/Summary-First-Peoples-Second-Class-Treatment-Final.pdf

Ali, A., Carre, A., Hassler, C., Spilka, S., Vanier, A., Barry, C., & Berthoz, S. (2016). Risk factors for substances use and misuse among young people in France: what can we learn from the Substance Use Risk Profile Scale? *Drug Alcohol Dependence, 163*, 84–91. doi:10.1016/j.drugalcdep.2016.03.027

Assembly of First Nations (AFN)/First Nations Information Governance Committee (FNIGC). (2007). *First Nations Regional Longitudinal Health Survey (RHS) 2002/03: The peoples' report* (Rev. 2nd ed.).

Assembly of First Nations, National Native Addictions Partnership Foundation, & Health Canada. (2011). *Honouring our strengths: A renewed framework to address substance use issues among First Nations people in Canada*. Retrieved from http://nnapf.com/honour- ing-our-strengths-full-version/

Banes, K. E., Stephens, R. S., Blevins, C. E., Walker, D. D., & Roffman, R. A. (2014). Changing motives for use: Outcomes from a cognitive-behavioral intervention for marijuana-dependent adults. *Drug and Alcohol Dependence, 139*, 41-46. https://doi.org/10.1016/j.drugalcdep.2014.02.706

Beals, J., Spicer, P., Mitchell, C., Novins, D., & Manson, S. (2003). Racial disparities in alcohol use: Comparison of 2 American Indian reservation populations with national data. *American Journal of Public Health (1971), 93*(10), 1683–1685. https://doi.org/10.2105/AJPH.93.10.1683

Beavers, A. S., Lounsbury, J. W., Richards, J. K., Huck, S. W., Skolits, G. J., & Esquivel, S. L. (2013). Practical considerations for using exploratory factor analysis in educational research. *Practical Assessment, Research & Evaluation, 18*(6), 1–13. https://doi.org/10.7275/qv2q-rk76

Bernstein, J., Graczyk, A., Lawrence, D., Bernstein, E., & Strunin, L. (2011). Determinants of drinking trajectories among minority youth and young adults: The interaction of risk and resilience. *Youth & Society*, *43*(4), 1199–1219. https://doi.org/10.1177/0044118X10382033

Blackwell, E., & Conrod, P. J. (2003). *A five-dimensional measure of drinking motives*. Unpublished manuscript, Department of Psychology, University of British Columbia.

Blevins, C. E., Banes, K. E., Stephens, R. S., Walker, D. D., & Roffman, R. A. (2016). Change in motives among frequent cannabis-using adolescents: Predicting treatment outcomes. *Drug Alcohol Dependence, 1,* 167:175-81. doi:10.1016/j.drugalcdep.2016.08.018

Bombay, A., Matheson, K., & Anisman, H. (2009). Intergenerational trauma: Convergence of multiple processes among First Nations peoples in Canada. *International Journal of Indigenous Health, 5*(3), 6–47. doi:10.3138/ijih.v5i3.28987

Bombay, A., Matheson, K., & Anisman, H. (2014). The intergenerational effects of Indian Residential Schools: Implications for the concept of historical trauma. *Transcultural Psychiatry, 51*(3), 320–338. https://doi.org/10.1177/1363461513503380

Bombay, A., Matheson, K., & Anisman, H. (2011). The impact of stressors on second generation Indian residential school survivors. *Transcultural Psychiatry, 48*(4), 367–391. doi:10.1177/1363461511410240

Bresin, K. (2021). The "why" of drinking matters: A meta-analysis of the association between drinking motives and drinking outcomes. *Alcoholism, Clinical and Experimental Research, 45*(1). https://doi.org/10.1111/acer.14518

Callaghan, R. C. (2003). Risk factors associated with dropout and readmission among first nations individuals admitted to an inpatient alcohol and drug detoxification program. *Canadian Medical Association Journal, 169*(1), 23-27. http://ezproxy.lakeheadu.ca/login?url=https://www-proquest-com.ezproxy.lakeheadu.ca/scholarly-journals/risk-factors-associated-with-dropout-readmission/docview/620166603/se-2?accountid=11956

Canadian Institutes of Health Research, Natural Sciences and Engineering Research Counsil of Canada, and Social Sciences and Humanities Research Council of Canada (2014). *Tri-council policy statement: Ethical conduct for research involving humans.* https://ethics.gc.ca/eng/policy-politique_tcps2-eptc2_2018.html

Canadian Public Health Association. (2019). *What are the social determinants of health?* https://www.cpha.ca/what-are-social-determinants-health.

Canfield, M., Gilvarry, C., & Koller, S. H. (2015). Psychometric proprieties of the substance use risk profile scale—Brazilian version. *International Journal of Mental Health and Addiction, 13*, 204–214. doi:10.1007/s11469-014-9522-1

Carey, K. B., & Correia, C. J. (1997). Drinking motives predict alcohol-related problems in college students. *Journal of Studies on Alcohol and Drugs, 58*, 100–105. doi:10.15288/jsa.1997.58.100

Carpenter, K. M., & Hasin, D. (1998). A prospective evaluation of the relationship between reasons for drinking and DSM-IV alcohol-use disorders. *Addictive Behaviors, 23*(1), 41–46. https://doi.org/10.1016/S0306-4603(97)00015-4

Castellanos-Ryan, N., O'Leary-Barrett, M., Sully, L., & Conrod, P. (2013). Sensitivity and specificity of a brief personality screening instrument in predicting future substance use, emotional, and behavioral problems: 18-Month predictive validity of the substance use risk profile scale. *Alcoholism, Clinical and Experimental Research, 37*(s1), E281–E290. https://doi.org/10.1111/j.1530-0277.2012.01931.x

Castonguay-Jolin, L., Perrier-Ménard, E., Castellanos-Ryan, N., Parent, S., Vitaro, F., Tremblay, R. E., Garel, P., Séguin, J. R., & Conrod, P. J. (2013). Validation de la traduction française de la SURPS pour une population d'adolescents québécois. *Canadian journal of psychiatry, 58*(9), 538–545. https://doi.org/10.1177/070674371305800909

Chalder, M., Elgar, F. J., & Bennett, P. (2006). Drinking and motivations to drink among adolescent children of parents with alcohol problems. *Alcohol and Alcoholism (Oxford), 41*(1), 107–113. https://doi.org/10.1093/alcalc/agh215

Chandrika Ismail, A., De Alwis Seneviratne, R., Newcombe, P. A., & Wanigaratne, S. (2009). A model of substance abuse risk: Adapting to the Sri Lankan context. *Evaluation Review, 33*(1), 83–97. https://doi.org/10.1177/0193841X08325145

Comrey, A.L. & Lee H.B. (1992). A first course in factor analysis. London: Taylor and Francis. https://doi.org/10.4324/9781315827506

Comasco, E., Berglund, K., Oreland, L., Nilsson, K. W. (2010). Why do adolescents drink? Motivational patterns related to alcohol consumption and alcohol-related problems. *Substance Use Misuse, 45*, 1589–1604. doi:10.3109/10826081003690159

Conrod, P. J., Pihl, R. O., Stewart, S. H., & Dongier, M. (2000). Validation of a system of classifying female substance abusers on the basis of personality and motivational risk factors for substance abuse. *Psychology of Addictive Behaviors, 14*(3), 243–256. https://doi.org/10.1037/0893-164X.14.3.243

Cooper, M. L. (1994). Motivations for alcohol use among adolescents: Development and validation of a four-factor model. *Psychological Assessment, 6*, 117–128. https://doi.org/10.1037/1040-3590.6.2.117

Cooper, M. L., Frone, M. R., Russell, M., & Mudar, P. (1995). Drinking to regulate positive and negative emotions: A motivational model of alcohol use. *Journal of Personality and Social Psychology, 69*, 990–1005. doi:10.1037//0022-3514.69.5.990

Cooper, M. L., Russell, M., Skinner, J. B., Frone, M. R., & Mudar, P. (1992). Stress and alcohol use: Moderating effects of gender, coping, and alcohol expectancies. *Journal of Abnormal Psychology, 101*, 139–152. doi:10.1037//0021-843x.101.1.139

Cox, W. M., & Klinger, E. (1988). A motivational model of alcohol use. *Journal of Abnormal Psychology, 97*, 168–180. doi:10.1037/0021-843X.97.2.168

Crutzen, R. & Kuntsche, E. (2013). Validation of the four-dimensional structure of drinking motives among adults. *European Addiction Research, 19*, 222–226. https://doi.org/10.1159/000345457

Elias, B., Mignone, J., Hall, M., Hong, S. P., Hart, L., & Sareen, J. (2012). Trauma and suicide behaviour histories among a Canadian indigenous population: An empirical exploration of the potential role of Canada's residential school system. *Social Science & Medicine (1982), 74*(10), 1560–1569. https://doi.org/10.1016/j.socscimed.2012.01.026

Feldman, L., Harvey, B., Holowaty, P., & Shortt, L. (1999). Alcohol use beliefs and behaviors among high school students. *Journal of Adolescent Health, 24*(1), 48–58. https://doi.org/10.1016/S1054-139X(98)00026-3

First Nations Information Governance Centre (FNIGC). (2005). *First Nations Regional Longitudinal Health Survey (RHS) 2002/03: Results for Adults, Youth, and Children Living in First Nations Communities*. Ottawa: First Nations Centre. https://uploads-ssl.webflow.com/5b786757ee914c5f85ba8959/5b7f15d55f91e10e3f4ec02e_13_rhs2002-03-technical_report.pdf

First Nations Information Governance Centre (FNIGC). (2012). *First Nations Regional Health Survey (RHS) 2008/10: National report on adults, youth and children living in First Nations communities*. Ottawa, ON: FNIGC. https://fnigc.ca/wp-content/uploads/2020/09/5eedd1ce8f5784a69126edda537dccfc_first_nations_regional_health_survey_rhs_2008-10_-_national_report_adult_2.pdf

First Nations Information Governance Centre (FNIGC). (2018). *National Report of the First Nations Regional Health Survey Phase 3: Volume One*. Ottawa, ON: FNIGC. https://fnigc.ca/wp-

content/uploads/2020/09/713c8fd606a8eeb021debc927332938d_FNIGC-RHS-Phase-III-Report1-FINAL-VERSION-Dec.2018.pdf

Fish, J., Osberg, T. M., & Syed, M. (2017). "This is the way we were raised": Alcohol beliefs and acculturation in relation to alcohol consumption among Native Americans. *Journal of Ethnicity in Substance Abuse*, *16*(2), 219-245. http://dx.doi.org.ezproxy.lakeheadu.ca/10.1080/15332640.2015.1133362

Gavrilova, Y., Blevins, C., & Abrantes, A. (2021). Modified drinking motives questionnaire–revised: Psychometric validation in a psychiatric sample of young adults with predominantly polysubstance use. *Addictive Behaviors, 114*, 6. https://doi.org/10.1016/j.addbeh.2020.106753

Gierski, F., Benzerouk, F., Jeanblanc, J., Angerville, B., Dervaux, A., Kaladjian, A., & Naassila, M. (2022). Validity and usefulness of the short form of the Drinking Motives Questionnaire Revised (DMQ-R SF) among patients with schizophrenia. *Addictive Behaviors, 129,* 107251–107251. https://doi.org/10.1016/j.addbeh.2022.10725

Gilson, K. M., Bryant, C., Bei, B., Komiti, A., Jackson, H., & Judd, F. (2013). Validation of the Drinking Motives Questionnaire (DMQ) in older adults. *Addictive Behaviours, 38*(5), 2196-202. doi:10.1016/j.addbeh.2013.01.021

Gonzalez, V. M. (2012). Association of solitary binge drinking and suicidal behavior among emerging adult college students. *Psychology of Addictive Behaviors, 26*, 609–614. doi:10.1037/a0026916

Gonzalez, V. M., Burroughs, A., & Skewes, M. C. (2021). Belief in the American Indian/Alaska Native biological vulnerability myth and drinking to cope: Does stereotype threat play a

role? *Cultural Diversity and Ethnic Minority Psychology, 27*(1), 37-46. http://dx.doi.org.ezproxy.lakeheadu.ca/10.1037/cdp0000366

Gonzalez, V. M., & Skewes, M. C. (2013). Solitary heavy drinking, social relationships, and negative mood regulation in college drinkers. *Addiction Research & Theory, 21*, 285–294. https://doi.org/10.3109/16066359.2012.714429

Grant, B. F., Dawson, D. A., Stinson, F. S., Chou, P., Dufour, M. C., & Pickering, R. P. (2004). The 12-month prevalence and trends in DSM-IV alcohol abuse and dependence. *Drug and Alcohol Abuse, 74*, 223–234. https://doi.org/10.1016/j.drugalcdep.2004.02.004

Grant, V. V., Stewart, S. H., O'Connor, R. M., Blackwell, E., & Conrod, P. J. (2007). Psychometric evaluation of the five-factor Modified Drinking Motives Questionnaire--Revised in undergraduates. *Addictive Behaviour, 32*(11), 2611-32. doi:10.1016/j.addbeh.2007.07.004

Gracey, M., & King, M. (2009). Indigenous health part 1: Determinants and disease patterns. *Lancet, 374*(9683), 65–75. doi:10.1016/S0140-6736(09)60914-4

Hackett, C., Feeny, D., & Tompa, E. (2016). Canada's residential school system: measuring the intergenerational impact of familial attendance on health and mental health outcomes. *Journal of Epidemiology and Community Health (1979), 70*(11), 1096–1105. https://doi.org/10.1136/jech-2016-207380

Haller, M., Handley, E., Chassin, L., & Bountress, K. (2010). Developmental cascades: Linking adolescent substance use, affiliation with substance use promoting peers, and academic achievement to adult substance use disorders. *Development and Psychopathology, 22*(4), 899-916. http://dx.doi.org.ezproxy.lakeheadu.ca/10.1017/S0954579410000532

Hatcher, L. (1994). A step-by-step approach to using the SAS system for factor analysis and structural equation modeling. Cary: SAS Institute.

Hautala, D., Sittner, K., & Walls, M. (2019). Onset, comorbidity, and predictors of nicotine, alcohol, and marijuana use disorders among North American Indigenous adolescents. *Journal of Abnormal Child Psychology, 47*(6), 1025-1038. doi:10.1007/s10802-018-0500-0

Herie, M., Godden, T., Shenfeld, J., & Kelly, C. (2010) *Addiction: An information guide. A guide for people with addiction and their families*. Centre for Addiction and Mental Health (CAMH). https://www.camh.ca/-/media/files/guides-and-publications/addiction-guide-en.pdf

Hudson, A., Wekerle, C., & Stewart, S. H. (2015). Associations between personality and drinking motives in adolescents involved in the child welfare system. *Personality and Individual Differences, 81*, 84-89. http://dx.doi.org.ezproxy.lakeheadu.ca/10.1016/j.paid.2014.12.008

Hutcheson, G. & Sofroniou N. (1999). The multivariate social scientist: Introductory statistics using generalized linear models. London: Sage Publication. https://doi.org/10.4135/9780857028075

Jolliffe, I. T., & Cadima, J. (2016). Principal component analysis: a review and recent developments. Philosophical Transactions of the Royal Society of London. *Series A: Mathematical, Physical, and Engineering Sciences, 374*(2065). https://doi.org/10.1098/rsta.2015.0202

Jurk, S., Kuitunen-Paul, S., Kroemer, N. B., Artiges, E., Banaschewski, T., Bokde, A. L. W., Büchel, C., Conrod, P., Fauth-Bühler, M., Flor, H., Frouin, V., Gallinat, J., Garavan, H.,

Heinz, A., Mann, K. F., Nees, F., Paus, T., Pausova, Z., Poustka, L., & Smolka, M. N. (2015). Personality and Substance Use: Psychometric Evaluation and Validation of the Substance Use Risk Profile Scale (SURPS) in English, Irish, French, and German Adolescents. *Alcoholism, Clinical and Experimental Research, 39*(11), 2234–2248. https://doi.org/10.1111/acer.12886

Kehayes, I. L., Mackinnon, S. P., Sherry, S. B., Leonard, K. E., & Stewart, S. H. (2019). Drinking motives and drinking behaviors in romantic couples: A longitudinal actor-partner interdependence model. *Psychology of Addictive Behaviors, 33*(3), 208-220. http://dx.doi.org.ezproxy.lakeheadu.ca/10.1037/adb0000459

Krank, M., Stewart, S. H., O'Connor, R., Woicik, P. B., Wall, A.-M., & Conrod, P. J. (2010). Structural, concurrent, and predictive validity of the Substance Use Risk Profile Scale in early adolescence. *Addictive Behaviors, 36*(1), 37–46. https://doi.org/10.1016/j.addbeh.2010.08.010

Kumar, M. B., & Tjepkema, M. (2019). *Suicide among First Nations people, Métis and Inuit (2011-2016): Findings from the 2011 Canadian Census Health and Environment Cohort (CanCHEC).* https://www150.statcan.gc.ca/n1/en/pub/99-011-x/99-011-x2019001-eng.pdf?st=VFU5JqBO

Kuntsche, E. (2007). Tell me...why do you drink? A study of drinking motives in adolescence. (Doctoral dissertation.) *Swiss Institute for the Prevention of Alcohol and Drug Problems. Retrieved from Radboud Repository*. http:// hdl.handle.net/2066/73214

Kuntsche, E. & Kuntsche, S. (2009). Development and validation of the Drinking Motive Questionnaire revised short form (DMQ-R SF). *Journal of Clinical Child and Adolescent Psychology, 38*(6). https://doi.org/10.1080/15374410903258967

Kuntsche, E., Knibbe, R., Gmel, G., & Engels, R. (2005). Why do young people drink? A review of drinking motives. *Clinical Psychology Review, 25*(7), 841-861. http://dx.doi.org.ezproxy.lakeheadu.ca/10.1016/j.cpr.2005.06.002

Kuntsche, E., Stewart, S. H., & Cooper, M. L. (2008). How stable is the motive-alcohol use link? A cross-national validation of the drinking motives questionnaire revised among adolescents from Switzerland, Canada, and the United States. *Journal of Studies on Alcohol and Drugs, 69*, 388–396. doi:10.15288/jsad.2008.69.388

Lavalley, J., Kastor, S., Tourangeau, M., Goodman, A., & Kerr, T. (2020). You just have to have other models; our DNA is different: The experiences of Indigenous people who use illicit drugs and/or alcohol accessing substance use treatment. *Harm Reduction Journal, 17*(1), 19–19. https://doi.org/10.1186/s12954-020-00366-3

Lo, C. C., & Globetti, G. (2000). Gender differences in alcohol beliefs and usual blood-alcohol concentration. *Journal of Child & Adolescent Substance Abuse, 9*(3), 15–33. https://doi.org/10.1300/J029v09n03_02

Long, E. C., Milcheva, S., Psederska, E., Vasilev, G., Bozgunov, K., Nedelchev, D., Gillespie, N. A., & Vassileva, J. (2018). Validation of the Substance Use Risk Profile Scale (SURPS) with Bulgarian substance dependent individuals. *Frontiers in Psychology, 9*, 2296–2296. https://doi.org/10.3389/fpsyg.2018.02296

Lund, J. I. (2021). *Adverse childhood experiences, executive functions, and substance use in an Indigenous residential treatment program*. Unpublished doctoral dissertation. https://knowledgecommons.lakeheadu.ca/handle/2453/4894

MacCallum, R.C., Widaman, K.F., Zhang, S. & Hong S. (1999). Sample size in factor analysis. *Psychological Methods,4*, 84−99. doi:10.1037/1082-989X.4.1.84.

Mackinnon, S. P., Couture, M., Cooper, M. L., Kuntsche, E., O'Connor, R. M., & Stewart, S. H. (2017). Cross-cultural comparisons of drinking motives in 10 countries: Data from the DRINC project. *Drug and Alcohol Review, 36*(6), 721-730. http://dx.doi.org.ezproxy.lakeheadu.ca/10.1111/dar.12464

Malmberg, M., Overbeek, G., Monshouwer, K., Lammers, J., Vollebergh, W. A., & Engels, R. C. M. (2010). Substance use risk profiles and associations with early substance use in adolescence. *Journal of Behavioral Medicine, 33*(6), 474–485. https://doi.org/10.1007/s10865-010-9278-4

Marsh, T. N., Coholic, D., Cote-Meek, S., & Najavits, L. M. (2015). Blending Aboriginal and Western healing methods to treat intergenerational trauma with substance use disorder in Aboriginal peoples who live in northeastern Ontario, Canada. *Harm Reduction Journal, 12*(1), 14–14. https://doi.org/10.1186/s12954-015-0046-1

Marsh, Cote-Meek, S., Young, N. L., Najavits, L. M., & Toulouse, P. (2016). Indigenous healing and seeking safety: A blended implementation project for intergenerational trauma and substance use disorders. *International Indigenous Policy Journal, 7*(2). https://doi.org/10.18584/iipj.2016.7.2.3

Maxwell, K. (2014). Historicizing historical trauma theory: Troubling the trans-generational transmission paradigm. *Transcultural Psychiatry, 51*(3), 407–435. https://doi.org/10.1177/1363461514531317

Mazzardis, S., Vieno, A., Kuntsche, E., & Santinello, M. (2010). Italian validation of the Drinking Motives Questionnaire Revised Short Form (DMQ-R-SF). *Addictive Behaviors, 35*, 905–908. doi:10.1016/j.addbeh.2010.05.002

Memetovic, J., Ratner, P. A., & Richardson, C. G. (2014). Gender-based measurement invariance of the substance use risk profile scale. *Addictive Behaviour 39*, 690–694. doi:10.1016/j.addbeh.2013.10.016

Mezquita, L., Ibáñez, M. I., Moya-Higueras, J., Villa, H., Arias, B., Fañanás, L., & Ortet, G. (2018). Psychometric properties of drinking motives questionnaire-revised (DMQ-R) in Spanish adolescents. *European Journal of Psychological Assessment, 34*(3), 145-153. http://dx.doi.org.ezproxy.lakeheadu.ca/10.1027/1015-5759/a000319

Mezquita, L., Stewart, S. H., & Ibáñez, M. I. (2011). Drinking motives in clinical and general populations. *European Addiction Research*, *17*, 250–261. doi:10.1159/000328510

Mikkonen, J., & Raphael, D. (2010). *Social determinants of health: The Canadian facts*. Toronto: York University School of Health Policy and Management. https://unnaturalcauses.org/assets/uploads/file/The_Canadian_Facts.pdf

Mundfrom, D. J., Shaw, D. G., & Ke, T. L. (2005). Minimum sample size recommendations for conducting factor analyses. *International Journal of Testing, 5*(2), 159–168. https://doi.org/10.1207/s15327574ijt0502_4

Mushquash, C.J., Comeau, M.N., & Stewart, S.H. (2007). An alcohol abuse early intervention approach with Mi'kmaq adolescents. *First Peoples Child & Family Review*, *3*(1), 17-26. https://fpcfr.com/index.php/FPCFR/article/view/34

Mushquash, C. J., Stewart, S. H., Comeau, M. N., & McGrath, P. J. (2008). The structure of drinking motives in first nations adolescents in Nova Scotia. *American Indian and Alaska Native Mental Health Research, 15*(1), 33-52. http://dx.doi.org.ezproxy.lakeheadu.ca/10.5820/aian.1501.2008.33

Mushquash, C. J., Stewart, S. H., Mushquash, A. R., Comeau, M. N., & McGrath, P. J. (2014). Personality traits and drinking motives predict alcohol misuse among Canadian Aboriginal youth. *International Journal of Mental Health and Addiction, 12*(3), 270-282. http://dx.doi.org.ezproxy.lakeheadu.ca/10.1007/s11469-013-9451-4

National Collaborating Centre for Aboriginal Health [NCCAH] (2013). *An overview of Aboriginal health in Canada*. Prince George, BC: Author. https://www.ccnsa-nccah.ca/docs/context/FS-OverviewAbororiginalHealth-EN.pdf

National Institute on Alcohol Abuse and Alcoholism [NIAAA]. (2017). *Alcohol facts and statistics*. https://pgdf.org/media/AlcoholFactsStats.pdf.

National Institute on Alcohol Abuse and Alcoholism [NIAAA]. (2006). *Alcohol use and alcohol use disorders in the United States: Main findings from the 2001–2002 National Epidemiologic Survey on Alcohol and Related Conditions (NESARC)* (Vol. 8). https://pubs.niaaa.nih.gov/publications/NESARC_DRM/NESARCDRM.pdf

Nehlin, C., & Öster, C. (2019). Measuring drinking motives in undergraduates: An exploration of the drinking motives questionnaire-revised in Swedish students. *Substance Abuse Treatment, Prevention, and Policy, 14*, 6. https://doi.org/10.1186/s13011-019-0239-9

Nelson, S. E., & Wilson, K. (2017). The mental health of Indigenous peoples in Canada: A critical review of research. *Social Science & Medicine (1982), 176*, 93–112. https://doi.org/10.1016/j.socscimed.2017.01.021

Newton, N., Barrett, E., Castellanos-Ryan, N., Kelly, E., Champion, K., Stapinski, L., Conrod, P., Slade, T., Nair, N., & Teesson, M. (2015). The validity of the Substance Use Risk Profile Scale (SURPS) among Australian adolescents. *Addictive Behaviors, 53*, 23–30. https://doi.org/10.1016/j.addbeh.2015.09.015

Nishnawbe Aski Nation. (2009). Resolution: 09/92. *Prescription drug abuse state of emergency.* http://apihtawikosisan.com/wp-content/uploads/2012/02/PDA-Backgrounder-7-Revised-November-21st.pdf

Omiya, S., Kobori, O., Tomoto, A., Igarashi, Y., & Iyo, M. (2015). Personality and substance use in Japanese adolescents: The Japanese version of Substance Use Risk Profile Scale. *Personality and Individual Differences., 76*, 153–157. https://doi-org.ezproxy.lakeheadu.ca/10.1016/j.paid.2014.11.034

Pearce, M. E., Jongbloed, K. A., Pooyak, S. D., Blair, A. H., Christian, W. M., Sharma, R., & Spittal, P. M. (2018). The cedar project: Exploring determinants of psychological distress among young indigenous people who use drugs in three Canadian cities. *Global Mental Health, 5*, 16. http://dx.doi.org.ezproxy.lakeheadu.ca/10.1017/gmh.2018.26

Reading, C. L. & Wien, F. (2009). *Health Inequalities and Social Determinants of Aboriginal Peoples' Health.* Prince George, BC: National Collaborating Centre for Aboriginal Health. https://www.ccnsa-nccah.ca/docs/determinants/RPT-HealthInequalities-Reading-Wien-EN.pdf

Robles-García, R., Fresán, A., Castellanos-Ryan, N., Conrod, P., Gómez, D., de Quevedo y Domínguez, M., Rafful, C., Real, T., Vásquez, L., & Medina-Mora, M. (2014). Spanish version of the Substance Use Risk Profile Scale: Factor structure, reliability, and validity in Mexican adolescents. *Psychiatry Research, 220*(3), 1113–1117. https://doi.org/10.1016/j.psychres.2014.08.057

Rodriguez, L. M., Litt, D. M., & Stewart, S. H. (2020). Drinking to cope with the pandemic: The unique associations of COVID-19-related perceived threat and psychological distress to

drinking behaviors in American men and women. *Addictive Behaviors, 110*, 106532–106532. https://doi.org/10.1016/j.addbeh.2020.106532

Rosenman, R., Tennekoon, V., & Hill, L. G. (2011). Measuring bias in self-reported data. *International Journal of Behavioural and Healthcare Research, 2*(4), 320-332. https://doi.org/10.1504/IJBHR.2011.043414

Ross, A., Dion, J., Cantinotti, M., Collin-Vézina, D., & Paquette, L. (2015). Impact of residential schooling and of child abuse on substance use problem in Indigenous Peoples. *Addictive Behaviors, 51*, 184–192. https://doi.org/10.1016/j.addbeh.2015.07.014

Saliba, A. J., Moran, C., & Yoo, Y. (2014). The substance use risk profile scale: Comparison of norms and outcomes for Australian and Korean adults. *International Journal of Mental Health and Addiction, 12*(4), 538-547. https://doi.org/10.1007/s11469-014-9490-5

Schlauch, R. C., Crane, C. A., Houston, R. J., Molnar, D. S., Schlienz, N. J., & Lang, A. R. (2015). Psychometric evaluation of the Substance Use Risk Profile Scale (SURPS) in an inpatient sample of substance users using cue-reactivity methodology. *Journal of Psychopathol. Behav. Assess. 37*, 231–246. doi:10.1007/s10862-014-9462-x

Siu, A. F. Y. (2011). Validation of the Substance Use Risk Profile Scale for Adolescents in Hong Kong. *Journal of Psychoeducational Assessment, 29*(1), 75–83. https://doi.org/10.1177/0734282910362044

Skewes, M., & Blume, A. (2015). Ethnic identity, drinking motives, and alcohol consequences among Alaska Native and non-Native college students. *Journal of Ethnicity in Substance Abuse, 14*(1), 12–28. https://doi.org/10.1080/15332640.2014.958641

Sznitman, S., & Engel-Yeger, B. (2017). Sensation seeking and adolescent alcohol use: Exploring the mediating role of unstructured socializing with peers. *Alcohol and Alcoholism, 52*(3) 369-401. https://doi.org/10.1093/alcalc/agx008.

Soper, D. (2021). *Free statistics calculators*. https://www.danielsoper.com/statcalc/default.aspx

Statistics Canada (2017). *The housing conditions of Aboriginal people in Canada*. Catalogue no. 99-200-X. https://www12.statcan.gc.ca/census-recensement/2016/as-sa/98-200-x/2016021/98-200-x2016021-eng.cfm

Statistics Canada. (2018). *First Nations People, Métis, and Inuit in Canada: Diverse and growing populations*. https://www150.statcan.gc.ca/n1/pub/89-659-x/89-659-x2018001-eng.htm.

Simons, J., Correia, C. J., Carey, K. B., & Borsari, B. E. (1998). Validating a five-factor marijuana motive measure: Relations with use, problems, and alcohol motives. *Journal of Counseling Psychology, 45*, 265-273. https://doi.org/10.1037/0022-0167.45.3.265

Stewart, S. H., Loughlin, H. L., & Rhyno, E. (2001). Internal drinking motives mediate personality domain — drinking relations in young adults. *Personality and Individual Differences, 30*(2), 271–286. https://doi.org/10.1016/S0191-8869(00)00044-1

Stewart, S. H., Sherry, S. B., Comeau, M. N., Mushquash, C. J., Collins, P., & Van Wilgenburg, H. (2011). Hopelessness and excessive drinking among Aboriginal adolescents: The mediating roles of depressive symptoms and drinking to cope. *Depression Research and Treatment,* 970169–11. https://doi.org/10.1155/2011/970169.

Stewart, S. H., Zeitlin, S. B., & Samoluk, S. B. (1996). Examination of a three-dimensional drinking motives questionnaire in a young adult university student sample. *Behavior Research and Therapy, 34*, 61- 71. doi:10.1016/0005-7967(95)00036-w

Suhr, D. (2006). *Exploratory or Confirmatory Factor Analysis*. SAS Users Group International Conference (pp. 1 - 17). https://support.sas.com/resources/papers/proceedings/proceedings/sugi31/200-31.pdf

Tabachnick, B. & Fidell, L. (2001). Using multivariate statistics. Needham Heights: Allyn & Bacon.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). Upper Saddle River, NJ: Pearson Allyn & Bacon.

Toombs, E., Marshall, N., & Mushquash, C. J. (2019). Residential and nonresidential substance use treatment within Indigenous populations: A systematic review. *Journal of Ethnicity in Substance Abuse,* 1–26. https://doi.org/10.1080/15332640.2019.1622478

UCLA: Statistical Consulting Group. *Principal Components (PCA) and Exploratory Factor Analysis (EFA) with SPSS*. from https://stats.idre.ucla.edu/spss/seminars/efa-spss/

Walls, M., Sittner Hartshorn, K. J., & Whitbeck, L. B. (2013). North American indigenous adolescent substance use. *Addictive Behaviors, 38*(5), 2103-2109. http://dx.doi.org.ezproxy.lakeheadu.ca/10.1016/j.addbeh.2013.01.004

Wang D., Luo, J., Li, S., Hu, M., & Wang, C. (2022). Psychometric properties of the chinese version of the substance use risk profile scale. *Journal of Psychopathology and Behavioral Assessment*. https://doi.org/10.1007/s10862-022-09984-6

Wang, Y. A., & Rhemtulla, M. (2021). Power analysis for parameter estimation in structural equation modeling: A discussion and tutorial. *Advances in Methods and Practices in Psychological Science, 4*(1). https://doi.org/10.1177/2515245920918253

Wechsler, H., & Austin, S. B. (1998). Binge drinking: the five/four measure. *Journal of Studies on Alcohol, 59*, 122–123. doi:10.15288/jsa.1998.59.122

Whelan, R., Watts, R., Orr, C. A., Althoff, R. R., Artiges, E., Banaschewski, T., Barker, G. J., Bokde, A. L. W., Büchel, C., Carvalho, F. M., Conrod, P. J., Flor, H., Fauth-Bühler, M., Frouin, V., Gallinat, J., Gan, G., Gowland, P., Heinz, A., Ittermann, B., … Garavan, H. (2014). Neuropsychosocial profiles of current and future adolescent alcohol misusers. *Nature (London), 512*(7513), 185–189. https://doi.org/10.1038/nature13402

Whitbeck, L., Walls, M., & Welch, M. (2012). Substance abuse prevention in American Indian and Alaska native communities. *American Journal of Drug and Alcohol Abuse*, *38*(5). https://doi.org/10.3109/00952990.2012.695416

White, A., Castle, I., Hingson, R., & Powell, P. (2020). Using Death Certificates to Explore Changes in Alcohol-Related Mortality in the United States, 1999 to 2017. *Alcoholism, Clinical and Experimental Research, 44*(1), 178–187. https://doi.org/10.1111/acer.14239

Woicik, P. A., Conrod, P. J., Phil, R. O., Stewart, S. H., & Dongier, M. (1999). *The Drug Abuse Subtyping Scale: A revised instrument for identifying motivational profiles for substance abuse*. Poster presented at the 22nd Annual Meeting of the Research Society on Alcoholism, Santa Barbara, California.

Woicik, P.A., Stewart, S.H., Pihl, R.O., & Conrod, P.J. (2009). The substance use risk profile scale: A scale measuring traits linked to reinforcement-specific substance use profiles. *Addictive Behaviors*, *34*(12), 1042-1055. https://doi.org/10.1016/j.addbeh.2009.07.001

Vaeth, P. A., Wang-Schweig, M., & Caetano, R. (2017). Drinking, alcohol use disorder, and treatment access and utilization among U.S. racial/ethnic groups. *Alcoholism, clinical and experimental research, 41*(1), 6–19. https://doi.org/10.1111/acer.13285

Villarosa-Hurlocker, Bravo, A. J., Pearson, M. R., Prince, M. A., Madson, M. B., Henson, J. M., Looby, A., Gonzalez, V. M., Henslee, A. M., Cuttler, C., Wong, M. M., & McChargue,

D. E. (2019). The relationship between social anxiety and alcohol and marijuana use outcomes among concurrent users: A motivational model of substance use. *Alcoholism, Clinical and Experimental Research, 43*(4), 732–740. https://doi.org/10.1111/acer.13966

Appendix A: ARTC Intake Form

Application of Admission
Adult Residential TX Centre

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THIS SECTION: TO BE COMPLETED BY CLIENT

ADDICTION HISTORY

Primary Substance	Approximate Date of Last Time Used	Age of First Use	Age Regular Use Began
1.			
2.			
3.			

Substances used in the last 12 months: (please check all that apply)

☐ Alcohol ☐ Amphetamines, *i.e. Ritalin* ☐ Barbiturates, *i.e. Phenobarbital* ☐ Benzodiazepine, *i.e. Ativan, Valium* ☐ Cocaine	☐ Crack ☐ Glue/inhalant ☐ Hallucinogens, *i.e. Ecstasy* ☐ Heroin/opium ☐ Marijuana	☐ Methadone ☐ Oxycontin ☐ Over-the-counter Codeine, *i.e. Tylenol #1 & 3's* ☐ Prescription Opiods, *i.e. Morphine*

Have you ever experienced any of the following: (please check all that apply)

☐ Hangovers ☐ Blackouts	☐ Vomiting ☐ Seizures	☐ Shakes ☐ Hallucinations	☐ Paranoia ☐ Health Problems

Injection Drug Use: ☐ Yes ☐ No

TREATMENT HISTORY

Previous Treatment Attempt(s) ☐ No ☐ Yes (Please complete the information below)

Name of Facility	Date	Completed
		☐ Yes ☐ No
		☐ Yes ☐ No
		☐ Yes ☐ No
		☐ Yes ☐ No

How long were you clean/sober after treatment:

What do you identify as the reasons for returning to drinking/drug using:

Appendix B: Family Health History Questionnaire

These questions will ask about yourself and your family. This information will allow us to better understand problems that may occur early in life, and may help others in the future. Some of these questions ask about sensitive topics and some people may feel uncomfortable with these questions. You do not have to answer any question that you don't want to.

1. How far did you get in school?	1= Didn't go to school/Lower than grade 6 2= Elementary (Grade 6) 3= Middle School (Grade 8) 4= Some high school 5= High school graduate or GED 6= Some college or technical school 7= College diploma/degree 8= University Degree (Bachelor) 9= Professional Degree (Master's or PhD)
2. What is your current marital status? Are you now:	1= Married 2= Common Law (not married but living together) 3= In a serious relationship 4= Widowed 5= Separated 6= Divorced 7= Single/Not in a serious relationship
3. What is your current annual income?	1= < $10 000 2= <$10 001 to $19 999 3= $20 0000 to $29 999 4= $30 000 to $39 999 5= $40 000 to $60 000 6= > than $60 000
4. Which of the following best describes your employment status before coming to ARTC?	1= Full time (35 hours or more) 2= Part-time (1-34 hours) 3= Student 4= Sick leave 5= Unemployed looking for work 6= Unemployed not looking for work 7= Retired 8= Disability (ODSP, OW) 9= Home/parenting
5. Have you ever attended a residential school?	1= YES 2= NO
6. If so, what age did you attend and for how many years?	AGE _____ Years attended _____

Sexual Health

In order to get a more complete picture of the health of our patients, the next three questions are about <u>voluntary</u> sexual experiences.

7. How old were you the first time you had voluntary sexual intercourse?	AGE: _____ NEVER HAD INTERCOURSE
8. How many different partners have you had sexual intercourse with?	# of partners: _____ NEVER HAD INTERCOURSE

Tobacco Use

9. Have you smoked at least 100 cigarettes in your life?	1= YES 2= NO
10. How old were you when you began to smoke cigarettes fairly regularly?	AGE: _____
11. Do you smoke cigarettes now or chew tobacco?	1= YES 2= NO
12. If yes, on average, how many cigarettes per day do you smoke?	# of cigarettes: _____ DOES NOT APPLY

Exercise/Health

13. During the past month, about how many days per week did you exercise for recreation or to keep in shape?	# of times per week:
14. What is the most you have ever weighed? (in lb)	WEIGHT in LB: _____
15. How old were you at your heaviest weight?	AGE: _____

Substance Use

16. How old were you when you had your first drink of alcohol, other than a few sips?	AGE: _____ NEVER DRANK
17. Have you ever used street drugs? *(ie: Marijuana, cocaine, speed, LSD, heroin)*	1= YES 2= NO
18. If yes, how old were you the first time you used them?	AGE: _____
19. About how many times have you used street drugs?	0=0 1=1-2 2=3-10 3=11-25 4=26-99 5=100+

Do you have:

Have you ever had, or been told you have:

20. High blood pressure	1= YES	2= NO
21. A heart attack (coronary)	1= YES	2= NO
22. Chronic bronchitis or emphysema	1= YES	2= NO
23. Other heart problems?	1= YES	2= NO

24. An ulcer	1= YES	2= NO
25. Gallstones, gallbladder problems	1= YES	2= NO
26. Yellow jaundice, hepatitis, or any liver trouble?	1= YES	2= NO
27. Had a stroke or "small stroke"	1= YES	2= NO
28. Chronic pain	1= YES	2= NO
29. A physical disability	1= YES	2= NO

Have you ever been treated for or told you have:

30. Any sexually transmitted infections (STIs, such as chlamydia, herpes, HIV)	1= YES	2= NO
31. Have you ever been diagnosed with Hep-C?	1= YES	2= NO

Please tell us:

32. In the past year, how many visits to a doctor, or other health care professional, have you made?	# of visits in past year: _____
33. In the past year, how many visits to the emergency department have you made?	# of visits in past year: _____
34. In the past year, how many emergency visits to the hospital have involved an ambulance?	# of visits in past year: _____
35. Have you ever been under the care of a psychologist, psychiatrist, or therapist?	1= YES 2= NO How long: _____

To your best knowledge, have you been diagnosed or received treatment for any of the following?

36. Depression (Major Depression, Dysthymia)	1= YES	2= NO
37. Anxiety (Generalized Anxiety, Fear of Public Spaces, Social Anxiety)	1= YES	2= NO
38. Eating Concerns (Anorexia, Bulimia, Binge Eating)	1= YES	2= NO
39. Bi-polar Disorders	1= YES	2= NO
40. Schizophrenia or Psychosis	1= YES	2= NO
41. Post-Traumatic Stress Disorder/Trauma	1= YES	2= NO
42. Substance Use Disorder	1= YES	2= NO
43. Attention-Deficit Hyperactivity Disorder	1= YES	2= NO
44. Fetal Alcohol Spectrum Disorder	1= YES	2= NO
45. Learning Disability	1= YES	2= NO
46. Personality Disorder (ie: Borderline Personality Disorder)	1= YES	2= NO

Appendix C: Modified Drinking Motives Questionnaire - Revised

M-DMQ-R (Blackwell & Conrod, 2003)

Below is a list of reasons people sometimes give for drinking alcohol or using drugs. Thinking of all the times you drink alcohol or use drugs, how often would you say that you drink/use for each of the following reasons?

Please respond based on how you usually have felt or behaved **over the past several years**.	Almost never/ Never	Some of the time	Half of the time	Most of the time	Almost always/ Always
1. As a way to celebrate	1	2	3	4	5
2. To relax	1	2	3	4	5
3. Because I like the feeling	1	2	3	4	5
4. Because it is what most of my friends do when we get together	1	2	3	4	5
5. To forget my worries	1	2	3	4	5
6. Because it is exciting	1	2	3	4	5
7. To be social	1	2	3	4	5
8. Because I feel more self-confident or sure of myself	1	2	3	4	5
9. To get a high	1	2	3	4	5
10. Because it is customary on special occasions	1	2	3	4	5
11. Because it helps me when I am feeling nervous	1	2	3	4	5
12. Because it's fun	1	2	3	4	5
13. Because it makes a social gathering more enjoyable	1	2	3	4	5
14. To cheer me up when I'm in a bad mood	1	2	3	4	5
15. To be liked	1	2	3	4	5
16. To numb my pain	1	2	3	4	5
17. Because it helps me when I am feeling depressed	1	2	3	4	5
18. So that others won't kid me about not using	1	2	3	4	5
19. To reduce my anxiety	1	2	3	4	5
20. To stop me from dwelling on things	1	2	3	4	5
21. To turn off negative thoughts about myself	1	2	3	4	5
22. To help me feel more positive about things in my life	1	2	3	4	5
23. To stop me from feeling so hopeless about the future	1	2	3	4	5
24. Because my friends pressure me to use	1	2	3	4	5
25. To fit in with a group I like	1	2	3	4	5
26. Because it makes me feel good	1	2	3	4	5
27. To forget painful memories	1	2	3	4	5
28. So I won’t feel left out	1	2	3	4	5

Appendix D: Substance Use Risk Profile Scale

SURPS (Woicik et al., 2009)

Please circle completely to show how much you agree or disagree with the following statements.

These questions are about your personality, that is, about the kind of person you generally are. Please respond based on how you usually have felt or behaved **over the past several years**.

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I am content.	1	2	3	4
2. I often don't think things through before I speak.	1	2	3	4
3. I would like to skydive.	1	2	3	4
4. I am happy.	1	2	3	4
5. I often involve myself in situations that I later regret being involved in.	1	2	3	4
6. I enjoy new and exciting experiences even if they are unconventional.	1	2	3	4
7. I have faith that my future holds great promise.	1	2	3	4
8. It's frightening to feel dizzy or faint.	1	2	3	4
9. I like doing things that frighten me a little.	1	2	3	4
10. It frightens me when I feel my heart beat change.	1	2	3	4
11. I usually act without stopping to think.	1	2	3	4
12. I would like to learn how to drive a motorcycle.	1	2	3	4
13. I feel proud of my accomplishments.	1	2	3	4
14. I get scared when I'm too nervous.	1	2	3	4
15. Generally, I am an impulsive person.	1	2	3	4
16. I am interested in experience for its own sake even if it is illegal.	1	2	3	4
17. I feel that I'm a failure.	1	2	3	4
18. I get scared when I experience unusual body sensations.	1	2	3	4
19. I would enjoy hiking long distances in wild and uninhabited territory.	1	2	3	4
20. I feel pleasant.	1	2	3	4
21. It scares me when I'm unable to focus on a task.	1	2	3	4
22. I feel I have to be manipulative to get what I want.	1	2	3	4
23. I am very enthusiastic about my future.	1	2	3	4

Appendix E: Verbal Recruitment Script

There is a project happening here at Dilico that you might be interested in. It involves answering some questions about yourself. You would answer some questions today and then again about half way through treatment. Some of the questions are related to your childhood and may be personal or sensitive in nature. Are you interested in hearing more? If so, I can tell you more about it. Your decision to take part or not to take part in the project, or stop participating in project at any time, will **never** affect your access to services or supports at Dilico.

Appendix F: Information Letter

Dr. Christopher Mushquash
Department of Psychology
t: (807) 343-8239 f: (807) 346-7734
e: chris.mushquash@lakeheadu.ca

Study Information Letter:
Understanding Childhood Experiences and Relation to Substance Use for First Nations People

Principal Investigator: Dr. Christopher Mushquash, Lakehead University, in collaboration with Dilico Anishinabek Family Care
Email: chris.mushquash@lakeheadu.ca
Phone: (807) 343-8239
Student Investigators: Elaine Toombs and Jessie Lund, Lakehead University
Email: etoombs@lakeheadu.ca or jlund@lakeheadu.ca

Dear potential participant,

We invite you to take part in a research study being conducted by Dr. Christopher Mushquash, Elaine Toombs, and Jessie Lund, in partnership with Dilico Anishinabek Family Care. As someone seeking treatment for substance use, your experiences and perspectives may help us understand how childhood experiences may influence substance use across your lifetime.

Your participation in this study is voluntary and you may withdraw from this study at any time**. Your decision to take part or not to take part in the study, or to drop out of the study at a later time, will never affect your access to services or supports at Dilico Anishinabek Family Care.** You should discuss any questions you have about this study with Dr. Mushquash, Elaine Toombs, Jessie Lund, or your counsellor at Dilico. Please take as much time as you need to decide if you'd like to participate.

Purpose of this study
The purpose of this study is to understand how childhood experiences of trauma may influence substance use and other health outcomes for First Nations people.

Who can participate in this study?

You must be a current client at the Adult Residential Treatment Centre (ARTC) and aged 18 years or older to participate in this study.

Who will be conducting the research?

Dr. Christopher Mushquash, Elaine Toombs, Jessie Lund, and staff at Dilico Anishinabek Family Care will be conducting the research.

What will I be asked to do?

You will be asked to complete questionnaires with your individual counsellors at ARTC. Some of these questionnaires will be used for your treatment at ARTC and would be completed with your individual counsellor whether you agree to participate in this study or not (ie: for clinical purposes). Some questionnaires however will only be used for research purposes. If you consent to participant in this study, some information collected as part of your intake to ARTC (including prior treatment history, substance use history, and health history) will also be shared with study researchers. No identifying information (such as your birth date, home address, or health insurance information) will be shared. Additional questions will ask you about individual and family life experiences about substance use, addiction, health outcomes, and trauma. Some questions will ask about difficult experiences you may have had in your life, which may be difficult to answer or may cause distress. It will take approximately 90 minutes to complete these questions, which will be completed in two sessions. If you agree to participate, you will have the option to complete questions individually using pen and paper or have the questions read to you and you respond orally. You do not have to answer all questions and can skip questions that you are not comfortable answering.

What are the burdens and potential harms to participation?

There is a possibility that answering some of the questions may make you feel upset. There is a small burden of time associated with the completion of the assessment questions and program content. If you feel upset at any time completing the study, please contact your counsellor at ARTC as they can connect you with appropriate resources. If you have research related questions, please contact your Dr. Mushquash by phone at (807) 343-8239 or by email at chris.mushquash@lakeheadu.ca.

What are the potential benefits?

There are minimal individual benefits to participating in this study. You may find it satisfying to contribute to research programs and/or help First Nations communities understand how adverse childhood experiences may influence substance use.

Can I withdraw from the study?

This study is voluntary. You are free to withdraw from the study at any time, and free to remove your answers from the study, up until the point at which the study is complete (approximately December 2019). Your decision to take part or not to take part in the study, or to drop out of the study at a later time, will never affect your access to services or supports at Dilico Anishinabek Family Care.

How will my privacy be protected?

Anonymity: Your individual information will not appear in any reports or publications. All information will only be used when it is combined with other participants' information, without your name or other information that would identify you. Several steps have also been taken to protect your confidentiality (see below).

Confidentiality: All information obtained is strictly confidential. The information you provide will only be accessed by designated members of the research team. All Dilico staff are trained to maintain your confidentiality and have signed confidentiality agreements.

Consistent with Lakehead University's policy on research data storage, paper copies of your information will be securely stored for 5 years after the completion of the study at Dilico. Your consent form will be stored separately from any collected data. These files will be stored in a locked filing cabinet in a locked office at Dilico, like all other client files. Electronic versions of de-identified data will be held for an indefinite period of time and will be kept in a password-protected USB drive in Dr. Mushquash's locked laboratory for a brief time and then will be held for 5 years at Dilico.

Electronic versions of the data will never include your name or contact information but will contain the following information about you: age, sex, ethnicity (i.e., self-reported ethnicity and country of birth), occupation, and nature of employment (e.g., full-time, part-time, etc.). Electronic information will be used by researchers at Lakehead University for a brief time and then stored at Dilico.

How can I receive a copy of the study results?

If you would like to receive a summary of study results, you can indicate this on the study consent form and provide your contact information. Individual results will not be made available to participants.

What if I have study questions or problems?

If you have any questions about this study or your participation, you may contact Dr. Mushquash by emailing chris.mushquash@lakeheadu.ca.

What are my research rights?

If you have any difficulties with, or wish to voice concern about, any aspect of your participation in this study, you may contact Lakehead University's Research Ethics Board for assistance at (807) 343-8283.

This study has been approved by the Lakehead University Research Ethics Board. If you have any questions related to the ethics of the research and would like to speak to someone outside of the research team please contact Sue Wright at the Research Ethics Board at 807-343-8283 or research@lakeheadu.ca.

Appendix G: Consent Form

Department of Psychology
t: (807) 343-8239 f: (807) 346-7734
e: chris.mushquash@lakeheadu.ca

CONSENT FORM: Understanding Childhood Experiences and Substance Use for First Nations People

Agreement to Participate

1) **Study Purpose**: Dilico Anishinabek Family Care, in collaboration with Dr. Christopher Mushquash at Lakehead University, is doing this study to understand how childhood experiences of trauma may influence substance use and other health outcomes for First Nations people.

2) **Participation:** We are inviting clients of the Adult Residential Treatment Centre (ARTC) to participant in approximately an hour interview asking about individual and family life experiences about substance use, addiction, health outcomes, and trauma.

3) **Confidentiality:** All information given is private and we will not share your individual answers with anyone outside of the research team. All Dilico staff are trained to maintain participant confidentiality and have signed confidentiality agreements. Study information will be kept in locked cabinets at Dilico Anishinabek Family Care offices in Thunder Bay for 5 years, and then destroyed. Your consent form will be stored separately from any collected data. Electronic information will be password protected. All information that you provide will be combined with information from all the other people interviewed, so no one will know what you said specifically. We will never use your name in our reports or presentations.

4) **Benefits and Risks**: There are minimal benefits and risks to you during your study participation. Some people may find it satisfying to participate in research activities. There is a possibility that answering some of the questions or participating in this study may make you feel upset. If you do feel uncomfortable or upset during your participation, please tell your counsellor at ARTC as they can help support you and connect you with appropriate resources to help.

5) **Reporting:** When our study is complete, we will prepare a summary of findings. You will also be able to request a summary of results by contacting the research team. In collaboration with the project advisory, we may prepare additional reports for publication in order to share the information for the benefit of others working with First Nations people with substance use concerns. Again, as a participant in this study, we will never include your name – your confidentiality and privacy will always be respected.

6) **Further Information**: If you have questions about the study after the study is completed or wish to receive a copy of the study results, you can contact Dr. Christopher Mushquash by

telephone at (807) 343-8239 or by email at chris.mushquash@lakeheadu.ca. If you wish to speak to someone other than a researcher about the study, you may call the Lakehead University Research Ethics Board at (807) 343-8283.

7) **Confirmation of Agreement to Participate**: It is your choice if you would like to participate in this study. Your decision to take part, or not take part, will **never** affect the services you receive from Dilico Anishinabek Family Care.

a) I agree to the following:

- ✓ I have read and understand the information contained in the Information Letter
- ✓ I agree to participate
- ✓ I understand the risks and benefits to the study
- ✓ That I am a volunteer and can withdraw from the study at any time, and may choose not to answer any question
- ✓ That the data will be securely stored at Dilico for a minimum period of 5 years following completion of the research project
- ✓ I understand that the research findings will be made available to me upon request
- ✓ I will remain anonymous
- ✓ All of my questions have been answered
- ✓ By consenting to participate, I have not waived any rights to legal recourse in the event of research-related harm.

b) Would you like to receive a copy of the study results?

_____ Yes _____ No

If you would like to receive a copy of the results, please provide us with your contact information:

Mailing Address **Email Address**

Participant Name: _____ **Witness Name**: _____

Signature: _____ Signature: _____

Date: _____ Date: _____

Optional study information:

In order to understand more about how childhood experiences affect health outcomes for First Nations people, we would like to contact study participants again to ask other questions that relate to your overall health and wellbeing, including how biological stress hormones may influence overall health.

Would you like to be contacted to receive more information about these studies?

_____ Yes _____ No

To receive more information, please provide us with your contact information:

Mailing Address **Email Address** **Telephone Number**