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Application of the Acquired Preparedness Model for Alcohol and Cigarette Use Among Reserve-Dwelling First Nation Adolescents

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Abstract

Objective: North American Indigenous youth experience disproportionate harm associated with alcohol and cigarette use compared to other racial/ethnic groups. The Acquired Preparedness Model (APM), developed and tested in primarily White samples, hypothesizes that urgency contributes to risk for substance use by influencing the degree to which adolescents attend to positive aspects of substance use, leading to the development of more positive expectations about the consequences of substance use, and increasing subsequent substance use. The purpose of the present study was to provide an initial test of whether the APM generalizes to understanding alcohol and cigarette use among high-risk First Nation adolescents.

Methods: First Nation adolescents (n = 106, M_{age} = 14.6, 50.0% female) recruited from reserve communities in Eastern Canada completed self-report measures as part of a larger community-based participatory research project. Procedures were approved by tribal chief, council, and university IRB.

Results: The hypothesized model demonstrated excellent fit for alcohol use ($\chi^2(1) = 1.07$, p = .30, CFI = 0.99, RMSEA = .03, SRMR = .02), and adequate fit for cigarette use ($\chi^2(1) = 2.58$, p = .11, CFI = 0.98, RMSEA = 0.12, SRMR = 0.03). The indirect effects of urgency on alcohol consumption and cigarette smoking through alcohol and cigarette expectancies were each significant.

Conclusions: Findings of the present study provide initial support for the generalizability of the APM in understanding risk for alcohol and cigarette use among reserve-dwelling First Nation youth. The next important step is to replicate this finding in a prospective sample.

Keywords

impulsivity; alcohol use; cigarette use; expectancies; urgency

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Introduction

Substance use among North American Indigenous (NAI) adolescents is of crucial public health concern and has been identified by Indigenous communities as among the most pressing concerns they face (Spillane et al., 2020). While there is variability across communities, NAI groups tend to have higher rates of substance use when compared to their non-NAI counterparts (Beebe et al., 2008; Swaim & Stanley, 2018). Specifically, NAI adolescents report higher rates of lifetime alcohol use, with 39.7% of 8th graders, 52.9% of 10th graders, and 72.5% of 12th graders drinking alcohol, compared to 22.8%, 43.4%, and 61.2% of non-NAI 8th, 10th, and 12th graders, respectively (Swaim & Stanley, 2018). Similarly, rates of cigarette use are higher among NAI adolescents, with 29.7% of 8th graders, 42% of 10th graders, and 49.7% of 12th graders smoking cigarettes, compared to 9.8%, 17.5%, and 28.3% of non-NAI 8th, 10th, and 12th graders, respectively (Swaim & Stanley, 2018). This is of great concern, as earlier initiation of substance use among NAI adolescents is associated with increased risk for developing a substance use disorder later in life (Hautala et al., 2019), as well as greater risk for engaging in problematic patterns of substance use (e.g., binge drinking; Young & Joe, 2009). Moreover, NAI youth are at high risk for experiencing negative consequences related to substance use compared to non-NAI adolescents (Henry et al., 2011; King et al., 2014; Young & Joe, 2009; Jetty, 2017; Kirk-Provencher et al., 2020; Szlemko et al., 2006). Despite these findings, we still do not have a clear picture of what places NAI adolescents at greater risk for substance use. Identifying theory-based risk and protective factors can help to inform and isolate key targets for prevention and intervention in this high-risk group.

The acquired preparedness model (APM; see Figure 1 for a theoretical model) has been applied to explain inter-individual differences in substance use (Settles et al., 2010; Corbin et al., 2011). The APM is based on person-environment transaction theory, which posits that two individuals may not experience objectively common events in the same way due to individual differences in personality traits (Caspi, 1993). Specifically, the APM states that individuals are differentially prepared to acquire new information from an experience as a function of their personality (Smith & Anderson, 2001). Applied to substance use, the APM theorizes that impulsive personality traits relate to substance use both directly, and indirectly through learning of positive expectations about such substance use. These learned expectations, often referred to as “expectancies”, are “if…then” statements reflecting “If I drink alcohol…then X will happen” (Fromme et al., 1997; Goldman et al., 1987). The APM model posits that the learning of positive substance use expectancies then leads to subsequence substance use (Anderson et al., 2003; Doran et al., 2013; McCarthy et al., 2001). Although well-supported across a range of cross-sectional and longitudinal studies, the APM was originally developed and tested among primarily White samples, leaving a question as to whether or not it can be validly applied to NAI communities.

Some personality traits appear more relevant to the APM model than others. One of the dominant theories of impulsivity, the UPPS-P Impulsive Behavior Model (Urgency, Premeditation, Perseverance, Sensation Seeking, Positive Urgency), describes impulsivity as five distinct but related traits (Cyders & Smith, 2007; Whiteside et al., 2005). One of these traits that has been found to influence substance use-related learning is *urgency*, defined as

the tendency to act rashly in response to intensive negative emotions (i.e., negative urgency) or positive emotions (i.e., positive urgency; Cyders & Smith, 2007). Urgency is robustly associated with both alcohol use (Cyders et al., 2007; Cyders et al., 2010) and cigarette smoking (Lee et al., 2015; Cyders et al., 2007), including for adolescents (Burris et al., 2017; Riley et al., 2016). Additionally, research has shown that the relationship between urgency and alcohol use is mediated by positive alcohol expectancies, supporting the strong role of urgency in the APM (Settles et al., 2010; Doran et al., 2013; Luba et al., 2018). Using the APM, an explanation for the observed association between urgency and alcohol and cigarette use may be that individuals who are high in urgency may be more likely to find that alcohol and cigarette use are reinforcing in the short term (i.e., because they provide negative reinforcement of distress relief or positive reinforcement of mood enhancement). Thus, these individuals are more likely to form learned expectancies that alcohol and cigarette use are rewarding, increasing the likelihood that they will drink alcohol or smoke cigarettes in the future (Fischer et al., 2005).

There is compelling reason to believe that the APM will hold true in NAI populations. Indeed, there is indirect evidence that the APM generalizes to NAI communities. Certain components of the APM have been examined in NAI youth; specifically, evidence shows support for substance use expectancies as a risk factor for substance use in NAI youth (Goldstein et al., 2021; Schick et al., *under review*). The formation of positive substance use expectancies may be especially important in communities with high rates of substance use, such as some NAI communities. For instance, in qualitative interviews, NAI youth in one community reported that they believe substance use to have positive effects because they observe adults within their community using substances while doing other enjoyable activities (e.g., playing baseball; Spillane et al., 2020). The APM may help to explain the wide inter-individual variability in substance use rates reported among NAI communities (i.e., wherein NAI individuals are at highest risk for problematic substance use, but also have the highest rates of abstinence; Swaim & Stanley, 2018; US Department of Health and Human Services, 2010). Further, one study found that the APM holds in a sample of NAI adults (Spillane & Smith, 2010), providing indirect support that it might also apply in NAI youth.

Yet, the cross-cultural validity of the APM is important to examine. There have been calls to avoid indiscriminately applying theories that were developed based on the values and behaviors of one normative cultural group to other groups (Hardin et al., 2014; Quintana et al., 2001). By not examining the applicability of theories within specific cultural groups, we risk introducing bias when drawing conclusions across groups. Indeed, other psychological theories (e.g., Person-Environment Fit Theory, Personal Growth Initiative Theory; Holland et al., 1997; Robischek et al., 2012) and interventions (e.g., cognitive-behavioral interventions; Horrell, 2008; Miranda et al., 2005) developed primarily using Eurocentric, White, and United States-based samples have been found to require adaptation for use with other cultural groups. Thus, the purpose of the present study is to examine the generalizability of the APM to understand risk for alcohol consumption and cigarette smoking in a sample of First Nation adolescents. Specifically, we hypothesized that: 1) urgency would be significantly positively associated with alcohol and cigarette use; 2) positive expectancies related to alcohol consumption and cigarette smoking would be

significantly positively associated with alcohol and cigarette use, respectively; and 3) the relationship between urgency and alcohol consumption and cigarette smoking would be indirectly explained by positive alcohol and cigarette expectancies.

Methods

Participants and Procedures

The present study represents a secondary analysis of data collected as part of a larger community-based participatory research study examining risk and protective factors associated with substance use among First Nation adolescents (Spillane et al., 2020; Spillane et al., 2021a). This work was not preregistered, and study materials are available upon request to the corresponding author. Participants were First Nation adolescents between the ages of 10 and 18 living in a reserve community and were recruited via snowball sampling through advertisements and announcements in reserve communities as well as through word-of-mouth. All research procedures were approved by institutional IRB and tribal chief and council prior to data collection. Parent permission was acquired prior to recruiting each adolescent into the study; once parent permission was obtained, research staff explained the study to the adolescent, who provided written assent. Of note, all prospective participants who approached study staff were eligible to participate, had parent permission, and provided assent to participate. A total of 106 First Nation adolescents from reserve communities in Eastern Canada completed pencil-and-paper surveys in the spring of 2017. The questionnaires took approximately 45 minutes to complete, and participants were compensated $25 USD for their time and effort.

Measures

Urgency—Urgency was measured using the 12 negative urgency items (e.g., “when I feel bad, I will often do things I later regret in order to make myself feel better now”) and 14 positive urgency items (e.g., “when I am very happy, I can’t seem to stop myself from doing things that can have bad consequences”) on the Urgency, Premeditation, Perseverance, Sensation Seeking, Positive Urgency (UPPS-P) scale (Cyders & Smith, 2007; Whiteside et al., 2005), a global measure of impulsivity. Participants rated each item on a 4-point Likert-type scale with four possible response options (1 = *agree strongly,* 5 = *disagree strongly*). Item scores were reverse coded as needed such that higher scores on each item indicate more impulsive behavior and summed to create total scale scores reflecting negative and positive urgency. The UPPS-P subscales have shown good internal consistency, and convergent and divergent validity, including in samples of Indigenous people (Spillane et al., 2012); Cronbach’s α in the current sample was .74 and .76 for the negative and positive urgency subscales, respectively.

Outcome Expectancies—Alcohol expectancies were assessed using eight items chosen by the Voices of Indian Teens survey (Mitchell, 1993) from the Alcohol Expectancy Questionnaire (AEQ; Mann et al., 1987), reflecting positive outcomes that individuals believe will happen if they drink alcohol. Participants rate the extent to which they believe each statement is accurate on a Likert-type scale with five possible response options (0 = *disagree,* 4 = *agree*). Scores are summed to create a total scale score; higher values reflect

more positive alcohol expectancies. Internal consistency in the present sample was excellent (Cronbach's α = .92).

Cigarette expectancies were measured using the Adolescent Smoking Consequences Questionnaire (ASCQ; Lewis-Esquerre et al., 2005), a 30-item self-reported measure assessing the outcomes that adolescents believe they will experience if they smoke cigarettes. Participants rate the extent to which they believe each statement is accurate with five possible response options (0 = *never*, 4 = *always*). Scores are summed to create a total scale score; higher values reflect more positive cigarette expectancies. Internal consistency in the present sample was excellent (Cronbach's α = .96).

Substance Use—Past three-month alcohol consumption was measured using the Adolescent Drinking Questionnaire (ADQ) comprised of 4 self-report items drawn from the Adolescent Health Behavior Questionnaire (Jessor et al., 1989) assessing frequency of drinking, high-volume drinking, drinking until intoxicated, and average number of drinks per drinking day over the past three months. Participants rated each item on an 8-point scale (frequency: 0 = *never,* 7 = *everyday*; quantity: 0 =*1 standard drink*, 7 = *more than 10 standard drinks*). Item scores were summed to create a total scale score, with higher scores reflecting greater alcohol consumption. Cronbach's α in the current sample was .87. Lifetime alcohol use was measured by one item asking participants whether they had ever had a full drink of alcohol in their lifetime.

Past month cigarette smoking was measured with one item asking how many days in the past 30 days participants had smoked cigarettes. Lifetime cigarette smoking was measured by one item asking whether participants had smoked at least 100 cigarettes in their lifetime.

Analytic Strategy

As recommended by Tabachnick & Fidell (2007), all study variables were assessed for assumptions of normality. Two participants did not complete the entire survey (i.e., both stopped immediately after completing demographic information), and thus were removed from analyses to allow for complete-case analysis. Next, in SPSS, Pearson correlations were calculated among the primary study variables to explore their bivariate associations, and independent samples *t*-tests were used to assess whether there were significant differences between adolescents who had (versus did not have) a lifetime history of drinking a full drink of alcohol and had smoked 100 cigarettes in their lifetime with respect to urgency and with respect to expectancies.

Finally, in *M*plus version 7.1, two structural equation models using maximum likelihood estimation were used to examine whether expectancies indirectly explained the relation between urgency and past three-month alcohol use and past month cigarette use (i.e., the acquired preparedness model). Urgency was modeled as a latent (exogenous) variable measured with the negative and positive urgency subscales of the UPPS-P in both models. Factor analytic examinations of the UPPS-P model of impulsivity by (Cyders & Smith, 2007) have found support for the conceptualization of impulsivity as hierarchical with three main facets (i.e., urgency, sensation seeking, and deficits in conscientiousness), and with positive and negative urgency loading onto a single urgency trait. In the first model, positive

alcohol expectancies were modeled as a single observed (endogenous) variable measured with the AEQ, and alcohol consumption was modeled as a single observed (endogenous) variable measured with the ADQ. In the second model, cigarette expectancies were modeled as a single observed (endogenous) variable measured with the ACSQ, and cigarette use was modeled as a single observed (endogenous) variable measured with the single-item assessing frequency of cigarette smoking.

Overall model fit was assessed using the likelihood ratio test based on the chi-square value, with a nonsignificant likelihood ratio test indicating good model fit (Hu & Bentler, 1999). However, because the chi-square test often rejects even adequately fitting models (Bentler, 1990), fit indices based on the chi-square distribution were also used to assess model fit. Agreement among fit indices provides evidence that at least adequate model fit has been achieved. The comparative fit index (CFI, with values > .95 indicating good fit; Bentler, 1990), root mean square error of approximation (RMSEA, with values < .05 indicating good fit and < .10 indicating adequate fit; Steiger, 1990), and standardized root mean square residual (SRMR, with values < .08 indicating acceptable fit; Hu & Bentler, 1999), were used. The bootstrap method was used to estimate the standard error of parameter estimates and bias-corrected confidence intervals of the indirect effects (MacKinnon et al., 2002); 1,000 bootstrapped samples were used to derive estimates of the indirect effect.

Results

Preliminary Analyses

See Table 1 for a summary of participant sociodemographic characteristics and substance use behaviors. Based on benchmarks of skewness > 2 and kurtosis > 7 reflecting non-normality (Curran et al., 1996), scores for the primary study variables were normally distributed.

Hypothesis One: Urgency is associated with engagement in risk behaviors

Bivariate correlations and descriptive statistics for primary study variables of interest are presented in Table 2. Negative and positive urgency were both significantly positively associated with both alcohol and cigarette expectancies, and negative urgency was significantly positively associated with lifetime cigarette smoking. Results of independent samples *t*-tests are summarized in Table 3. Mean levels of negative ($t[103] = -0.31$, $p = .76$) and positive urgency ($t[103] = -0.24$, $p = .81$) were not significantly different between adolescents who had (versus had not) had a full drink of alcohol in their lifetime. Likewise, mean levels of negative ($t[103] = -1.58$, $p = .12$) and positive urgency ($t[103] = -0.34$, $p = .74$) did not significantly differ between adolescents who had (versus had not) smoked at least 100 cigarettes in their lifetime.

Hypothesis Two: Expectancies are associated with engagement in risk behaviors

Alcohol expectancies were significantly positively associated with past three-month and lifetime alcohol consumption, while cigarette expectancies were significantly positively associated with lifetime use and past month frequency of cigarette smoking. Mean levels of alcohol expectancies were found to significantly differ between adolescents who had

(versus had not) had a full drink of alcohol in their lifetime ($t[96] = -3.92$, $p < .001$, $d = .80$). Adolescents who had a full drink of alcohol reported significantly higher alcohol expectancies ($M = 13.74$, $SD = 7.79$) compared to those who had not had a full drink of alcohol ($M = 7.40$, $SD = 7.98$). Levene's test for equality of variances revealed that the assumption of homogeneity of variance was not met when examining differences in smoking expectancies between those who had (versus had not) smoked at least 100 cigarettes in their lifetime; we examined *t*-test results assuming unequal variances. Mean levels of smoking expectancies were found to significantly differ between those who had (versus had not) smoked at least 100 cigarettes in their lifetime ($t[57.10] = -3.64$, $p = .001$, $d = .77$). Adolescents who had smoked at least 100 cigarettes reported significantly greater cigarette expectancies ($M = 47.62$, $SD = 18.82$) compared to those who had not smoked at least 100 cigarettes ($M = 30.62$, $SD = 25.04$).

Hypothesis Three: The Acquired Preparedness Model

Alcohol Use—The hypothesized structural model demonstrated excellent model fit, $\chi^2(1) = 1.07$, $p = .30$, CFI = 0.99, RMSEA = 0.03, 90%*CI* [0.00, 0.26], SRMR = 0.02; this model is summarized in Figure 2. The association between urgency and alcohol expectancies was significant (β = 0.34, $SE = 0.11$, $p = .001$, 95%*CI* [0.11, 0.55]), as was the association between alcohol expectancies and past three-month alcohol consumption (β = 0.36, $SE = 0.08$, $p < .001$, 95%*CI* [0.18, 0.51]). Furthermore, the indirect effect of urgency on past three-month alcohol consumption through alcohol expectancies was also significant (β = 0.13, $SE = 0.05$, $p = .01$, 95%*CI* [0.03, 0.23]), while the direct effect linking urgency and past three-month alcohol consumption was not significant when controlling for alcohol expectancies (β = −0.01, $SE = 0.10$, $p = .93$, 95%*CI* [−0.16, 0.20]).

Cigarette Use—The hypothesized structural model demonstrated adequate model fit, $\chi^2(1) = 2.58$, $p = .11$, CFI = 0.98, RMSEA = 0.12, 90%*CI* [0.00, 0.32], SRMR = 0.03; this model is summarized in Figure 3. The association between urgency and cigarette expectancies was significant (β = 0.31, $SE = 0.13$, $p = .01$, 95%*CI* [0.04, 0.51]), as was the association between cigarette expectancies and past month frequency of smoking cigarettes (β = 0.33, $SE = 0.08$, $p < .001$, 95%*CI* [0.16, 0.48]). Further, the indirect effect of urgency on past month frequency of cigarette smoking through cigarette expectancies was significant (β = 0.10, $SE = 0.05$, $p = .04$, 95%*CI* [0.01, 0.20]), and the direct effect linking urgency and past month frequency of smoking cigarettes was not significant when controlling for cigarette expectancies (β = −0.09, $SE = 0.14$, $p = .48$, 95%*CI* [−0.30, 0.18]).

Discussion

The purpose of the present study was to examine the generalizability of the APM to understand risk for alcohol and cigarette use in a sample of reserve-dwelling First Nation adolescents. Of note, we found that more than half of our sample reported having drank alcohol and nearly a quarter reported having smoked at least 100 cigarettes in their lifetime. These rates are higher than prevalence rates of cigarette and alcohol use observed in a nationally representative sample of Canadian adolescents (Boyes et al., 2017). Thus, there is a pressing need to better understand the risk processes both leading to the initiation of

alcohol use and cigarette smoking, as well as escalation in use among NAI adolescents. Our findings provide initial support for the use of the APM as a model of risk and highlight the need for more intensive tests of the APM in this population.

We found that there were not significant differences in either positive or negative urgency across individuals who had (versus had not) consumed a full drink of alcohol or smoked at least 100 cigarettes in their lifetime. One explanation for the lack of an observed difference between youth who had (versus had not) initiated substance use may reflect previous work largely focusing on urgency with respect to intensity of substance use and problems related to substance use rather than simply use per se (e.g., Spillane & Smith, 2010). Thus, it may be that levels of urgency would be more likely to differ between youth reporting problems related to their substance use versus not than between youth in the earlier stages of substance use (e.g., those who recently initiated substance use) versus those who had never used. More work is needed to investigate this possibility and other potential reasons for this finding. However, urgency was significantly associated with substance use variables at the bivariate level. This correlational finding is in alignment with previous evidence in both Indigenous (Tingey et al., 2016; Spillane & Smith, 2010) and non-Indigenous samples finding urgency to be a robust risk factor for substance use (Coskunpinar et al., 2013; Burris et al., 2017; Riley et al., 2016). Further, this result is well-aligned with previous literature finding pubertal onset (i.e., the early adolescent years) to be associated with increases is urgency, and thus risk for substance use (Gunn & Smith, 2010). Impulsivity traits tend to decline linearly over time through young adulthood after peaking in adolescence (Harden & Tucker-Drob, 2011; Churchwell & Yurgelun-Todd, 2013). This, combined with our finding that urgency was significantly related to substance use variables, speaks to the importance of identifying ways of mitigating the effects of urgency for high-risk adolescents.

Next, we found that expectancies were significantly different between youth who had (versus had not) consumed a full drink of alcohol or smoked at least 100 cigarettes in their lifetime, such that those reporting lifetime substance use reported higher levels of expectancies and were significantly associated with alcohol and cigarette use. This finding is consistent with a large body of literature finding substance use expectancies to be among the most robust predictors of substance use (Cable & Sacker, 2007; Dieterich et al., 2013; Smit et al., 2018; Nikčević et al., 2017), including among Indigenous adolescents (Goldstein et al., 2021). Since expectancies can be formed through direct or indirect methods, it is important to target communities with high availability of substances. In such settings, adolescents may be more likely to view older adolescents and adults using substances (Spillane et al., 2020). Such modeling of substance use has been found to promote positive expectancies, increasing the likelihood that adolescents will initiate substance use (Brown et al., 1999; Smit et al., 2020; Whiteman et al., 2016). Thus, adults could be encouraged to avoid using alcohol and cigarettes in the presence of children and adolescents to avoid reinforcing the development of positive expectancies.

Alternatively, community-wide interventions could aim to reduce the availability of substances to adolescents. Previous work suggests that, among NAI adolescents, decreased substance availability is associated with decreased beliefs regarding the acceptability of that substance (Spillane et al., 2021b). Environmental strategies to limit the availability

of substances to adolescents have included targeting the sale of alcohol to minors by convenience stores (Moore et al., 2012) and community mobilization efforts to raise community-level awareness about the risks of underage substance use via distributing educational materials for youth, parents, and other important stakeholders (Moore et al., 2018). Yet, work is needed to examine whether these interventions might indirectly affect adolescents' development of positive substance use expectancies. Findings of the present study suggest that directly challenging substance use expectancies may be one important component of interventions aiming to reduce the likelihood that adolescents will use alcohol or cigarettes. Some work has found that expectancy challenge techniques, which directly challenge positive substance use expectancies by discussing expectancies and emphasizing the distinction between the behavioral (i.e., expectancy) and pharmacological effects of alcohol (Darkes & Goldman, 1993), are effective in reducing substance use, including both alcohol expectancies and subsequent amount of alcohol consumed (Scott-Sheldon et al., 2012; Wood et al., 2007). Other interventions, such as those which incorporate principles of motivational interviewing (e.g., creating a decisional balance; Miller & Rollnick, 2013) to assist adolescents with identifying and weighing their own positive and negative expectations for substance use may also be helpful. It may be that such techniques would allow adolescents to indirectly challenge the positive expectancies they hold, which would promote their healthy decision-making regarding substance use (LaBrie et al., 2006; Thush et al., 2009). Indeed, motivational interviewing has been found to be efficacious in reducing substance use when culturally adapted for use with NAI adolescents (D'Amico et al., 2020; Dickerson et al., 2016). Additionally, brief interventions including components of motivational enhancement have been found to have the largest effects on adolescent substance use compared to other types of brief interventions (for a meta-analytic review, see Tanner-Smith & Lipsey, 2015). Future work is needed to continue to examine the efficacy of these interventions for NAI youth and to understand the extent to which additional cultural adaptations may be needed.

Finally, we found support for an indirect effect of urgency on alcohol consumption and cigarette smoking through the pathways of alcohol and cigarette expectancies, providing preliminary support for the overall APM in explaining risk for engaging in alcohol and cigarette use. In the model examining risk for alcohol use, the direct effect of urgency on alcohol use dropped nearly to zero when accounting for the effect of alcohol expectancies. This is well-aligned with previous research finding support for the APM in risk for alcohol use among NAI adults (Spillane & Smith, 2010). It may be that learning-based factors (i.e., expectancies developed based on observation of consequences of drinking observed around them) are more proximal and specific to particular behaviors (Baines et al., 2016) compared to disposition-based factors (e.g., urgency), which tend to be more distal (Wood et al., 2013). These expectancies may also be more social in nature (because they tend to be learned from observation of others using substances around them) and therefore more salient given that NAI communities tend to be more collectivistic and interdependent compared to other racial/ethnic groups. Indeed, recent literature highlights the importance of social risk and protective factors for Indigenous adolescent substance use (Spillane et al., 2020; Spillane et al., 2021a). Our findings may suggest that urgency is related to alcohol and cigarette use only in that it may influence the extent to which adolescents attend to reward-related

information when observing the consequences experienced by individuals around them when using substances.

This finding of initial support for the APM has implications for two important future lines of research. First, further work is needed to examine how these factors prospectively influence risk for substance use and to examine the generalizability of the directional pathways posited by the APM among NAI youth using longitudinal data. Next, if these associations are found to hold in longitudinal tests, challenging alcohol expectancies, either directly or through motivational interviewing approaches, may be a viable and important avenue for intervening to target substance use among high-risk NAI youth.

It is worth noting that, while the present study provides strong preliminary support for the use of the APM to understand NAI adolescent alcohol and cigarette use, there are likely other important factors to consider that are not captured in this model. For instance, the APM does not consider important environmental factors that are relevant to adolescent substance use such as relative availability of substances (Broman, 2016; Spillane et al., 2021b) or individual sociodemographic influences, such as socioeconomic status (Andrabi et al., 2017). Further, it is important to recognize the sociocultural context in which NAI youth live, and the influence of this context on substance use. Historical trauma, defined as the cumulative response to chronic trauma and unresolved grief across generations, stemming from widespread genocide, legally sanctioned ethnic cleansing, and policies of forced acculturation, has been linked to substance use and substance-related health disparities among NAI communities (Brave Heart, 2003; Gone et al., 2019). In the present day, NAI individuals continue to experience trauma related to the legacy of settler colonialism (e.g., bodies of hundreds of children being discovered in unmarked graves at the sites of residential schools; Coletta, 2021). Continued work is needed to test the generalizability of other prominent models of adolescent substance use to NAI youth, and to develop a unified theory of NAI adolescent substance use integrating existing psychological theories, historical trauma, and Indigenous knowledge.

While results of the present study contribute important knowledge to our understanding of the risk processes underlying NAI adolescent alcohol and cigarette use, they should be considered within the context of the study's limitations. First, the cross-sectional and correlational nature of this study precludes determination of the causal or temporal order of these associations. Specifically, we were unable to test whether urgency predicts the acquisition of positive alcohol and/or cigarette expectancies, as is posited by the APM. Longitudinal examinations are needed to assess the time-dependent associations among these variables. Second, these data were collected from one band of First Nation adolescents living on reserves in Eastern Canada. Given that there is significant variability across NAI groups, our findings may not generalize to other Indigenous groups, or to adolescents living in urban areas or off-reserve. Further, though our sample represents approximately one-third of the population of interest (i.e., adolescents within this age range from this cultural group; Indigenous and Northern Affairs Canada, 2016), it is relatively small. Additional research should examine these association in other, larger samples.

Despite these limitations, the present study provides important insights regarding the generalizability of the APM to understand risk for alcohol and cigarette use in this high-risk, reserve-dwelling First Nation adolescent sample. Despite the disproportionate substance use-related harm experienced by NAI youth, they remain an understudied group with few interventions for reducing or preventing substance use. Further work is needed in collaboration with Indigenous communities to fully parse out these associations, yet findings of the current study provide important cross-sectional initial support for such intensive investigations (i.e., to avoid allotting time and resources, and asking communities to expend their energy towards work that may not be needed if such support were not identified). Specifically, our findings provide partial support for the APM and speak to the need for more intensive tests of the model, including longitudinal examinations in larger samples to further elucidate these associations. Additionally, findings speak to the importance of learning processes (i.e., expectancies) in particular, and the need for interventions to target substance use expectancies.

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Public Health Significance:

The present study provided an initial test of the Acquired Preparedness Model to understand North American Indigenous adolescent alcohol and cigarette use. Findings suggest that urgency (i.e., personality traits) and expectancies (i.e., learning) are related to alcohol and cigarette use, and that expectancies explained the association between urgency and alcohol and cigarette use. Findings provide support for more intensive examinations of the Acquired Preparedness Model and underline the need for interventions designed to specifically target substance use expectancies for high-risk North American Indigenous adolescents.

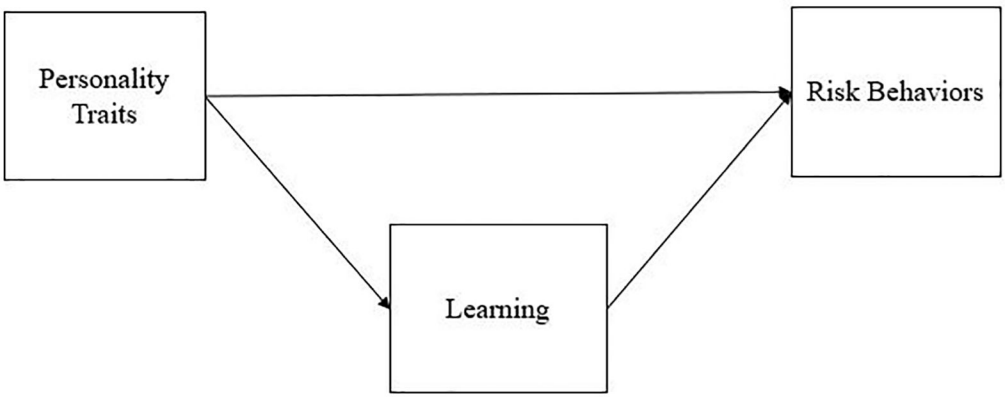

Figure 1.

Theoretical model depicting the Acquired Preparedness Model

Note. In the present study, personality traits are represented by urgency, learning is represented by alcohol and cigarette expectancies, and risk behaviors are represented by past three-month alcohol use and past month cigarette use.

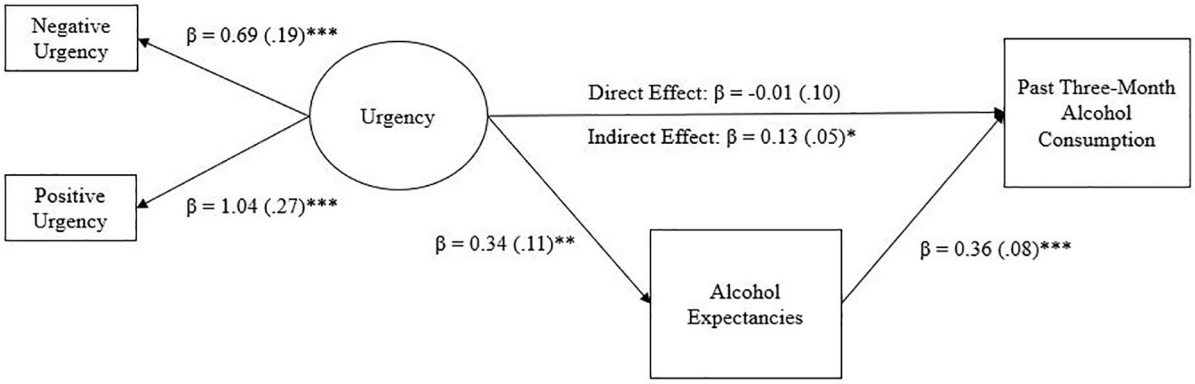

Figure 2.

Indirect Effect of Alcohol Expectancies in the Association between Urgency and Past Three-Month Alcohol Consumption

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

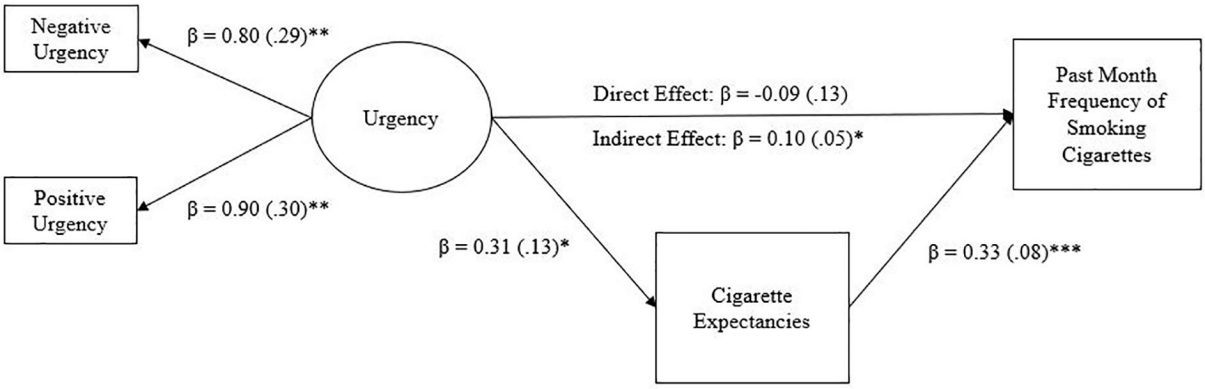

Figure 3.

Indirect Effect of Cigarette Expectancies in the Association between Urgency and Past Month Frequency of Smoking Cigarettes

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

Table 1

Participant Sociodemographic Characteristics and Substance Use

	n **(%)**	***M*** **(*SD*)**	**Range**
Age		14.58 (2.15)	11 – 18
Sex			
Male	53 (50.0%)		
Female	53 (50.0%)		
Alcohol use			
Lifetime	60 (56.6%)		
Past three-month	40 (37.7%)		
Cigarette use			
Lifetime	50 (47.2%)		
Past month	27 (25.5%)		
Marijuana use			
Lifetime	58 (54.7%)		
Past month	35 (33.0%)		
Lifetime use of other drugs	15 (14.2%)		

Table 2

Bivariate Correlations and Descriptive Statistics for Primary Variables of Interest

	1	2	3	4	5	6	7	8
1. Negative Urgency	-							
2. Positive Urgency	.72***	-						
3. Alcohol Expectancies	.22*	.36***	-					
4. Cigarette Expectancies	.27**	.27**	.46***	-				
5. Past Three-Month Alcohol Consumption	.15	.13	.37***	.19	-			
6. Past Month Frequency of Cigarette Smoking	.09	−.03	.10	.31***	.40***	-		
7. Lifetime Alcohol Use	−.03	−.03	.37***	.21*	.51***		-	
8. Lifetime Cigarette Smoking	.20*	.12	.22*	.19	.42***	.52***	.48***	-
M	28.32	31.40	11.15	34.91	3.85	5.37		
SD	6.13	6.45	8.43	24.68	5.64	11.00		
Range	8–43	17–46	0–32	0–95	0–25	0–30		

Note.

*$p < .05$

**$p < .01$

***$p < .001$

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Table 3

Independent Samples t Tests

Construct	Comparison Groups	*M*	*SD*	Test Statistic
Negative Urgency	Lifetime alcohol use	28.48	5.60	$t(103) = -0.31$, $p = .76$, $d = .06$
	No lifetime alcohol use	28.11	6.84	
	Have smoked at least 100 cigarettes in lifetime	29.96	5.89	$t(103) = -1.58$, $p = .12$, $d = .36$
	Have not smoked at least 100 cigarettes in lifetime	27.79	6.15	
Positive Urgency	Lifetime alcohol use	31.53	6.35	$t(103) = -0.24$, $p = .81$, $d = .05$
	No lifetime alcohol use	31.22	6.65	
	Have smoked at least 100 cigarettes in lifetime	31.77	6.49	$t(103) = -0.34$, $p = .74$, $d = .08$
	Have not smoked at least 100 cigarettes in lifetime	31.28	6.47	
Alcohol Expectancies	Lifetime alcohol use	13.74	7.79	$t(96) = -3.92$, $p < .001$, $d = .80$
	No lifetime alcohol use	7.40	7.79	
Cigarette Expectancies *	Have smoked at least 100 cigarettes in lifetime	47.62	18.82	$t(57.10) = -3.17$, $p = .002$, $d = .77$
	Have not smoked at least 100 cigarettes in lifetime	30.62	25.04	

Note.

* Levene's Test for Equality of Variances revealed that the assumption of homogeneity of variance was not met; thus, the test statistic assuming unequal variances is presented here.