HHS Public Access

Author manuscript

*Dev Psychol*. Author manuscript; available in PMC 2018 June 11.

Published in final edited form as:

*Dev Psychol*. 2015 May ; 51(5): 697–705. doi:10.1037/a0038978.

# The Utility of the Prototype/Willingness Model in Predicting Alcohol Use Among North American Indigenous Adolescents

**Brian E. Armenta**, **Dane S. Hautala**, and **Les B. Whitbeck**

Department of Sociology, University of Nebraska–Lincoln

## Abstract

In the present study, we considered the utility of the prototype/willingness model in predicting alcohol use among North-American Indigenous adolescents. Specifically, using longitudinal data, we examined the associations among subjective drinking norms, positive drinker prototypes, drinking expectations (as a proxy of drinking willingness), and drinking behavior among a sample of Indigenous adolescents from ages 12 to 14 years. Using an autoregressive cross-lagged analysis, our results showed that subjective drinking norms and positive drinker prototypes at 12 years of age were associated with increased drinking expectations at 13 years of age, and that greater drinking expectations at 13 years of age were associated with increased drinking behavior at 14 years of age. Our results provide initial evidence that the prototype/willingness model may generalize to Indigenous adolescents, a population that has received little attention within the psychological sciences. Our results also highlight some potential ways in which existing prevention efforts aimed at reducing substance use among Indigenous adolescents may be enhanced.

### Keywords

drinking; prototype/willingness model; Native Americans; Canadian First Nations; adolescents

Early research on alcohol use among North-American Indigenous populations (e.g., Native Americans) focused heavily on reporting ethno-cultural-related differences in alcohol-related behaviors. However, more recently, scholars have moved beyond making such simple comparisons (cf. Bryant & Kim, 2012; Wu, Woody, Yang, Pan, & Blazer, 2011) to focus on the factors that account for the variations in alcohol use of Indigenous populations (e.g., Cheadle & Whitbeck, 2011; Dickens, Dieterich, Henry, & Beauvais, 2012; Swaim, Beauvais, Walker, & Silk-Walker, 2011; Walls, Whitbeck, Hoyt, & Johnson, 2007). The present study contributes to this growing body of research by considering the utility of the prototype/willingness model (Gerrard, Gibbons, Houlihan, Stock, & Pomery, 2008; Gibbons, Gerrard, Blanton, & Russell, 1998) in predicting alcohol use among Indigenous adolescents. Specifically, using a longitudinal design, we examined the associations among subjective drinking norms, positive drinker prototypes, drinking expectations (as a proxy of drinking willingness), and drinking behavior among a sample of North-American

Correspondence concerning this article should be addressed to Brian E. Armenta, University of Nebraska–Lincoln, 120 Benton Hall, Lincoln, NE 68588. barmenta@unl.edu.

Indigenous (i.e., Native Americans and Canadian First Nations) adolescents from age 12 to 14 years (hereafter referred to as Indigenous adolescents).

## The Prototype/Willingness Model

Early models of behavioral decision-making postulated that risk behaviors result from a rational weighing of costs and benefits and are thus largely planful (e.g., Ajzen, 1991; Fishbein, 1980; for review, see Gerrard et al., 2008). By contrast, the prototype/willingness model (PWM; Gerrard et al., 2008; Gibbons et al., 1998) is founded on the premise that opportunities to engage in risk behaviors, specifically among adolescents, most often occur within social contexts (e.g., when with friends); thus, rather than being planned, an adolescent's decision to engage in a given risk behavior should be more strongly influenced by his or her openness or willingness to engage in that behavior. Extending this contextually embedded, social-reaction view of adolescent risk behaviors, the PWM posits that willingness to engage in a given risk behavior is influenced by one's beliefs regarding the extent to which others engage in that behavior (i.e., subjective behavioral norms) and the positive (or negative) characteristics that one associates with the prototypical individual who engages in that behavior (i.e., behavioral prototype). Theoretically, an adolescent who believes that many or most others engage in a given behavior (high subjective behavioral norms) and holds a positive image of the typical individual who engages in that behavior (positive behavioral prototype) should be more willing to, and thus at greater risk for, engaging in that behavior.

The PWM has been tested with several longitudinal data sets with non-Indigenous samples and has proven to be useful in predicting a wide range of adolescent risk behaviors, such as unsafe sexual behavior (e.g., Gibbons et al., 1998), substance use (e.g., Stock et al., 2013), and unsafe tanning practices (Gibbons, Gerrard, Lane, Mahler, & Kulik, 2005; for a review, see Gerrard et al., 2008). Focusing specifically on drinking behavior, studies have shown that greater willingness to drink is strongly associated with subsequent increases in drinking behavior among early to late adolescents (Blanton, Gibbons, Gerrard, Conger, & Smith, 1997; Dal Cin et al., 2009; Gibbons, Etcheverry, et al., 2010; Ouellette, Gerrard, Gibbons, & Reis-Bergan, 1999). Studies also have shown that more positive drinker prototypes are associated with increased drinking behavior, and that this association is partially or fully mediated by willingness to drink (Blanton et al., 1997; Dal Cin et al., 2009; Gibbons, Pomery, et al., 2010; Ouellette et al., 1999).

Although considered less frequently than drinker prototypes, studies also have supported the role of subjective drinking norms as outlined within the PWM. For example, using longitudinal data collected from early adolescents, Blanton and his colleagues (1997) showed that higher perceptions of subjective drinking norms were associated with increased willingness to drink, and that greater willingness to drink was in turn associated with increased drinking behavior. In another study, Litt and Stock (2011) assessed subjective drinking norms and willingness to drink after experimentally manipulating perceived drinking norms by having adolescents evaluate mock social network pages that varied in the degree to which posted pictures depicted adolescents engaging in drinking behavior. Their results showed that adolescents who viewed the high drinking norms pages reported higher

subjective drinking norms than did their counterparts who viewed the low drinking norms pages. Subjective drinking norms were in turn positively associated with self-reported willingness to drink.

## Present Study

We are aware of no studies that have tested the theoretical postulates of the PWM among Indigenous youths. The primary aim of the present study was to fill this gap by examining a portion of the PWM among a sample of Indigenous adolescents. In particular, we examined the longitudinal links among subjective drinking norms, positive drinker prototypes, future drinking expectations (as a proxy of willingness to drink), and drinking behavior among a sample of Indigenous adolescents (i.e., American Indian and Canadian First Nations youths). Our data allowed us to examine the associations among these variables from 12 to 14 years of age for our sample.

We had no strong reasons to believe that the PWM would not apply to Indigenous adolescents. Indeed, Dieterich, Stanley, Swaim, and Beauvais (2013) showed that perceived drinking norms were positively associated with past month drinking, past month drunkenness, and past 2-week binge drinking among a sample of Indigenous adolescents. Moreover, Walls and Whitbeck (2011) showed that a latent factor defined by positive substance use prototypes and friend substance use behaviors was associated with the early onset of substance use behavior among early adolescent Indigenous girls. Thus, we predicted that (a) subjective drinking norms and (b) positive drinker prototypes would be positively associated with subsequent increases in drinking behavior. We further predicted that these associations would be mediated by drinking expectations; specifically, we expected there to be significant indirect (i.e., mediated) associations from (c) subjective drinking norms and (d) positive drinker prototypes to subsequent drinking behaviors via increases in future drinking expectations.

We analyzed our data using an autoregressive cross-lagged path model, which allowed us to examine potential reciprocal associations among the focal variables that are not explicitly outlined within the PWM. It is important to note that there are theoretical and empirical reasons to expect additional associations to be statistically significant. First, social identity and self-categorization theories (Tajfel & Turner, 1979; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987) posit that we are motivated to maintain positive views of the groups to which we belong because our personal self-views are partially based on our group memberships (i.e., social identities; cf. Hogg, 2007).Thus, we hypothesized that (e) higher rates of drinking, which may be indicative of a drinker social identity, would be linked to more favorable images of drinkers (i.e., increased positive drinker prototypes). In support of this hypothesis, several studies have shown that previous risk behaviors are positively associated with positive behavioral prototypes (e.g., Dal Cin et al., 2009; Gerrard, Gibbons, Stock, Vande Lune, & Cleveland, 2005; Hukkelberg & Dykstra, 2009; Stock et al., 2013; cf. Spijkerman, Van Den Eijnden, Overbeek, & Engels, 2007).

Second, studies suggest that individuals tend to believe that their personal characteristics and behaviors are common among others, a phenomenon that has been referred to as the “false

consensus effect" (Ross, Greene, & House, 1977) and "social projection" (Holmes, 1968). For example, among a sample of early adolescents, Marks, Graham, and Hansen (1992) showed that higher estimates of peer drinking behavior were prospectively associated with more personal drinking and, at the same time, that higher levels of personal drinking were prospectively associated with higher estimates of peer drinking behavior. Drawing on this work, we also hypothesized that (f) higher rates of drinking would be associated with subsequent increases in perceived subjective drinking norms.

Finally, given that past behavior is a consistently strong predictor of future behavior, we hypothesized that (g) higher levels of drinking would be associated with subsequent increases in drinking expectations. Empirical evidence has supported this hypothesis by showing that previous risk behaviors are positively associated with subsequent increases in behavioral willingness (Dal Cin et al., 2009; Ouellette et al., 1999).

It is important to note that the study from which the data for the present paper were drawn did not include a direct measure of willingness to drink as it is conceptualized within the PWM. As a proxy, we relied on a measure of drinking expectations; specifically, one's expectation that he or she will drink in the following year. Although behavioral willingness and behavioral expectations are conceptually distinct, and have at times shown to account for unique variance in behavioral outcomes, the two constructs are nonetheless strongly correlated and have often shown to be highly collinear in explaining behavioral outcomes (see Gibbons et al., 1998). In addition, Blanton et al. (1997) suggested that behavioral willingness and expectations may not be easily distinguishable for early adolescents, and Gibbons, Gerrard, and their colleagues have often used behavioral willingness and behavioral expectations as indicators of a behavioral willingness or behavioral vulnerability latent variable (e.g., Blanton et al., 1997; Cleveland, Gibbons, Gerrard, Pomery, & Brody, 2005; Gibbons, Gerrard, Cleveland, Wills, & Brody, 2004). For these reasons, we believe that drinking expectations served as an acceptable proxy for willingness to drink in our study.

## Method

### Data and Participants

The data used for the present paper were drawn from an eight-wave longitudinal study (data collected annually) examining culture-specific risk and resilience factors among Indigenous adolescents in the U.S. Northern Midwest and Canada (see Whitbeck, Walls, & Sittner Hartshorn, 2014). The relevant measures for the present study were completed at Waves 1, 2, 3, 5, and 7 (cf. *Measures*). At Wave 1 the sample included 674 Indigenous adolescents (*M* age = 11.11 years, *SD* = 0.83, 50.3% girls), of which 94.4% completed Wave 2 (50.1% girls), 92.9% completed Wave 3 (49.8% girls), 89.8% completed Wave 5 (50.8% girls), and 84.4% completed Wave 7 (51.1% girls). As described within *Data Restructuring*, the data were restructured by age for analysis. On the basis of the caregiver reports at Wave 1, the average per capita family income for the sample was $5,488 (*SD* = $4,044). For full details regarding the sample, readers are referred to Whitbeck et al. (2014).

## Study Design and Procedure

The study from which the data were drawn was designed in partnership with three U.S. American Indian Reservations and four Canadian First Nations Reserves. As part of strict confidentiality agreements, the names of the cultural group and participating sites are not provided, nor are any attempts made to distinguish among individuals from the various locations. However, it is important to note that the reservations and reserves share a common cultural tradition and language with only minor regional variations in dialects. At each site, tribal advisory boards were responsible for advising the research team on questionnaire development and for handling personnel issues. The interviewers and site coordinators all were approved by advisory boards and were either enrolled tribal members or, in a very few cases, nonmember spouses of enrollees. The interviewers were trained before each wave of data collection concerning methodological guidelines of personal interviewing and protection of human subjects.

Before the first wave of data collection, each participating reservation/reserve provided us with a list of all families with at least one tribally enrolled child between the ages of 10 and 12 years who lived on or near the reservations/reserves, which represented our target population. An attempt to contact all families was made in an effort to obtain a representative sample of the communities. The families were formally recruited through home visits, during which they were presented with a traditional cultural gift and an overview of the project. For those families who agreed to participate, the target adolescent and at least one adult caretaker were interviewed once per year for 8 years. A total of 79.4% of families that were contacted participated in the study, providing us with most of our target population. As compensation, participating families received $20 (U.S.) per participant for each wave completed. Only the adolescent data were used for the present study. All of the adolescents were fully fluent in English, which is the language in which the study materials were administered. The project was approved by and conducted in compliance with reservation/reserve advisory boards and the Institutional Review Board at the University of Nebraska–Lincoln.

## Measures

The adolescent participants completed a battery of measures at each wave of the study. The measures that are relevant to the present paper were completed at Waves 1, 2, 3, 5, and 7 of the study, with the exception of positive drinker prototypes, which was only assessed at Waves 2, 3, and 5.[1] The measures were directly based on those used in previous studies conducted by Gibbons, Gerrard, and their colleagues (e.g., Blanton et al., 1997; Gibbons et al., 1998).

**Subjective drinking norms—**We used two items to assess subjective drinking norms. First, participants were asked to indicate how many of their same-aged peers they believe drink alcohol. Responses were provided on a 3-point scale, anchored by 1 (*none*) and 3

[1]During Waves 4 and 6, the participants completed diagnostic interviews. The measures of relevance to the present study were not completed at these waves.

(*most*). Second, participants were asked to report how many of their three best friends drink alcohol. Responses were provided on a 4-point scale, anchored by 0 (*none*) and 3 (*all three*).

**Positive drinker prototype—**We assessed positive drinker prototypes by first asking participants to think about kids their age who drink alcohol. Participants were specifically instructed to think about their general image of kids who drink, and not anyone in particular. They were then asked to indicate the degree to which they thought kids who drink alcohol are *popular*, *smart*, *cool*, *tough*, *good-looking*, *mature*, *dull or boring* (reverse phrased), *independent*, and *self-confident*. Responses were provided on a 4-point scale, anchored by 1 (*not at all*) and 4 (*very*). Alpha coefficients ranged from .80 (Wave 2) to .86 (Wave 5), with an average of .83 across the waves.

**Future drinking expectations—**As a proxy of willingness to drink, we assessed future drinking expectations by asking participants, "Within the next 12 months do you think you might drink alcohol?" Response options included *no*, *yes*, and *don't know/refused*. Very few individuals reported that they did not know or refused to answer the question. To facilitate the interpretation of our results, which would be complicated by using a dichotomous mediating variable (Mackinnon & Dwyer, 1993), we coded the responses as 0 (*no*), 1 (*don't know/refuse*), and 2 (*yes*). Of critical importance, secondary analyses using a yes/no dichotomous coding provided virtually identical results to those reported here and in no case differed in a way that would alter the substantive interpretation of our results (full results available upon request from B.E.A.).

**Drinking behavior—**We assessed past year frequency of drinking by first asking participants whether or not they had ever tried alcohol (17.6% at Wave 1, 31.9% at Wave 2, 44.4% at Wave 3, 72.8% at Wave 5, and 82.5% at Wave 7) and, if so, if they had a drink of alcohol during the past year (5.8% at Wave 1, 17.5% at Wave 2, 27.1% at Wave 3, 50.7% at Wave 5, and 63.1% at Wave 7). Participants who answered yes to both questions were then asked to indicate how often during the past year they had a drink of alcohol. Responses were provided on a 6-point scale, anchored by 1 (*one or two times*) and 6 (*every day*). Participants who indicated that they had never tried alcohol or did not drink alcohol during the past year were coded as 0, reflecting a response of *never during the past year*. Thus, the scale ranged from 0 to 6, with higher values indicating greater frequency of past year drinking.

## Data Restructuring

Given the specific pattern of measures administered at each wave, especially the measure of positive drinker prototypes, restructuring the data by age resulted in an adequate amount of data to test the PWM at three consecutive ages—ages 12, 13, and 14 years. As a result of the study design (i.e., measures not administered at Waves 4 and 6 and prototypes not assessed at Wave 1), not all participants completed each of the relevant measures at each of the ages. The number of participants for whom data were available for each measure by age is reported in Table 1. The resulting sample included 657 participants (50.1% girls), which represents 97.5% of the baseline sample. Because the missing data are largely a result of the study design (Graham, Taylor, Olchowski, & Cumsille, 2006), rather than systematic nonresponse, the pattern of missingness theoretically qualifies as missing completely at

random (Little & Rubin, 2002; Rubin, 1976). This allowed us to obtain unbiased parameter estimates (e.g., regression coefficients) through the use of full information maximum likelihood estimation (see Enders, 2010; Graham et al., 2006).

## Analytic Strategy

To analyze our data, we estimated an autoregressive cross-lagged path model via Mplus Version 6.1 (Muthén & Muthén, 1998–2010). Drinking expectations and drinking behavior were included in the model as observed variables, subjective drinking norms were included as latent variables with perceptions of peer and friend drinking behaviors as observed indicators, and positive drinker prototypes were included as latent variables with three item parcels as indicators.[2] The model was specified such that paths were included from each variable at 12 years of age to each variable at 13 years of age, and from each variable at 13 years of age to each variable at 14 years of age. By including the autoregressive paths (e.g., drinking expectations at 12 years of age to drinking expectations at 13 years of age), the cross-lagged associations (e.g., positive drinker prototypes at 12 years of age to drinking expectations at 13 years of age) reflect the association from a given variable (e.g., positive drinker prototypes at 12 years of age) with subsequent changes in the remaining variables (e.g., increases or decreases in drinking expectations at 13 years of age).

Following convention, the model included covariances between the variables at 12 years of age, covariances between the error variances for the variables at 13 years of age, and covariances between the error variance for the variables at 14 years of age. Moreover, to account for item-specific variance in the observed indicators for the latent variables, covariances were separately included between the error variances for each individual item indicator across the three ages (see Vandenberg & Lance, 2000). Finally, some of the study sites were in remote locations (i.e., ≥50 miles from a small town or city) where adolescents' access to alcohol may be limited. Thus, we created a dummy variable, with remote locations coded as 0 and nonremote locations coded as 1, which we used as a covariate by including paths from this location variable to all other variables in our model.

We used full information maximum likelihood estimation to account for the missing data, including those responses that were missing by design (Graham et al., 2006) and those responses that were missing because of participant noncompletion (for details, see Enders, 2010). Overall model fit was evaluated based on the comparative fit index (CFI), root mean squared error of approximation (RMSEA), and standardized root mean square error (SRMR). According to Hu and Bentler (1999), a model demonstrates a good fit to the data with a CFI close to or greater than .95, an RMSEA value close to or below .06, and a SRMR value close to or below .08. We report $\chi^2$ values for all analyses; however, because of the sensitivity of $\chi^2$ to minor deviations in explained/unexplained variances/covariances (Bollen, 1989), we did not rely on these values to evaluate overall model fit.

We estimated a series of models to consider whether the associations differed as a function of age and to provide the most parsimonious description of the data. To this end, we first

[2]The nine positive drinking prototype items were randomly assigned into three categories, and responses to the items within each category were averaged to create the item parcels (Little, Cunningham, Shahar, & Widaman, 2002).

estimated a model in which all of the paths in the model were allowed to estimate separately across the ages (unconstrained model). We then estimated a model in which the coefficients for like paths (e.g., age 12 years positive drinker prototypes to age 13 years drinking behavior and age 13 years positive drinker prototypes to age 14 years drinking behavior) were constrained to be equal across the ages (constrained model). A significant drop in model fit for the constrained model relative to the unconstrained model, based on the $\chi^2$ difference ($\Delta\chi^2$) test, would indicate that one or more of the associations differed as a function of (i.e., were moderated by) age.

## Results[3]

The unconstrained model provided a good fit to the data, $\chi^2(139) = 158.04$, $p = .13$, CFI = .99, RMSEA = .01, SRMR = .04, as did the constrained model, $\chi^2(163) = 185.45$, $p = .11$, CFI = .99, RMSEA = .01, SRMR = .05. It is important to note that the constrained model did not result in a significant drop in model fit relative to the unconstrained model, $\Delta\chi^2(24) = 27.41$, $p = .29$. The unstandardized path coefficients and corresponding standard errors and two-tailed probability values for the final (constrained) model are reported in Table 2. To simplify the presentation of our results, the statistically significant standardized path coefficients are shown in Figure 1.

### Test of the PWM

As expected based on the PWM (Hypotheses a– d), subjective drinking norms and positive drinker prototypes were positively and significantly associated with drinking expectations, and drinking expectations were positively and significantly associated with drinking behavior. This was the case for the variables from ages 12 to 13 years and from ages 13 to 14 years. Equally important, the indirect (i.e., mediated) associations from subjective drinking norms at age 12 years ($\beta = .02$, $SE = .01$, $p = .03$, 95% confidence intervals [CIs] [.002, .05]) and positive drinker prototypes at age 12 years ($\beta = .02$, $SE = .01$, $p = .05$, 95% CIs [.001, .04]) with drinking behavior at age 14 years via drinking expectations at age 13 years both were positive and statistically significant. These results support the theoretical postulates of the PWM (Gerrard et al., 2008; Gibbons et al., 1998).

### Additional Associations

Beyond the associations specified within the PWM, there were additional statistically significant associations. First, with the effects of drinking expectations partialed out (i.e., statistically controlled for), there remained positive and statistically significant direct associations from subjective drinking norms and positive drinker prototypes to subsequent drinking behavior. Second, drinking behavior was positive and significantly associated with subsequent drinking expectations (Hypothesis g). Third, drinking expectations were positively and significantly associated with subjective drinking norms. Finally, although not reported in Table 2 or Figure 2, our location variable was negatively and significantly associated with positive drinker prototypes at ages 12, 13, and 14 years, $\beta$s = −.10, $SE$s <.02,

[3]To conserve space, and because our study does not focus on any mean comparisons, the means, variances, correlations, and covariances among the variables are not reported here, but are available upon request from B.E.A.

*p*s < .01, indicating that, on average, participants in nonremote locations reported less favorable drinker prototypes than their counterparts in remote locations. Location was not significantly associated with any other variables in the model. Note that drinking was not significantly associated with positive drinker prototypes (Hypothesis e) or subjective drinking norms (Hypothesis f).

### Secondary Analyses

We conducted secondary analyses to consider whether or not gender moderated any of the associations in our model. To this end, we estimated a series of multiple-group autoregressive path models with gender as the grouping variable. We first estimated a model in which all of the path coefficients were allowed to vary for boys and girls (unconstrained model). We compared this model to a model in which the path coefficients were constrained to be equal across genders and ages (constrained model). The unconstrained model provided a good fit to the data, $\chi^2(296) = 329.55$, $p = .09$, CFI = .99, RMSEA = .02, SRMR = .06, as did the constrained model, $\chi^2(364) = 426.09$, $p = .01$, CFI = .98, RMSEA = .02, SRMR = .08. However, the constrained model resulted in a significant drop in model fit relative to the unconstrained model, $\Delta\chi^2(68) = 96.64$, $p = .01$. Examination of the LaGrange Multiplier values (modification indices in Mplus) suggested that the constraint imposed on the path from the location variable to positive drinker prototypes at age 14 years for girls introduced a substantial source of model misfit. A model in which this single path was allowed to estimate freely provides a good fit to the data, $\chi^2(363) = 414.04$, $p = .03$, CFI = .98, RMSEA = .02, SRMR = .07, which did not differ significantly from the unconstrained model, $\Delta\chi^2(67) = 84.85$, $p = .07$.

The results of the final model showed that the association from the location variable with positive drinker prototypes for girls at 14 years of age was not statistically significant. The remaining associations followed the same exact pattern as reported above for our primary model and were statistically equivalent for boys and girls. Thus, none of the substantive associations of interest were moderated by gender.

## Discussion

The primary aim of the present study was to examine the utility of the PWM (Gerrard et al., 2008; Gibbons et al., 1998) in predicting alcohol use among Indigenous adolescents. Our results showed that higher perceptions of subjective drinking norms and more favorable drinker prototypes at 12 years of age were associated with increases in drinking expectations at 13 years of age, and that greater drinking expectations at 13 years of age were associated with increased drinking behavior at 14 years of age. Moreover, the indirect (i.e., mediated) associations from subjective drinking norms and positive drinker prototypes to drinking behavior (via drinking expectations) were positive and statistically significant. Our secondary analyses showed that this was equally true for boys and girls. These findings support our first four hypotheses as well as the theoretical contentions of the PWM.

Beyond our PWM-based predictions, we proposed three additional hypotheses. First, given that past behavior is consistently a strong predictor of future behavior, we predicted that higher levels of drinking behavior would be associated with subsequent increases in drinking

expectations (Hypothesis g). This hypothesis was supported. Second, on the basis of theory and research that suggests that individuals tend to view their own personal characteristics and behaviors as being common among others (Holmes, 1968; Marks et al., 1992; Ross et al., 1977), we predicted that higher levels of drinking behavior would be associated with subsequent increases in subjective drinking norms (Hypothesis f). This hypothesis was not supported. However, greater drinking expectations were positively associated with subsequent increases in subjective drinking norms. One possible explanation for this is that adolescents who expect to drink are motivated to see drinking as a normative behavior, making their own drinking behavior more socially acceptable.

Third, we predicted that higher levels of drinking behavior would be associated with increases in positive drinker prototypes (Hypothesis e). This prediction was based on social identity and self-categorization theories (Tajfel & Turner, 1979; Turner et al., 1987), which posit that the groups to which we belong are incorporated into our personal self-concepts, and that we are thus motivated to evaluate the groups to which we belong in a positive manner. This hypothesis was not supported. It must be recognized that simply being a drinker does not necessarily imply that an individual identifies him or herself as a member of the "drinker" social category. Therefore, our lack of support for this hypothesis should be interpreted with extreme caution.

In addition to the predicted associations, our results also showed that, beyond the effects of drinking expectations, subjective drinking norms and positive drinker prototypes both had a positive and significant direct association with drinking behavior. Although not explicitly outlined in the PWM, these results were not too surprising because one would not expect drinking expectations to fully account for the effects of subjective drinking norms and positive drinker prototypes on drinking behavior. Finally, our results indicated that boys in nonremote locations held more favorable drinker prototypes than girls in nonremote locations or boys and girls in remote locations. The reason for this association is not entirely clear. However, one possibility is that the sanctions for drinking are greater among adolescents in remote locations, where the communities are small, and for adolescent girls in general, perhaps because of gender roles. However, whether or not this is the case will require further empirical consideration.

## Implications and Limitations

The results of our study have theoretical and practical implications. Theoretically, our results suggest that the PWM may generalize to Indigenous adolescents. This is an important finding given that our study represents an initial effort to consider the PWM among Indigenous adolescents, especially the role of behavioral expectations (as a proxy of behavioral willingness) in the associations from behavioral norms and behavioral prototypes with risk behavior. However, Indigenous groups vary in several potentially important ways (e.g., with differences in beliefs, values, practices, and behavioral tendencies). Thus, whether or not the contentions of the PWM apply to Indigenous adolescents more broadly is an empirical question that will require further attention.

From a practical standpoint, our results may be used to inform existing prevention and intervention efforts that aim to reduce the use of alcohol and perhaps other substances

among Indigenous adolescents. As described in the introduction to this paper, Litt and Stock (2011) showed that a simple manipulation of perceived subjective drinking norms led to a reduction in adolescents' willingness to drink. In addition, among college students, Blanton and his colleagues (2001) experimentally manipulated the image favorability of individuals who do and do not use condoms. Their results showed that individuals who read a story depicting a noncondom user in a negative light reported less willingness to engage in unsafe sexual practices compared with individuals in a control condition who received no information regarding condom use. The results of these experimental studies suggest that even simple manipulations aimed at altering one's perceptions of individuals who engage in risk behaviors can reduce one's willingness to engage in those risk behaviors, at least within a proximal timeframe.

A quick perusal of the peer-reviewed literature suggests that most existing prevention and intervention programs aimed at reducing the rates of substance use among Indigenous adolescents focus heavily on the strengthening of parenting practices and parent-child relationships (cf. Hawkins, Cummins, & Marlatt, 2004). Given the historical centrality of the family within many Indigenous cultures, this focus may indeed represent the most effective route to reducing the rates of substance use among Indigenous youths. At the same time, the results of our study at least suggest that efforts to change behavioral norms and behavioral prototypes may further enhance the utility of existing family-based prevention and intervention programs. Gerrard and her colleagues (2006) have used such an approach in a 7-week family-based alcohol prevention program among African-American adolescents that incorporates a module aimed at reducing the adolescents' perceptions of subjective drinking norms. Their prevention program was effective in reducing the age-related growth in alcohol use among their sample relative to a sample of adolescents who were randomly assigned to a nonprevention control condition.

One particularly salient limitation that should also be noted is that we considered drinking expectations as a proxy of willingness to drink. This limitation was unavoidable given that we were working with exiting data. However, on a positive note, as discussed in the introduction, behavioral willingness and behavioral expectations often are highly correlated, have at times shown to account for similar variance in risky behaviors, and have shown to be less distinguishable at earlier ages. Thus, although we were unable to provide a strict test of the PWM, we feel confident in suggesting that our data allowed us to provide an adequate test of the PWM. However, at minimum, our results provide indirect evidence to support the PWM.

## Summary and Conclusion

In summary, our results supported the theoretical contentions of the PWM, providing preliminary evidence that the PWM may generalize to Indigenous adolescents. However, as noted, there is substantial heterogeneity across Indigenous groups. Thus, whether or not the PWM will generalize to adolescents from other Indigenous groups remains unknown. Our results also provide information that may be of interest to scholars working on prevention and intervention programs aimed at reducing alcohol use, and perhaps substance use more broadly, among Indigenous adolescents. In particular, combined with previous experimental

research demonstrating that willingness to drink is highly malleable (Blanton et al., 2001; Litt & Stock, 2011), our results suggest that attempts to modify Indigenous adolescents' beliefs regarding the prevalence and characteristics of individuals who engage in drinking and other risk behaviors may enhance existing programs, such as those based on improving family relations. At minimum, we hope that our study motivates scholars who examine risk behaviors among Indigenous adolescents to give more attention to the role of risk-behavior-related cognitions in the development of and engagement in risk behaviors.

## Acknowledgments

This research was supported by grants from the National Institute on Drug Abuse (DA13580), the National Institute of Mental Health (MH67281), and the National Institute on Alcohol Abuse and Alcoholism (AA020299) awarded to Les B. Whitbeck.

## References

Ajzen I. The theory of planned behavior. Organizational Behavior and Human Decision Processes. 1991; 50:179–211. http://dx.doi.org/10.1016/0749-5978(91)90020-T.

Blanton H, Gibbons FX, Gerrard M, Conger KJ, Smith GE. Role of family and peers in the development of prototypes associated with substance use. Journal of Family Psychology. 1997; 11:271–288. http://dx.doi.org/10.1037/0893-3200.11.3.271.

Blanton H, VandenEijnden RJJM, Buunk BP, Gibbons FX, Gerrard M, Bakker A. Accentuate the negative: Social images in the prediction and promotion of condom use. Journal of Applied Social Psychology. 2001; 31:274–295. http://dx.doi.org/10.1111/j.1559-1816.2001.tb00197.x.

Bollen, KA. Structural equations with latent variables. New York, NY: Wiley; 1989. http://dx.doi.org/10.1002/9781118619179

Bryant AN, Kim G. Racial/ethnic differences in prevalence and correlates of binge drinking among older adults. Aging & Mental Health. 2012; 16:208–217. http://dx.doi.org/10.1080/13607863.2011.615735. [PubMed: 22224754]

Cheadle JE, Whitbeck LB. Alcohol use trajectories and problem drinking over the course of adolescence: A study of North American indigenous youth and their caretakers. Journal of Health and Social Behavior. 2011; 52:228–245. http://dx.doi.org/10.1177/0022146510393973. [PubMed: 21558489]

Cleveland MJ, Gibbons FX, Gerrard M, Pomery EA, Brody GH. The impact of parenting on risk cognitions and risk behavior: A study of mediation and moderation in a panel of African American adolescents. Child Development. 2005; 76:900–916. http://dx.doi.org/10.1111/j.1467-8624.2005.00885.x. [PubMed: 16026504]

Dal Cin S, Worth KA, Gerrard M, Gibbons FX, Stoolmiller M, Wills TA, Sargent JD. Watching and drinking: Expectancies, prototypes, and friends' alcohol use mediate the effect of exposure to alcohol use in movies on adolescent drinking. Health Psychology. 2009; 28:473–483. http://dx.doi.org/10.1037/a0014777. [PubMed: 19594272]

Dickens DD, Dieterich SE, Henry KL, Beauvais F. School bonding as a moderator of the effect of peer influences on alcohol use among American Indian adolescents. Journal of Studies on Alcohol and Drugs. 2012; 73:597–603. [PubMed: 22630798]

Dieterich SE, Stanley LR, Swaim RC, Beauvais F. Outcome expectancies, descriptive norms, and alcohol use: American Indian and white adolescents. The Journal of Primary Prevention. 2013; 34:209–219. http://dx.doi.org/10.1007/s10935-013-0311-6. [PubMed: 23754535]

Enders, CK. Applied missing data analysis. New York, NY: New York: Guilford Press; 2010.

Fishbein M. A theory of reasoned action: Some applications and implications. Nebraska Symposium on Motivation. 1980; 27:65–116. [PubMed: 7242751]

Gerrard M, Gibbons FX, Brody GH, Murry VM, Cleveland MJ, Wills TA. A theory-based dual-focus alcohol intervention for preadolescents: The Strong African American Families Program. Psychology of Addictive Behaviors. 2006; 20:185–195. [PubMed: 16784365]

Gerrard M, Gibbons FX, Houlihan AE, Stock ML, Pomery EA. A dual-process approach to health risk decision making: The prototype willingness model. Developmental Review. 2008; 28:29–61. http://dx.doi.org/10.1016/j.dr.2007.10.001.

Gerrard M, Gibbons FX, Stock ML, Vande Lune LS, Cleveland MJ. Images of smokers and willingness to smoke among African American pre-adolescents: An application of the prototype/willingness model of adolescent health risk behavior to smoking initiation. Journal of Pediatric Psychology. 2005; 30:305–318. http://dx.doi.org/10.1093/jpepsy/jsi026. [PubMed: 15863428]

Gibbons FX, Etcheverry PE, Stock ML, Gerrard M, Weng CY, Kiviniemi M, O'Hara RE. Exploring the link between racial discrimination and substance use: What mediates? What buffers? Journal of Personality and Social Psychology. 2010; 99:785–801. http://dx.doi.org/10.1037/a0019880. [PubMed: 20677890]

Gibbons FX, Gerrard M, Blanton H, Russell DW. Reasoned action and social reaction: Willingness and intention as independent predictors of health risk. Journal of Personality and Social Psychology. 1998; 74:1164–1180. http://dx.doi.org/10.1037/0022-3514.74.5.1164. [PubMed: 9599437]

Gibbons FX, Gerrard M, Cleveland MJ, Wills TA, Brody G. Perceived discrimination and substance use in African American parents and their children: A panel study. Journal of Personality and Social Psychology. 2004; 86:517–529. [PubMed: 15053703]

Gibbons FX, Gerrard M, Lane DJ, Mahler HIM, Kulik JA. Using UV photography to reduce use of tanning booths: A test of cognitive mediation. Health Psychology. 2005; 24:358–363. http://dx.doi.org/10.1037/0278-6133.24.4.358. [PubMed: 16045371]

Gibbons FX, Pomery EA, Gerrard M, Sargent JD, Weng CY, Wills TA, … Yeh HC. Media as social influence: Racial differences in the effects of peers and media on adolescent alcohol cognitions and consumption. Psychology of Addictive Behaviors. 2010; 24:649–659. http://dx.doi.org/10.1037/a0020768. [PubMed: 21198226]

Graham JW, Taylor BJ, Olchowski AE, Cumsille PE. Planned missing data designs in psychological research. Psychological Methods. 2006; 11:323–343. http://dx.doi.org/10.1037/1082-989X.11.4.323. [PubMed: 17154750]

Hawkins EH, Cummins LH, Marlatt GA. Preventing substance abuse in American Indian and Alaska native youth: Promising strategies for healthier communities. Psychological Bulletin. 2004; 130:304–323. http://dx.doi.org/10.1037/0033-2909.130.2.304. [PubMed: 14979774]

Hogg, MA. Uncertainty-identity theory. In: Zanna, MP., editor. Advances in experimental social psychology. Vol. 39. San Diego, CA: Elsevier Academic Press; 2007. p. 69-126.

Holmes DS. Dimensions of projection. Psychological Bulletin. 1968; 69:248–268. http://dx.doi.org/10.1037/h0025725. [PubMed: 4873052]

Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling. 1999; 6:1–55. http://dx.doi.org/10.1080/10705519909540118.

Hukkelberg SS, Dykstra JL. Using the Prototype/Willingness model to predict smoking behaviour among Norwegian adolescents. Addictive Behaviors. 2009; 34:270–276. http://dx.doi.org/10.1016/j.addbeh.2008.10.024. [PubMed: 19095361]

Litt DM, Stock ML. Adolescent alcohol-related risk cognitions: The roles of social norms and social networking sites. Psychology of Addictive Behaviors. 2011; 25:708–713. http://dx.doi.org/10.1037/a0024226. [PubMed: 21644803]

Little, RJA., Rubin, DB. Statistical analysis with missing data. Hoboken, NJ: Wiley; 2002. http://dx.doi.org/10.1002/9781119013563

Little TD, Cunningham WA, Shahar G, Widaman KF. To parcel or not to parcel: Exploring the question, weighing the merits. Structural Equation Modeling. 2002; 9:151–173. http://dx.doi.org/10.1207/S15328007SEM0902_1.

Mackinnon DP, Dwyer JH. Estimating mediated effects in prevention studies. Evaluation Review. 1993; 17:144–158. http://dx.doi.org/10.1177/0193841X9301700202.

Marks G, Graham JW, Hansen WB. Social projection and social conformity in adolescent alcohol use: A longitudinal analysis. Personality and Social Psychology Bulletin. 1992; 18:96–101. http://dx.doi.org/10.1177/0146167292181014.

Muthén, LK., Muthén, BO. Mplus user's guide. Los Angeles, CA: Muthén & Muthén; 1998.

Ouellette JA, Gerrard M, Gibbons FX, Reis-Bergan M. Parents, peers, and prototypes: Antecedents of adolescent alcohol expectancies, alcohol consumption, and alcohol-related life problems in rural youth. Psychology of Addictive Behaviors. 1999; 13:183–197. http://dx.doi.org/10.1037/0893-164X.13.3.183.

Ross L, Greene D, House P. The false consensus effect: An egocentric bias in social perception and attribution processes. Journal of Experimental Social Psychology. 1977; 13:279–301. http://dx.doi.org/10.1016/0022-1031(77)90049-X.

Rubin DB. Inference and missing data. Biometrika. 1976; 63:581–592. http://dx.doi.org/10.1093/biomet/63.3.581.

Spijkerman R, Van Den Eijnden RJJM, Overbeek G, Engels RCME. The impact of peer and parental norms and behavior on adolescent drinking: The role of drinker prototypes. Psychology & Health. 2007; 22:7–29. http://dx.doi.org/10.1080/14768320500537688.

Stock ML, Gibbons FX, Gerrard M, Houlihan AE, Weng CY, Lorenz FO, Simons RL. Racial identification, racial composition, and substance use vulnerability among African American adolescents and young adults. Health Psychology. 2013; 32:237–247. http://dx.doi.org/10.1037/a0030149. [PubMed: 23088177]

Swaim RC, Beauvais F, Walker RD, Silk-Walker P. The effects of parental diagnosis and changing family norms on alcohol use and related problems among urban American Indian adolescents. The American Journal on Addictions. 2011; 20:212–219. http://dx.doi.org/10.1111/j.1521-0391.2011.00129.x. [PubMed: 21477049]

Tajfel, H., Turner, JC. An integrative theory of intergroup conflict. In: Austin, WG., Worchel, S., editors. The social psychology of intergroup relations. Monterey, CA: Brooks/Cole; 1979. p. 33-47.

Turner, JC., Hogg, MA., Oakes, PJ., Reicher, SD., Wetherell, MS. Rediscovering the social group: A self-categorization theory. Cambridge, MA: Basil Blackwell; 1987.

Vandenberg RJ, Lance CE. A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. Organizational Research Methods. 2000; 3:4–70. http://dx.doi.org/10.1177/109442810031002.

Walls ML, Whitbeck LB. Maturation, peer context, and indigenous girls' early-onset substance use. The Journal of Early Adolescence. 2011; 31:415–442. http://dx.doi.org/10.1177/0272431610366245. [PubMed: 22228919]

Walls ML, Whitbeck LB, Hoyt DR, Johnson KD. Early-onset alcohol use among Native American youth: Examining female caretaker influence. Journal of Marriage and Family. 2007; 69:451–464. http://dx.doi.org/10.1111/j.1741-3737.2007.00376.x.

Whitbeck, LB., Walls, ML., Sittner Hartshorn, KJ. Indigenous adolescent development: Psychological, social and historical contexts. New York, NY: Psychology Press; 2014.

Wu LT, Woody GE, Yang C, Pan JJ, Blazer DG. Racial/ethnic variations in substance-related disorders among adolescents in the United States. Archives of General Psychiatry. 2011; 68:1176–1185. http://dx.doi.org/10.1001/archgenpsychiatry.2011.120. [PubMed: 22065533]

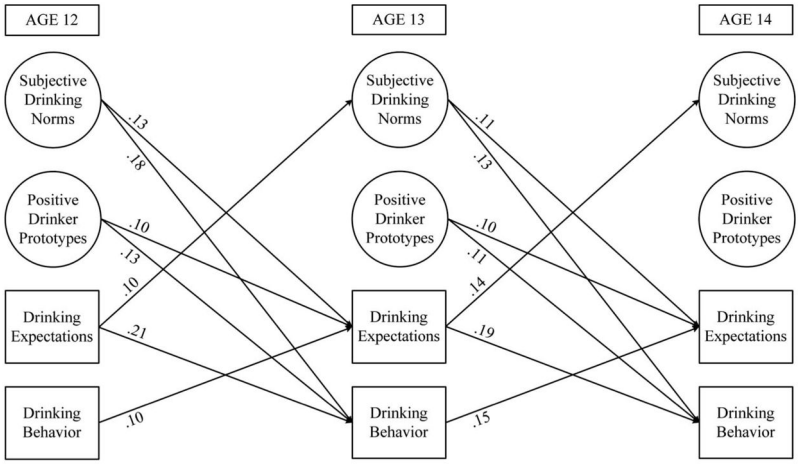


**Figure 1.**

Standardized results for statistically significant cross-lagged associations. Autoregressive paths are omitted to reduce visual clutter.

**Table 1**

Number of Data Points for Each Variable by Age for Age-Restructured Data File

| | Age (years) | | |
|---|---|---|---|
| **Variable** | **12** | **13** | **14** |
| Perceived peer drinking | 579 | 453 | 350 |
| Perceived friend drinking | 577 | 446 | 340 |
| Positive drinker prototypes | 401 | 437 | 351 |
| Drinking expectations | 599 | 460 | 353 |
| Drinking behavior | 592 | 455 | 352 |

**Table 2**

Standardized Path Coefficients for Final Autoregressive Cross-Lagged Path Model

| | Age 12 years → Age 13 years | | | | Age 13 years → Age 14 years | | | |
|---|---|---|---|---|---|---|---|---|
| **Association** | **β** | ***SE*** | ***p*** | **95% CIs** | **β** | ***SE*** | ***p*** | **95% CIs** |
| Subjective drinking norms → | | | | | | | | |
| Subjective drinking norms | .56 | .07 | <.01 | [.43, .70] | .60 | .09 | <.01 | [.42, .77] |
| Positive drinker prototypes | .04 | .06 | .49 | [−.07, .15] | .04 | .05 | .49 | [−.07, .14] |
| Drinking expectations | .13 | .06 | .03 | [.02, .24] | .11 | .05 | .03 | [.01, .21] |
| Drinking behavior | .18 | .06 | <.01 | [.06, .30] | .13 | .05 | <.01 | [.04, .22] |
| Positive drinker prototypes → | | | | | | | | |
| Subjective drinking norms | −.03 | .04 | .51 | [−.11, .05] | −.04 | .06 | .51 | [−.15, .07] |
| Positive drinker prototypes | .50 | .05 | <.01 | [.41, .60] | .55 | .05 | <.01 | [.45, .66] |
| Drinking expectations | .10 | .05 | .03 | [.01, .19] | .10 | .05 | .03 | [.01, .19] |
| Drinking behavior | .13 | .05 | .01 | [.04, .23] | .11 | .04 | .01 | [.03, .19] |
| Drinking expectations → | | | | | | | | |
| Subjective drinking norms | .10 | .04 | .02 | [.02, .19] | .14 | .06 | .01 | [.03, .26] |
| Positive drinker prototypes | .07 | .04 | .11 | [−.02, .15] | .08 | .05 | .11 | [−.02, .18] |
| Drinking expectations | .23 | .04 | .01 | [.15, .31] | .25 | .05 | .01 | [.16, .34] |
| Drinking behavior | .21 | .04 | <.01 | [.03, .18] | .19 | .04 | <.01 | [.04, .26] |
| Drinking behavior → | | | | | | | | |
| Subjective drinking norms | .04 | .04 | .27 | [−.03, .12] | .08 | .07 | .26 | [−.06, .22] |
| Positive drinker prototypes | .01 | .04 | .79 | [−.04, .09] | .02 | .06 | .79 | [−.11, .14] |
| Drinking expectations | .10 | .04 | .01 | [.12, .29] | .15 | .06 | <.01 | [.11, .27] |
| Drinking behavior | .17 | .04 | <.01 | [.08, .25] | .20 | .05 | <.01 | [.10, .31] |

*Note.* β = standardized path coefficient; *SE* = standard error; *p* = two-tailed probability value; 95% CIs = 95% confidence intervals.