



Published in final edited form as:

*Alcohol Clin Exp Res.* 2010 November ; 34(11): 1985–1992. doi:10.1111/j.1530-0277.2010.01288.x.

## Individual Differences in Problem Drinking Among Tribal Members from One First Nation Community

**Nichea S. Spillane, Ph.D.** and

Brown University, Center for Alcohol and Addiction Studies

**Gregory T. Smith, Ph.D.**

University of Kentucky

### Abstract

**Background**—Health disparities related to drinking in Native communities are of concern. Although individuals living in Native communities have high rates of problem drinking there is also variability in their drinking levels. The authors conducted a test of a model of First Nation drinking risk that incorporates personality and psychosocial learning to examine its cross-cultural applicability. That model identifies a risk process thought to explain aspects of individual differences in both Native problem drinking and non-Native problem drinking. One implication of the theory is that positive alcohol expectancies mediate the influence of negative urgency (the tendency to act rashly when distressed) on problem drinking similarly for both cultures.

**Method**—We administered questionnaires to a total of 211 First Nation people and 236 Caucasians.

**Results**—A structural modeling analysis of 211 First Nation people and 236 Caucasian people found that (a) personality, alcohol expectancy, and problem drinking measures were invariant across the two cultures and (b) results consistent with the hypothesis that positive alcohol expectancies mediated the influence of negative urgency on problem drinking were also invariant across culture.

**Conclusion**—The findings support the theory that personality traits and psychosocial learning are important determinants of problem drinking in First Nation people and Caucasians.

### Keywords

First Nations people; problem drinking; personality; alcohol expectancies

---

Problematic alcohol use is a major health concern for many Native communities in both Canada and the United States. However, while some Native communities appear to have relatively high numbers of individuals experiencing alcohol-related problems, other reservations do not (Spillane & Smith, 2007). Because health disparities related to alcohol use are pronounced in this population (Beals et al., 2003; Beauvais, 1996; King, Beals, & Manson, 1992; Whitesell et al., 2006), it is important to study factors that may contribute to

---

\*corresponding author Nichea S. Spillane, Ph.D., Box G-S-121-4, Department of Community Health, Center for Alcohol and Addiction Studies, Brown University, (401) 863-6627, Nichea\_Spillane@Brown.edu.

risk for this set of problems. One important consideration for understanding problem drinking in Native communities is the individual variability in their drinking behavior. To understand the variability in drinking-related problems in this group, it is important to understand what contributes to individual differences in risk within this group.

Previous research has examined peer factors (Swaim, Oetting, Thurman, Beauvais, & Edwards, 1993), perceived discrimination (Whitbeck, Hoyt, McMorris, Chen, & Stubben, 2001), modeling (Mail, 1995); and alcohol expectancies (Garcia-Andrade, Wall, & Ehlers, 1996) among other risk factors. However, few studies have examined the potential role of personality and the integration of personality and alcohol expectancies in risk for problem drinking. In particular, impulsivity (Cyders et al., 2007; Smith et al., 2007) and alcohol expectancies have been found to predict alcohol use in other populations (Christiansen, Smith, Roehling, & Goldman, 1989; Smith, Goldman, Greenbaum, & Christiansen, 1995).

One model that combines personality and positive alcohol expectancies is the Acquired Preparedness (AP) model of addictive behaviors (Smith & Anderson, 2001). The AP model is based on person-environment transaction theory (Caspi, 1993; Caspi & Roberts, 2001; Smith, Williams, Cyders, & Kelley, 2006a). Spillane & Smith (2007) proposed that the AP model would apply to individual differences in drinking risk among native populations, just as it has for Caucasians (Settles, Cyders, & Smith, in press), African Americans (McCarthy, Miller, Smith, & Smith, 2001), and Taiwanese (Fu, Ko, Wu, Cherng, & Chen, 2007).

### **Acquired Preparedness Model of Drinking**

The AP model holds that people high on certain forms of impulsivity learn from their drinking experiences to expect drinking to be more reinforcing than do other people. By virtue of individual differences in traits, individuals are differentially prepared to acquire high risk positive alcohol expectancies; those expectancies are one proximal influence on drinking choices. Thus, the theory suggests that the role of personality in problem drinking is mediated by positive alcohol expectancies (Smith & Anderson, 2001).

The AP model (using various disinhibition-related measures) has been supported in a series of cross-sectional (Anderson, Smith, & Fischer, 2003; Barnow et al., 2004; McCarthy, Kroll, & Smith, 2001a; McCarthy et al., 2001b; Meier, Slutske, Arndt, & Cadoret, 2007; Trembach, Belyaev, & Lysenko, 2004) and longitudinal (Settles et al., in press; Fu et al., 2007) studies. Most recently, Settles et al. (in press) showed that disinhibition predicted subsequent increases in positive alcohol expectancies, which in turn predicted later increases in problem drinking. The supportive findings have been observed in samples of Caucasian men, Caucasian women, African Americans, Taiwanese, and adolescents of multiple ethnic backgrounds.

### **One Current Version of the AP model of Problem Drinking Risk**

Recent parsing of impulsivity into its components makes it possible to refine the AP model to be more specific in its predictions (Whiteside & Lynam, 2001). This parsing of impulsivity into four-modestly related personality traits allows us to clarify which disinhibition-related personality traits are most central to risk for problem drinking.

Following Whiteside and Lynam's (2001) initial work, researchers have studied four different dispositions to rash action: *negative urgency* (the tendency to act rashly in response to subjective distress); *sensation seeking* (the tendency to seek out new, novel, thrilling, and dangerous stimulation); *lack of planning/premeditation* (the tendency to act without thinking ahead); and *lack of perseverance* (the tendency to fail to stay focused on tasks and complete them). Among Caucasians, sensation seeking consistently predicts the frequency of alcohol consumption, whereas negative urgency consistently predicts problem drinking (Cyders et al., 2007; Fischer & Smith, 2008; Smith et al., 2007).

Because of negative urgency's association with problem drinking, one version of the AP model is as follows: individuals high in negative urgency are (a) more likely than others to drink when in a very negative mood state, (b) more likely to find that drinking is reinforcing in the short term (because it provides the negative reinforcement of distress relief or distraction: Fischer, Smith, Spillane, & Cyders, 2005; Heatherton & Baumeister, 1991), therefore (c) more likely to form expectancies that drinking is rewarding, and thus (d) more likely to engage in problem drinking. Although this version of the model has been supported empirically among Caucasians, it has not been tested with Native populations. There is some research to suggest that alcohol expectancies correlate with drinking among Native populations (Garcia-Andrade et al., 1996), but other aspects of the model, including the role of personality traits and personality's influence on psychosocial learning, have not previously been examined.

For this first test of the AP model in Native populations, we chose one First Nation community located in Canada and we conducted cross-sectional tests of three hypotheses. We hypothesized that 1) measures of personality risk (the four dispositions to rash action), positive alcohol expectancies, and drinking problems will be invariant across this First Nation community and a sample of individuals of Caucasian background; 2) the nature of covariation between the four traits and problem drinking would be the same for both ethnic groups; thus, negative urgency would uniquely predict problem drinking concurrently; and 3) positive alcohol expectancies would mediate the influence of negative urgency on problem drinking to the same degree in both groups.

## Method

### Participants

Participants comprised two groups. The first group consisted of a group of First Nation people from a tribe located in the province of New Brunswick, Canada. This sample consisted of 211 individuals (96 male) whose ages ranged from 18 to 70 years old (mean age of 35). Approximately 71% of the sample's income fell below \$20,000. Approximately 37% of the sample did not complete high school, and 30% had a high school diploma or GED.

The comparison group consisted of 236 (128 male) collected primarily from the U.S. ( $n = 167$ ), with the remainder coming from the area surrounding the reservation. Participants' ages ranged from 19 to 69 years (mean age of 39). Approximately 53% of the participants in this sample reported income greater than \$50,000. Approximately 17% of the sample did not

receive a high school diploma, 20% received a high school diploma, 16% received some college education, and the remaining 46% had completed college or post college education.

## Measures

**Demographics.** This is a 14-item questionnaire that consists of age, gender, education level achieved, and occupation.

**Drinking Style Questionnaire (DSQ)**—The DSQ is a 2-subscale questionnaire: drinking/drunkenness and problems related to drinking (Smith, McCarthy, & Goldman, 1995). Both scales are internally consistent, stable across time, and correlated highly with collateral reports (Smith et al., 1995). The drinking/drunkenness factor includes quantity of consumption, frequency of consumption, proportion of time drinking leads to drunkenness, maximum quantity consumed, and physical effects of alcohol. The problem factor includes items measuring various negative consequences of consumption (e.g. legal difficulties, trouble with family, trouble with relationships, illness). There is evidence for the validity of both scales in both adolescent and adult samples (Settles et al., in press; Smith et al., 1995). We used the problem drinking factor for this study. Coefficients alpha for the scale were .68 for AIs and .79 for Caucasians.

**UPPS – R Impulsivity Scale**—The UPPS–R (Whiteside & Lynam, 2001) measures negative urgency, sensation seeking, lack of planning/premeditation, and lack of perseverance. Internal consistency reliabilities were comparable across groups. Coefficients alpha for the negative urgency scale were as follows: .77 for AIs and .86 for Caucasians. Coefficients alpha for the lack of premeditation scale were: .82 for AIs and .82 for Caucasians. Coefficients alpha for the sensation seeking were: .80 for AIs and .82 for Caucasians. Coefficients alpha for the lack of perseverance were: .76 for AIs and .81 for Caucasians. Evidence that the four traits represent distinct pathways to rash action has been reported and replicated (Smith et al., 2007; Whiteside & Lynam, 2001), and there is considerable evidence that the four traits relate differently to different forms of dysfunction (Anestis, Shelby, Fink, & Joiner, 2007a; Anestis, Shelby, & Joiner, 2007b; Billieux, Van der Linden, D'Acromont, Ceschi, & Zermatten, 2007a; Billieux, Van der Linden, & Ceschi, 2007b; Breen & Zuckerman, 1999; Claes, Vandereycken, & Vertommen, 2005; Fischer, Smith, & Anderson, 2003; Miller, Flory, Lynam, & Leukefeld, 2003; Fischer, Smith, Annus, & Hendricks, 2007; Fischer & Smith, 2008; Miller et al., 2003; Smith et al., 2007; Whiteside & Lynam, 2001; Whiteside & Lynam, 2003; Whiteside, Lynam, Miller, & Reynolds, 2005).

**Alcohol Expectancy Questionnaire (AEQ; Brown, Goldman, Inn, & Anderson, 1980)**—Positive expectancies for drinking were measured using the AEQ scale “alcohol leads to global, positive transformations of experience.” Responses are made in an agree-disagree format. Coefficients alpha for the global, positive alcohol expectancies were .90 for AIs, .92 for Caucasians. This scale has been shown to be associated with different aspects of drinking behavior including early onset, quantity and frequency of consumption, alcohol related problems, and treatment outcome (Goldman, Brown, Christiansen, & Smith, 1991).

## Procedure

**Data Collection**—For the First Nation sample, the data were collected in two different trips to the reservation. A flyer was sent out two weeks prior to each visit which described tribal members' opportunity to participate in the study; fliers were also posted around the reservation. The fliers described the investigator, the purpose of the study, when they would be approached to consider participating, and how much they would be paid (\$10 USD). The first author went door-to-door to recruit potential participants. When an individual agreed to participate, he/she completed consent forms and then the investigator left a packet of questionnaires with him or her and scheduled a return visit to pick up the completed materials. Participants were also provided a phone number they could use to contact the investigator.

Participants in the Caucasian sample were mostly recruited through advertisements placed in newspapers and fliers posted around communities. Interested individuals were instructed to call the phone number provided and given a brief description of the study. If interested, they scheduled appointments with an investigator. We oversampled for low socioeconomic status by recruiting from various community centers and soup kitchens. Participants at these sites were approached in person and asked if they would like to take part in a research study. If they agreed to participate, they completed consent forms and then the measures in counterbalanced order. They were paid (\$10 USD) for their participation.

All participants were introduced to the study as an investigation of drinking styles. After completing the consent forms, they completed the measures in counterbalanced order. Completed questionnaires were placed in a sealed envelope and stored in a locked file. At the completion of the study, participants were paid, debriefed, and thanked for their participation.

This study was approved by the University's Institutional Review Board for research as well as by the members of the tribal council and chief on the reservation where the research was conducted.

## Overview of data analysis

Data analysis proceeded in a series of steps. We used structural equation modeling (SEM) using *Mplus* (Muthén & Muthén, 2004), to test the model. We began by testing whether the four trait scales, the alcohol expectancy scale, and the problem drinking scale were invariant across ethnicity. We then tested whether the impulsivity-related traits had the same relationship to problem drinking in the two groups. Next, we tested the hypothesis that positive alcohol expectancies appear to mediate the relationship between negative urgency and problem drinking for both groups.

We considered four indices of model fit for these analyses: the comparative fit index (CFI), the Tucker-Lewis index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Guidelines for how to interpret these indices vary. For the CFI and TLI indices, values of .90 or .95 are thought to indicate good fit between a model and data (Hu & Bentler, 1999; Kline, 2005); SRMR values of .09 or lower indicate good fit, and RMSEA values of .10 are thought to reflect marginally good

fit, .08 reflect good fit, and .06 reflect excellent fit (Browne & Cudeck, 1993; Hu & Bentler, 1999). Overall evaluation of model fit is made by considering the values of each of the four fit indices; models that fit well on most indices are generally considered well-fitting. We did not use the model chi-square to evaluate fit, because the test has been shown to be overly sensitive, resulting in rejection of well-fitting models (Bentler, 1990).

Our model involved four trait measures, an expectancy measure, and the problem drinking measure; each of the six measures includes over 10 items. With this many items, it was not possible to test the model at the item level; one would need extremely large sample sizes to do so. We therefore created parcels of items for each measure. Parcels are groupings of items. For a given scale, we assigned items to parcels in alternating fashion, and each parcel score was the average score of the items included in the parcel. We chose three parcels per measure; that choice made it possible to test the model with the sample sizes available. There are additional advantages to the use of parcels of items, beyond the necessity of doing so in the present case. First, the reliability of a parcel of items is greater than that of a single item, so parcels can serve as more stable indicators of latent constructs as represented in SEM. Second, as combinations of items, parcels provide more scale points, thereby more closely approximating continuous measurement of the latent construct. Third, there is reduced risk of spuriously positive correlations, both because fewer correlations are being estimated and because each estimate is based on more stable indicators. These advantages have been described by Little, Cunningham, Shahar, and Widaman (2002) and partly by Rushton, Brainerd, and Pressley (1983). The crucial relevant caution about using parcels is that they could mask multidimensionality in an item set (Hagtvet & Nasser, 2004; Little, et al., 2002). However, each scale we used has been shown to be unidimensional in independent factor analyses, and again in the current samples, so this concern is significantly mitigated.

**Means to Measure Invariance Across Groups**—There are many levels on which scales can be invariant across groups (Hoyle & Smith, 1994). They can have the same factor structure, which suggests common dimensionality of target constructs across group. One can then impose the constraint that each factor indicator has precisely the same loading for both groups. Although there are further constraints one can impose, such as constraining error variances, these two constraints (equivalent factor structures and equal loadings) are the primary ones of interest. We conducted invariance testing by first imposing the full constraint that all factor loadings were equal. We then tested whether the model fit better when we relaxed that constraint, thus allowing for different factor loadings across groups. If the model did fit better with the constraint relaxed, one concludes that factor loadings were not equal across groups. One compares two models such as these using a chi-square difference test: an absence of a difference between the two models confirms that the models are not different, thus supporting full invariance. Since the chi-square test is overly sensitive (Bentler, 1990), one also examines fit indices to determine whether there is any meaningful drop in fit once the constraints of equal factor loadings are imposed.



## Results

### Descriptive Statistics

Table 1 presents the means and standard deviations for drinking quantity, frequency, and problems, the four impulsivity-like constructs, and positive alcohol expectancies by ethnicity. For the First Nation sample, 32% of the sample reported drinking less than once per month, 22% reported drinking once per month, 32% reported drinking once or twice a week, and about 10% reported drinking daily. Drinking frequency for the Caucasians were somewhat similar with 26% reporting drinking less than once per month, 22% drinking about once per month, 31% drinking about once or twice a week, and 16% drinking almost daily.

Among the First Nation sample, 15% reported that they don't currently drink, 21% reported that they typically drink 3 alcoholic beverages or less when they drink, 29% reported that they drink between 4 – 8 alcoholic beverages when they drink, and 30% reported that when they drink, they consume 9 alcoholic beverages or more. For Caucasians, almost 13% reported that they don't drink, almost 50% of the Caucasian sample reported that they drink 3 or fewer alcoholic beverages when they do drink, 16% reported consuming between 4 – 8 alcoholic beverages, and 18% reported consuming 9 alcoholic beverages or more.

### Invariance of Measures of Traits, Expectancies, and Problem Drinking

We first examined the factor structure for the problem drinking scale and the UPPS - R scales together within each of the two ethnic groups. We then tested the invariance of the factor structures between the two groups.

For the First Nation sample, the model resulted in a CFI of .95, a TLI of .93, an SRMR of .06, and an RMSEA of .06 (90% confidence interval .04-.08). For the Caucasian group, the model resulted in a CFI of .96, a TLI of .94, and SRMR of .05, and an RMSEA of .06 (90% confidence interval of .05-.08). For each group, factor loadings for the five latent variables ranged from .50 to .86. Clearly, the model fit well for each group.

Next, we tested the invariance of the models across ethnicity (see table 2). First, we imposed the constraint that the factor loadings were equal across groups. This resulted in a  $\chi^2 = 301.72$ ,  $df = 170$ . The model had a CFI of .95, a TLI of .94, an SRMR of .06 and an RMSEA of .06 (90% confidence interval of .05 – .07). This fully constrained model fit the data very well.

We next relaxed these constraints to examine whether the fit was improved under the condition of equivalent structures but non-equal factor loadings. We examined each scale separately. Lack of premeditation, negative urgency, sensation seeking, lack of perseverance, and problem drinking were invariant across groups (see table 2). In each case, the improvement in chi-square from relaxing the constraints was non-significant and all four fit indices were the same as in the fully constrained model.

These findings are the first to show that these personality traits and a measure of problem drinking operate in the same structural way for First Nation people as for Caucasians. This

demonstration of invariance was also necessary before it was theoretically sensible to compare correlations among the construct measures across groups.

We next examined the invariance of the factor structure for the scale measuring the expectancy that alcohol provides global, positive transformations of experience across ethnicity, following the same procedure. We again imposed the constraint that the factor loadings were equivalent across groups, and found that the constrained (i.e., invariant) model fit the data well: CFI = 1.0; TLI = 1.00; SRMR = .03; RMSEA = .00 (90% confidence interval .00-.09). Relaxing the constraint of equal factor loadings did not improve the model fit significantly (CFI = 1.0; TLI = 1.0; SRMR = .03; RMSEA .03 (90% confidence interval of .00-.15). Clearly the alcohol expectancy scale was invariant in structure and factor loadings across the two ethnic groups<sup>1</sup>.

### The Role of Negative Urgency for AIs and for Caucasians

We tested a structural model with lack of premeditation, lack of perseverance, sensation seeking, and negative urgency as concurrent predictors of problem drinking for both groups. For the First Nation sample, results were consistent with past Caucasian samples. Negative urgency was the only significant predictor of problem drinking ( $\beta = .24, z = 2.65, p < .01$ ). As expected, lack of premeditation ( $\beta = .12, ns$ ), sensation seeking ( $\beta = .13, ns$ ), and lack of perseverance ( $\beta = .15, ns$ ) did not add to the concurrent prediction of problem drinking. In the Caucasian sample, negative urgency was the only significant predictor of problem drinking ( $\beta = .33, z =, p < .001$ ); as expected, lack of premeditation ( $\beta = .29, ns$ ), sensation seeking ( $\beta = .10, ns$ ), and lack of perseverance ( $\beta = .01, ns$ ) did not add to the concurrent prediction of problem drinking. Figure 1 depicts these analyses.

### Expectancies' Mediation of Negative Urgency's Influence on Problem Drinking

We next tested whether the relations among negative urgency, positive alcohol expectancies, and problem drinking were consistent with the theory that alcohol expectancies mediate the influence of negative urgency on problem drinking, i.e., that a significant portion of negative urgency's influence on problem drinking is accounted for by the two variables' common association with expectancies. We tested this hypothesis for both ethnic groups, and we then tested whether the mediation model was invariant across group.

For the First Nation sample, the mediation model resulted in a CFI of .99, a TLI of .98, an SRMR of .03, and an RMSEA of .04 (90% confidence interval .00-.08). The direct effect between negative urgency and problem drinking when expectancies were not included in the model was .35. When positive alcohol expectancies were entered into the model the relationship between negative urgency and problem drinking dropped significantly (new  $\beta$

<sup>1</sup> These findings indicate that latent variable scores on each of the personality, expectancy, and problem drinking scales appear to have measurement equivalence across the two groups. Our sample size did not permit the examination of item equivalence across groups, tests for which are referred to as differential item functioning analyses. This technique across involves plotting and testing curves relating responses to each item to scores on the latent variable. It is certainly possible that individual items in some of the measures we have used do have different properties for the different groups, in the sense that endorsement of an item may relate differently to total scores for different groups. Thus, although the latent variables derived in this study can be used to compare the two groups with respect to prediction and mediation, that finding should not be construed to imply that each individual item operates invariantly across group membership. Investigation of differential item functioning is important and should be pursued with the measures we have described in this report.



= .18; the test of the significance of the drop is given by  $z = 3.49, p < .001$ ). These findings are consistent with the hypothesis that positive alcohol expectancies mediate the influence of negative urgency on problem drinking among First Nation people.

For the Caucasian group, the model resulted in a CFI of 1.0, a TLI of 1.0, and SRMR of .03, and an RMSEA of .02 (90% confidence interval of .00-.06). The direct effect between negative urgency and problem drinking when expectancies were not included in the model was .42. When positive alcohol expectancies were entered into the model the relationship between negative urgency and problem drinking dropped significantly (new  $\beta = .15$ , statistical significance of drop:  $z = 4.39, p < .001$ ). These findings are also consistent with the hypothesis that positive alcohol expectancies mediate the influence of negative urgency on problem drinking among Caucasians.

We found that this mediation model was invariant across ethnicity ( $\chi^2 = 26.28; df = 24, ns$ ). The model had a CFI of .99, TLI of .98, SRMR of .04, and RMSEA of .04 (90% confidence interval of .01-.06). Clearly, the model fit the data well. Thus, the findings were consistent with the hypothesis that alcohol expectancies mediate the influence of negative urgency on problem drinking to the same degree in the two ethnic groups. Figure 2 depicts results of the mediation model tests.

## Discussion

We investigated the invariance of measures of drinking problems, four impulsivity-related traits, and positive alcohol expectancies and the cross-cultural applicability of the Acquired Preparedness model in predicting problem drinking in a group of reservation-dwelling First Nation people. The four dispositions to rash action, the problem drinking scale, and the measure of positive alcohol expectancies were invariant across ethnicity, i.e. the traits have the same factor structure in both groups. This result provides evidence for the validity of using these measures in both populations and allows researchers to test theories concerning these constructs and compare the findings between natives and non-natives. We encourage researchers to test the invariance of their measures across cultural groups routinely: one cannot assume that all measures have the same structure in different ethnic groups, and interpretation of findings when invariance has not been established is difficult.

Of the structural findings, negative urgency was the only trait to concurrently predict problem drinking in each ethnic group. The consistent role of negative urgency in the two groups is consistent with the findings of several recent studies that highlight negative urgency as an important personality risk factor for problem drinking in particular, and addictive behaviors in general (Anestis et al., 2007b; Billieux et al., 2007a, 2007b; Billieux, Rochat, Rebetz, & Van der Linden, 2008; Cyders & Smith, 2007; Fischer & Smith, 2008; Fischer, Anderson, & Smith, 2004; Fischer et al., 2007; Magid & Colder, 2007; Miller et al., 2003; Smith et al., 2007; Whiteside & Lynam, 2003; Whiteside et al., 2005). This emotion-based disposition to rash action appears to play a role in problem drinking.

Statistical tests of mediation were consistent with our hypothesis that positive alcohol expectancies mediate the influence of negative urgency on problem drinking, and do so to

the same degree for both natives and non-natives, in this case a group of members from one First Nation group and Caucasians. This result constitutes additional cross-cultural support for the AP model in this First Nation group (for Caucasians and African Americans: McCarthy et al., 2001b; Settles et al., in press; for Taiwanese: Fu et al., 2007). Our results complement prior cross-sectional and longitudinal findings that are consistent with mediation and implies that the same risk process that predicts problem drinking among other ethnic groups also applies to First Nation people. The possibility that a trait, such as negative urgency, helps shape psychosocial learning, such as alcohol expectancies, is an example of a person-environment transaction and thus illustrates how personality theory and psychosocial learning theory can be integrated to explain individual differences in behavior (Smith et al., 2006a).

Should the findings of this study replicate on other samples of Native groups and in longitudinal research, there are important implications for intervention. Negative urgency refers to the tendency to engage in rash, ill-advised behaviors when distressed and this tendency has been addressed successfully by dialectical behavior therapy (Linehan, 1993). It may be that training on how to tolerate one's distress may prove fruitful for some individuals engaging in high levels of alcohol consumption. More broadly, the different impulsivity-related traits appear to require different interventions (Zapolski, Settle, Cyders, & Smith, 2010); this reality makes recognition of the role of negative urgency in problem drinking particularly important.

The findings described here should be understood in the context of the limitations of this research. First, our test of the individual differences model was cross-sectional and correlational. The individual differences model is a causal model: individual differences in negative urgency are understood to influence expectancy formation, and thus indirectly influence problem drinking levels. Therefore, the present findings should be understood as consistent with the model, not as a demonstration of the model's validity. However, there is good reason for the temporal order of variables implied in our model. Negative urgency is analogous to the impulsiveness facet of Neuroticism on the NEO-PI-R measure of personality, and that measure has been shown to be substantially heritable (Jang, McCrae, Angleitner, Reimann, & Livesley, 1998) and therefore likely present before alcohol-related learning or actual consumption. Numerous studies have shown that alcohol expectancies predate and predict subsequent drinking onset (cf. Christiansen et al., 1989; Ouellette, Gerrard, Gibbons, & Resi-Bergan, 1999; Smith et al., 1995), so the proposed sequence of trait predicting learning and then learning predicting behavior is consistent with considerable prior research. In addition, similar longitudinal research with different disinhibition-related measures supported the same trait to learning to behavior sequence (Settles et al., in press; Fu et al., 2007).

Relatedly, tests of this model were conducted using one members from one First Nation community. Although there is no reason to believe that this model would not apply to other First Nation groups, future research should investigate this possibility. In addition, it is possible that our recruitment of First Nation people or of Caucasians resulted in samples not fully representative of their respective populations; future research on truly random samples

is necessary. Despite these sampling differences, results were invariant across ethnic groups providing additional support for our hypotheses.

Demonstrations that measures are invariant do not rule out the possibility that additional constructs, unique to a given culture, play a central role in alcohol and drug use. It seems likely that experiences and constructs indigenous to a culture play a central role in the risk process. It is important that our study of processes thought to be common across the two groups not be construed to imply that other processes, indigenous to First Nation culture and perhaps to reservation life, are not also very important. There are many possible domains of cultural differences; we briefly refer to three related to the topic of this investigation. First, it may be the case that, in addition to largely universal personality traits, members of a cultural group also may differ on trait dimensions specific to that group (Church & Katigbak, 2000; Smith, Spillane, & Annus, 2006b; Zhang & Bond, 1998). Second, trait-based reactions are likely to be triggered by different antecedents in different cultural contexts, and of course trait-based behaviors likely involve different content in different cultural contexts (Smith et al., 2006b). Third, alcohol expectancy measures were initially developed based on interviews with alcoholics and others within the U.S. (Brown et al., 1980), so existing measures may not reflect content domains specific to other cultures. To better understand learned expectancies, perhaps researchers should apply test development techniques similar to those of Brown et al. (1980) anew in different cultures.

## Acknowledgments

Portions of this work were based on the doctoral dissertation of Nichea S. Spillane. This work was supported by NIAAA F31 (5 F31 AA 014467) to Nichea S. Spillane and 1 RO1 AA 016166 to Gregory T. Smith.

## References

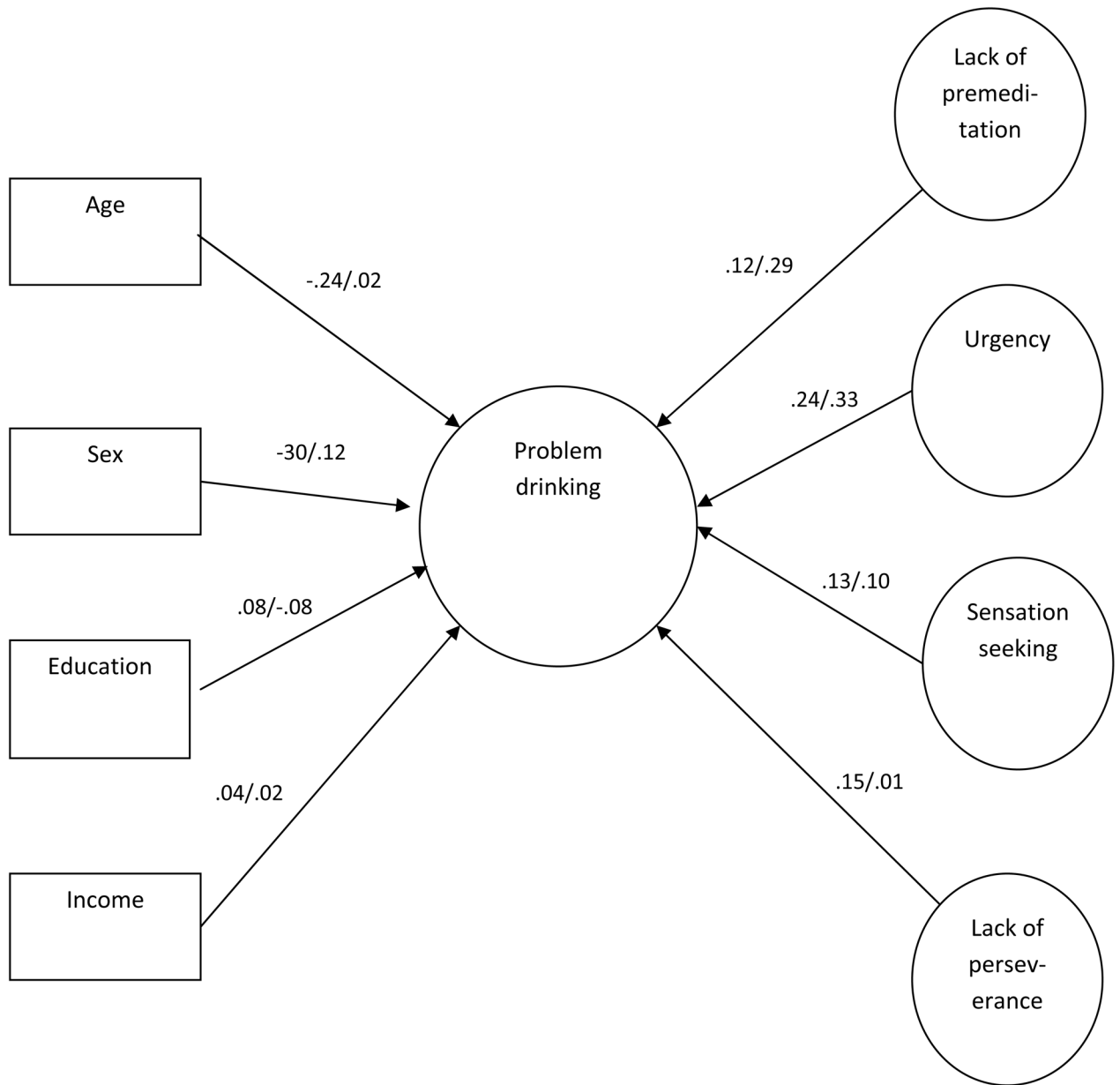
- Anderson KG, Smith GT, Fischer S. Women and acquired preparedness: Personality and learning implications for alcohol use. *Journal of Studies on Alcohol*. 2003; 64:384–392. [PubMed: 12817828]
- Anestis MD, Shelby EA, Fink EL, Joiner TE. The multifaceted role of distress tolerance in dysregulated eating behaviors. *The International Journal of Eating Disorders*. 2007a; 40:718–726. [PubMed: 17868125]
- Anestis MD, Shelby EA, Joiner TE. The role of urgency in maladaptive behaviors. *Behaviour Research and Therapy*. 2007b; 45:3018–3029. [PubMed: 17923108]
- Barnow S, Shultz G, Lucht M, Ulrich I, Preuss UW, Freyberger HJ. Do alcohol expectancies and peer delinquency/substance use mediate the relationship between impulsivity and drinking behaviour in adolescence? *Alcohol & Alcoholism*. 2004; 39:213–219. [PubMed: 15082458]
- Beals J, Manson SM, Shore JH, Friedman M, Ashcraft M, Schlenger JF. The prevalence of posttraumatic stress disorder among American Indian Vietnam veterans: Disparities and context. *Journal of Traumatic Stress*. 2002; 15:89–97. [PubMed: 12013069]
- Beauvais F. Trends in drugs use among American Indian students and drop-outs, 1975–1994. *American Journal of Public Health*. 1996; 86:1594–1599. [PubMed: 8916526]
- Bentler PM. Comparative fit indices in structural equation modeling. *Psychological Bulletin*. 1990; 107:238–246. [PubMed: 2320703]
- Billieux J, Rochat L, Rebetz M, Van der Linden M. Are all facets of impulsivity related to self-reported compulsive buying behavior? *Personality and Individual Differences*. 2008; 44:1432–1442.

- Billieux J, Van der Linden M, D'Acremont M, Ceschi G, Zermatten A. Does impulsivity relate to perceived dependence on and actual use of the mobile phone? *Applied Cognitive Psychology*. 2007a; 21:527–537.
- Billieux J, Van der Linden M, Ceschi G. Which dimensions of impulsivity are related to cigarette craving? *Addictive Behaviors*. 2007b; 32:1189–1199. [PubMed: 16997490]
- Breen R, Zuckerman M. 'Chasing' in gambling behavior: Personality and cognitive determinants. *Personality and Individual Differences*. 1999; 25:365–380.
- Browne, MW.; Cudeck, R. Alternative ways of assessing model fit. In: Bollen, KA.; Long, JS., editors. *Testing structural equation models*. Newbury Park, CA: Sage; 1993. p. 136-162.
- Brown SA, Goldman MS, Inn A, Anderson LR. Expectations of reinforcement from alcohol: Their domain and relation to drinking patterns. *Journal of Consulting and Clinical Psychology*. 1980; 57:93–99.
- Caspi, A. Why maladaptive behaviors persist: Sources of continuity and change across the life course. In: Funder, DC.; Parke, RD.; Tomlinson-Kersey, C.; Widaman, K., editors. *Studying Lives Through Time: Personality and Development*. Washington, D. C: American Psychological Association; 1993.
- Caspi A, Roberts BW. Personality development across the life course: The argument for change and continuity. *Psychological Inquiry*. 2001; 12:49–66.
- Christiansen BA, Smith GT, Roehling PV, Goldman MS. Using alcohol expectancies to predict adolescent drinking behavior after one year. *Journal of Studies on Alcohol*. 1989; 48:483–489. [PubMed: 3669677]
- Church AT, Katigbak MS. Trait psychology in the Philippines. *American Behavioral Scientist*. 2000; 44(1):73–94.
- Claes L, Vandereycken W, Vertommen H. Impulsivity related traits in eating disorder patients. *Personality and Individual Differences*. 2005; 39:739–749.
- Cyders MA, Smith GT. Mood-based rash action and its components: Positive and negative urgency. *Personality and Individual Differences*. 2007; 43:839–850.
- Cyders MA, Smith GT, Spillane NS, Fischer S, Annus AM, Peterson C. Integration of impulsivity and positive mood to predict risky behavior: Development and validation of a measure of positive urgency. *Psychological Assessment*. 2007; 19(1):107–118. [PubMed: 17371126]
- Fischer S, Anderson KG, Smith GT. Coping with distress by eating or drinking: The role of trait urgency and expectancies. *Psychology of Addictive Behaviors*. 2004; 18:269–274. [PubMed: 15482082]
- Fischer S, Smith GT. Binge eating, problem drinking, and pathological gambling: Linking behavior to shared traits and social learning. *Personality and Individual Differences*. 2008; 44:789–800.
- Fischer S, Smith GT, Anderson KG. Clarifying the role of impulsivity in bulimia nervosa. *International Journal of Eating Disorders*. 2003; 33:406–411. [PubMed: 12658670]
- Fischer S, Smith GT, Annus AM, Hendricks M. The relationship of neuroticism and urgency to negative consequences of alcohol use in women with bulimic symptoms. *Personality and Individual Differences*. 2007; 43:1199–1209.
- Fischer, S.; Smith, GT.; Spillane, NS.; Cyders, M. Urgency: Individual differences in reaction to mood and implications for addictive behaviors. In: Columbus, F., editor. *The Psychology of Mood*. New York: Nova Science Publishers; 2005.
- Fu A, Ko H, Wu JY, Cherng B, Cheng C. Impulsivity and expectancy in risk for alcohol use: Comparing male and female college students in Taiwan. *Addictive Behaviors*. 2007; 32:1887–1896. [PubMed: 17287091]
- Garcia-Andrade C, Wall TL, Ehlers CL. Alcohol expectancies in a Native American population. *Alcoholism: Clinical and Experimental Research*. 1996; 20:1438–1442.
- Goldman MS, Brown SA, Christiansen BA, Smith GT. Alcoholism and memory: Broadening the scope of alcohol-expectancy research. *Psychological Bulletin*. 1991; 110:137–146. [PubMed: 1891515]
- Hagtvet KA, Nasser FM. How well do item parcels represent conceptually defined latent constructs? A two-facet approach. *Structural Equation Modeling*. 2004; 11:168–193.

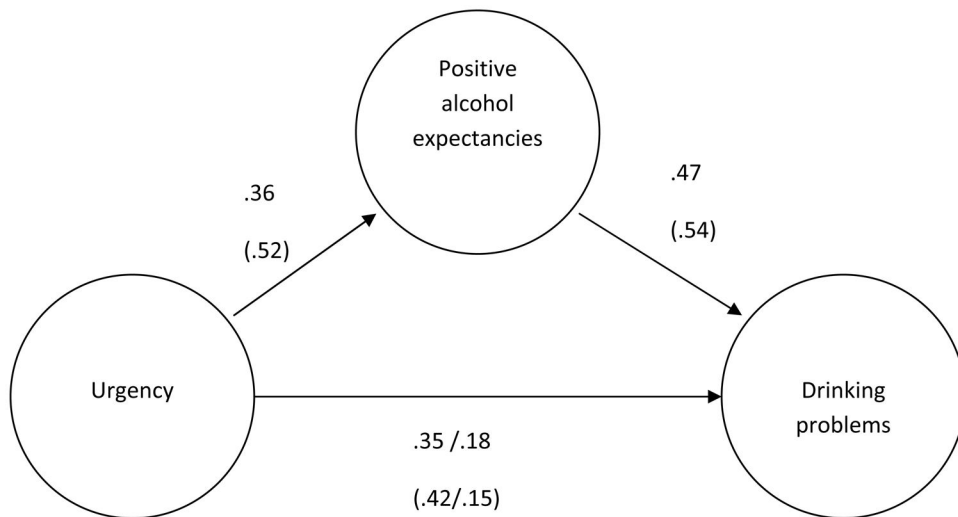
- Heatherton TF, Baumeister RF. Binge eating as an escape from self-awareness. *Psychological Bulletin*. 1991; 110:86–108. [PubMed: 1891520]
- Hoyle RH, Smith GT. Formulating clinical research hypotheses as structural equation models: A conceptual overview. *Journal of Consulting and Clinical Psychology*. 1994; 62:429–440. [PubMed: 8063970]
- 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.
- Jang KL, McCrae RR, Angleitner A, Reimann R, Livesley WJ. Heritability of facet level traits in a cross cultural twin sample: Support for a hierarchical model of personality. *Journal of Personality and Social Psychology*. 1998; 74:1556–1565. [PubMed: 9654759]
- King J, Beals J, Manson SM. A structural equation model of factors related to substance use among American Indian adolescents. *Journal of Drug Issues*. 1992; 6:253–268.
- Kline, RB. *Principles and practice of structural equation modeling*. New York: Guilford Press; 2005.
- Linehan, MM. *Cognitive behavioral treatment of Borderline Personality Disorder*. New York: Guilford Press; 1993.
- 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.
- Magid V, Colder CR. The UPPS impulsive behavior scale: Factor structure and associations with college drinking. *Personality and Individual Differences*. 2007; 43:1927–1937.
- Mail PD. Early modeling of drinking behavior by Native American elementary school children playing drunk. *The International Journal of the Addictions*. 1995; 30:1187–1197. [PubMed: 7591357]
- McCarthy DM, Kroll LS, Smith GT. Integrating disinhibition and learning risk for alcohol. *Experimental and Clinical Psychopharmacology*. 2001a; 9:389–398. [PubMed: 11764015]
- McCarthy DM, Miller TL, Smith GT, Smith JA. Disinhibition and expectancy in risk for alcohol use: Comparing black and white college samples. *Journal of Studies on Alcohol*. 2001b; 62:313–329. [PubMed: 11414341]
- Meier MH, Slutske WS, Arndt S, Cadoret RJ. Positive alcohol expectancies partially mediate the relation between delinquent behavior and alcohol use: Generalizability across age, sex, and race in a cohort of 85,000 Iowa schoolchildren. *Psychology of Addictive Behaviors*. 2007; 21:25–34. [PubMed: 17385952]
- Muthén, LK.; Muthén, BO. *Mplus: User's Guide*. Los Angeles, CA: Muthén & Muthén; 2004.
- Miller J, Flory K, Lynam D, Leukefeld C. A test of the four-factor model of impulsivity-related traits. *Personality and Individual Differences*. 2003; 34:1403–1418.
- Ouellette JA, Gerrard M, Gibbons FX, Reis-Bergan M. Parents, peers, and prototypes: Antecedents of adolescent alcohol expectancies, alcohol consumption, and alcohol-related problems in rural youth. *Psychology of Addictive Behaviors*. 1999; 13:183–197.
- Rushton JP, Brainerd CJ, Pressley M. Behavioral development and construct validity: The principle of aggregation. *Psychological Bulletin*. 1983; 94:18–38.
- Settles RF, Cyders MA, Smith GT. Longitudinal validation of the acquired preparedness model of drinking risk. *Psychology of Addictive Behaviors*. in press.
- Smith, GT.; Anderson, KG. Adolescent risk for alcohol problems asacquired preparedness: A model and suggestions for intervention. In: Monti, PM.; Colby, SM.; O'Leary, TA., editors. *Adolescents, Alcohol, and Substance Abuse: Reaching Teens through Brief Intervention*. New York: Guilford Press; 2001.
- Smith GT, Fischer S, Cyders MA, Annus AM, Spillane NS, McCarthy D. The construct validity of four types of impulsivity: a multi-trait, multi-method study. *Assessment*. 2007; 14:155–170. [PubMed: 17504888]
- Smith GT, Goldman MS, Greenbaum P, Christiansen BA. The expectancy for social facilitation from drinking: the divergent paths of high-expectancy and low-expectancy adolescents. *Journal of Abnormal Psychology*. 1995; 104:32–40. [PubMed: 7897051]
- Smith GT, McCarthy DM, Goldman MS. Self-reported drinking and alcohol-related problems among early adolescents: Dimensionality and validity over 24 months. *Journal of Studies on Alcohol*. 1995; 56:383–394. [PubMed: 7674672]

- Smith GT, Spillane NS, Annus AM. Implications of an emerging integration of universal and culturally-specific psychologies. *Perspectives on Psychological Science*. 2006b; 1:211–233.
- Smith GT, Williams SF, Cyders M, Kelley S. Reactive personality-environment transactions and the transition to adulthood. *Developmental Psychology*. 2006a; 42:877–887. [PubMed: 16953693]
- Spillane N, Smith GT. A theory of reservation-dwelling American Indian alcohol use risk. *Psychological Bulletin*. 2007; 133:395–418. [PubMed: 17469984]
- Swaim RC, Oetting ER, Thurman PJ, Beauvais F, Edwards RW. American Indian adolescent drug use and socialization characteristics: A cross-cultural comparison. *Journal of Cross-Cultural Psychology*. 1993; 24:53–70.
- Trembach AB, Belyaev MA, Lysenko VV. Age-related changes in attention and impulsivity in young schoolchildren. *Human Physiology*. 2004; 30:537–544.
- Whitbeck LB, Hoyt DR, McMorris BJ, Chen X, Stubben JD. Perceived discrimination and early substance abuse among American Indian children. *Journal of Health and Social Behavior*. 2001; 42(4):405–424. [PubMed: 11831140]
- Whitesell NR, et al. Latent class analysis of substance use: comparison of two ‘ American Indian reservation populations and a national sample. *Journal of Studies on Alcohol*. 2006; 67:32–43. [PubMed: 16536127]
- Whiteside SP, Lynam DR. The five factor model and impulsivity: Using a structural model of personality to understand impulsivity. *Personality and Individual Differences*. 2001; 30:669–689.
- Whiteside SP, Lynam DR. Understanding the role of impulsivity and externalizing psychopathology in alcohol abuse: Applications of the UPPS Impulsive Behavior Scale. *Experimental and Clinical Psychopharmacology*. 2003; 11:210–217. [PubMed: 12940500]
- Whiteside SP, Lynam DR, Miller JD, Reynolds SK. Validation of the UPPS impulsive behavior scale: A four-factor model of impulsivity. *European Journal of Personality*. 2005; 19:559–574.
- Zapolski TCB, Settles RF, Cyders MA, Smith GT. Borderline Personality Disorder, Bulimia Nervosa, Antisocial Personality Disorder, ADHD, Substance Use: Common Threads, Common Treatment Needs, and the Nature of Impulsivity. *The Independent Practitioner*. 2010; 30:20–23.
- Zhang J, Bond MH. Personality and filial piety among college students in two Chinese societies: The added value of indigenous constructs. *Journal of Cross-Cultural Psychology*. 1998; 29:402–417.





**Figure 1.** Summary of the concurrent predictive relationships between demographic, the four scales of the UPPS-R and problem drinking. Each scale’s influence is corrected for its overlap with the other scales. For each relationship, the first number represents the beta weight for the First Nation group and the second number represents the beta weight for the Caucasians.



**Figure 2.**

SEM test of Positive alcohol expectancies mediating the relationship between urgency and drinking problems in First Nation people and Caucasians. For each path, the first number represents the path estimate for First Nation people and the second number (in parentheses) for Caucasians. For the urgency to drinking problems path, the two coefficients not in parentheses apply to First Nation people and represent, first, the association between negative urgency and drinking problems without considering alcohol expectancies, and then, after the slash, the association between negative urgency and drinking problems with alcohol expectancies included in the model. The coefficients in parentheses apply to Caucasians, and again, the first coefficient is between negative urgency and drinking problems without alcohol expectancies in the model and the second coefficient reflects the same association with expectancies included. Path coefficients represent maximum likelihood estimates.

**Table 1**

Means and standard deviations for drinking quantity, frequency, and problems, the four impulsivity-like traits, and positive alcohol expectancies by ethnicity.

	<b>AIs (N = 211)</b>	<b>Caucasians (N = 236)</b>
Drinking quantity, <i>M (SD)</i>	3.45 (1.58)	3.06 (1.34)
Don't drink (%)	15	13
3 alcoholic beverages or less (%)	21	50
4–8 alcohol beverages (%)	29	16
9 or more (%)	30	18
Drinking frequency, <i>M(SD)</i>	3.99 (1.41)	4.24(1.34)
Less than 1/month (%)	32	26
1/month (%)	22	22
1–2/week (%)	32	31
Daily (%)	10	16
DSQ: Problems, <i>M(SD)</i>	3.89 (2.46)	3.50 (2.75)
Negative urgency, <i>M(SD)</i>	31.60 (6.84)	28.97 (7.44)
Sensation seeking, <i>M(SD)</i>	31.74 (7.58)	30.57 (7.41)
Lack of planning, <i>M(SD)</i>	21.07 (5.97)	20.85 (5.55)
Lack of perseverance, <i>M(SD)</i>	19.54 (5.11)	19.45 (5.37)
Positive alcohol expectancies, <i>M(SD)</i>	7.49 (5.76)	7.03 (5.92)

**Table 2**  
Fit indices and Invariance Comparison Tests for the Four Personality Traits and Problem Drinking.

	CFI	TLI	SRMR	RMSEA	$\chi^2$	df	$\chi^2$ diff	p
Equal factor loadings	.95	.94	.06	.06 (.05-.07)	301.72	170		
Same factor structure								
Lack of premeditation	.95	.94	.06	.06 (.05-.07)	299.79	167	1.93	<.59
Negative urgency	.95	.94	.06	.06 (.05-.07)	300.21	167	1.51	<.68
Sensation seeking	.95	.94	.06	.06 (.05-.07)	300.49	167	1.23	<.70
Lack of perseverance	.95	.94	.06	.06 (.05-.07)	297.22	167	4.50	<.25
Problem drinking	.95	.94	.06	.06 (.05-.07)	298.31	167	3.31	<.45