A MULTIGROUP CONFIRMATORY FACTOR ANALYSIS OF ADOLESCENT ALCOHOL-RELATED BEHAVIORS ACROSS ETHNIC GROUPS

A Thesis
Presented to the
Faculty of
San Diego State University

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Psychology

by
Darius B. Dawson
Summer 2013
SAN DIEGO STATE UNIVERSITY

The Undersigned Faculty Committee Approves the

Thesis of Darius B. Dawson:

A Multigroup Confirmatory Factor Analysis of Adolescent Alcohol-Related
Behaviors Across Ethnic Groups

[Signatures]

Elizabeth Klonoff, Chair
Department of Psychology

Scott Roesch
Department of Psychology

Suzanne Lindsay
Graduate School of Public Health

6/5/13
Approval Date
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by

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DEDICATION

This thesis is dedicated to my parents, Wayne and Lydia Dawson.
ABSTRACT OF THE THESIS

A Multigroup Confirmatory Factor Analysis of Adolescent Alcohol-Related Behaviors Across Ethnic Groups
by
Darius B. Dawson
Master of Arts in Psychology
San Diego State University, 2013

Alcohol-related behaviors are often examined using national and state surveys assessing participants’ self report of attitudes and actions. However, few studies have examined the psychometric properties and the factorial invariance of various alcohol-related behaviors across ethnic group. Past research has revealed ethnic differences in scale construction and evaluation. Also, surveys that evaluate alcohol behaviors have been found to lack invariance across different ethnic groups. These dissimilarities may be due to deep rooted differences in ethnic classification of unhealthy substance use behaviors. Because the conclusions made from state and national surveys can affect various prevention, policy, and intervention programs, valid conclusions should be made concerning all ethnic groups. The present study examined the factor structure of 3 alcohol-related items: “Have you ever, even once, had a drink of any type of alcoholic beverage?”, “During the past 30 days, on how many days did you drink one or more drinks of an alcoholic beverage?”, and “On the days that you drank, how many drinks did you usually have?” administered as part of the 2011 National Survey on Drug Use and Health (NSDUH). Factorial invariance was examined across 12 to 17 year old Caucasian Americans (N = 11,235; 62.0%), African Americans (N = 2,640; 14.6%), Asian Americans (N = 598; 3.3%), and Latin Americans (N = 3535; 19.6%). A multigroup confirmatory factor analysis was conducted to statistically determine whether the factor structure was invariant across all four ethnic groups. All of the baseline models were good fits to the NSDUH data (all factor loadings were significant: p < .001). However, only the Asian American and Latin American metric invariance model was a good fit to the data (p > .05). The analyses revealed the alcohol scale administered as part of the NSDUH to lack invariance across all ethnic groups. The findings from this study accentuate the significance of evaluating psychometric properties of scales assessing alcohol-related behaviors generalized across ethnic groups.
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CHAPTER 1

INTRODUCTION

Nearly 20% to 32% of adolescents have reported drinking alcohol or engaging in alcohol-related behaviors (Wu, Woody, Yang, Pan, & Blazer, 2011; Youth Risk Behavior Survey, 2011). An early onset of alcohol use increases the chronicity of adult alcohol dependence (Guttmannova et al., 2012) and the participation of risky sexual, binge drinking, drug, and tobacco behaviors (Calvert, Bucholz, & Stegar-May, 2010; Sintov, Kendler, Walsh, Patterson, & Prescott, 2009; Wu et al., 2011). These behaviors can be extremely detrimental to adolescents’ health and can affect many cognitive and mental health functions (Agrawal, Narayanan, & Oltmanns, 2013; Lev-Ran, Imtiaz, & Le Foll, 2012; Mericle, Ta Park, Holck, & Arria, 2012; Skala et al., 2011; Wang et al., 2010).

Alcohol-related differences have been found across ethnic groups (Chartier & Caetano, 2010; Mericle et al., 2012; Muthen & Muthen, 2000; Wu et al., 2011) however, data about substance-related disorders sparsely exist for young ethnic minority groups (Mericle et al., 2012; Wu et al., 2011). Because differences in alcohol behaviors exist across ethnic groups, they should not be ignored when examining these behaviors. Conclusion about adolescent alcohol-related behaviors and attitudes are drawn from state and national surveys such as the Monitoring the Future Survey (Johnston, O'Malley, & Bachman, 2012), the California Health Interview Survey (CHIS 2009 Adolescent Public Use File, 2011), and the National Survey on Drug Use and Health (Centers for Disease Control and Prevention [CDC], 2011), among others. Very few studies have examined the underlying dimensions, reliability, and validity of these surveys, which influence prevention, intervention, and treatment of adolescent alcohol behaviors. Most importantly, very few studies examine the psychometric properties or factorial invariance of these surveys across ethnic groups.

Previous examinations of factorial invariance and psychometric properties of alcohol scales have been examined. The Michigan Alcoholism Screening (MAST), which is commonly used to measure alcohol-related problems, found a lack of invariance for Muslim, Hindu, and Catholic groups (Luczak, Raine, & Venables, 2001). This religious variance
could be due in part to a strong correlation between ethnicity and religion. Mills, Caetano, Ramisetty-Mikler, and Bernstein (2012) examined the invariance of the 2006 Hispanic Americans Baseline Alcohol Survey (HABLAS) across Puerto Rican, Cuban American, Mexican American, and South/Central Americans. The researchers found the scale to lack invariance in areas of social extroversion pertaining to alcohol expectancy. However, when examining the Temptations to Try Alcohol Scale (TTAS) strong factorial invariance was found across adolescent ethnic and racial groups (Harrington et al., 2011). These discrepancies in such few examinations of psychometric properties and invariance emphasize the importance of evaluating scales that assess alcohol behaviors.

Reliability, validity, and psychometric properties of surveys have been examined in smoking-related behaviors, which may serve as valid examples of how survey-based conclusions are not accurate representations of all ethnic groups. Lack of invariance across ethnic groups and ethnic discrepancies have been found in other behaviors that are smoking-related. MacPherson and Myers (2004) examined the psychometric properties and scale invariance of the California Tobacco Survey across non-Hispanic white adolescents and adolescents who self-identified as Mexican or Mexican-American. Invariance analyses concluded that relationships among the smoking-related cognition items and the underlying construct were equivalent for the non-Hispanic whites and English-speaking Mexican-Americans, but not for the former group and the Spanish-speaking Mexican-Americans. Through the construction of the Meanings of Smoking Index, it was concluded that the associations between smoking behaviors and meanings were dissimilar across ethnic groups (Spruijt-Metz, Gallaher, Unger, & Anderson-Johnson, 2004). Schroeder and Moochann (2007) concluded that the Fagerstrom Test for Nicotine Dependence did not equivalently measure dependence for both White and African American adolescents. Also, Osypuk, Kawachi, Subramanian, and Acevedo-Gracia, (2006) found that regional differences affected ethnic outcomes in smoking prevalence, which differed from reported national data.

The goal of the present study was to evaluate the psychometric properties and invariance of alcohol-related behaviors administered as part of the National Survey of Drug Use and Health (NSDUH) across four ethnic groups. Skala et al. (2011) emphasized that the use of self-reporting instruments have always reduced objectivity and introduces the possibility of misreporting. As proven with past research, ethnic differences have been found
in scale construction and evaluation. Also, surveys that evaluate alcohol and smoking behaviors have been found to lack invariance across different ethnic groups. These differences may be due to deep rooted differences in ethnic classification of unhealthy substance use behaviors. Because the conclusions made from state and national surveys can affect various prevention, policy, and intervention programs, valid conclusions should be made concerning all ethnic groups. Based on the past research examining these behaviors, it is expected that the alcohol-related behaviors assessed in the NSDUH will not be invariant across the four ethnic groups. However, the study will emphasize the importance of examining the psychometric properties and invariance of scales in order to ensure valid and effective research relating to alcohol behaviors.
CHAPTER 2

METHOD

DATA SOURCE

The present study used data from the 2011 National Survey on Drug Use and Health (NSDUH), sponsored by the Center for Behavioral Health Statistics and Quality with the Substance Abuse and Mental Health Services Administration and its conducted by RTI International, Research Triangle Park, North Carolina. The purpose of the 2011 NSDUH is to measure the prevalence and correlates of drug use in the United States. The survey provides information about the use of illicit drugs, alcohol, and tobacco among members of the U.S. population aged 12 or older. Surveys have been conducted periodically since 1971, with public use data available from 1979. Since 1999, the survey has been conducted using computer-assisted interviewing conducted by an interviewer and audio computer-assisted self-interviewing (ACASI). Use of ACASI insures confidentiality to allow for the most honest and accurate reporting of illicit drug use and other sensitive behaviors. The survey sample included participants from all 50 states and the District of Columbia. Each state’s sample was approximately equally distributed among each age group. Each respondent was given $30 upon completing the survey. Field interviewers visited selected residents to determine the dwelling unit eligibility and the number of persons in each unit. The resident was considered eligible if persons were currently residing. Once the resident was considered eligible, each person completed screening interview and the computer-assisted interview. The screening interview was conducted to get an accurate number of eligible persons residing in the residence. The completion rate of the NSDUH was 89.98% for the screening interview and 74.38% for the computer-assisted interview.

SAMPLE AND MODEL

The 2011 NSDUH includes 70,109 participants. This study uses 18,008 adolescents aged 12 to 17 years old. The study included Caucasian Americans ($N = 11,235; 62.0\%$), African Americans ($N = 2,640; 14.6\%$), Asian Americans ($N = 598; 3.3\%$), and Latin Americans ($N = 3535; 19.6\%$).
“Alcohol-Related Behaviors” was assessed with three items (as seen in Figure 1):
“Have you ever, even once, had a drink of any type of alcoholic beverage?”, “During the past 30 days, on how many days did you drink one or more drinks of an alcoholic beverage?”, and “On the days that you drank, how many drinks did you usually have?”

![Figure 1. The Alcohol-Related Behaviors model.](image)

**DATA ANALYSIS**

A multigroup confirmatory factor analysis statistically tested the psychometric and factorial invariance across the ethnic groups (Vandenberg & Lance, 2000). The method consists of three mutigroup CFA models, which were fit to the NSDUH data. All analyses were conducted using the MPlus (version 7) statistical software (Muthen & Muthen, 1998). First, a configural invariance model for each group was tested to indicate if the model is a good fit to the data. The configural invariance model is the least restrictive model and tests whether groups have the same factor structure. This provides a baseline value for the comparison of a more constrained model. The configural models are deemed good fits to the data if the data supports the same factor loading pattern across groups, and can then be tested against a more restrictive model (the metric invariance model). Because of the limited amount of observed variables in the model, the model used in this analysis is considered a
just-identified model. Because the degrees of freedom in a just-identified model are equivalent to the number of estimated parameters, the likelihood ratio chi-square test and traditional descriptive fit indices cannot be calculated (Babyak & Green, 2010). Just-identified models do not allow for a chi-squared value or for descriptive fit indices. Instead, such a model is deemed to be a good fit to the data if all the factor loadings are significant.

Once the baseline models were determined to be good fits to the data, they were compared to the metric invariance model in which factor loadings between groups are held to equivalency. Comparisons were conducted two groups at a time. Metric invariant models, in which the factor loadings are held to equivalency, were compared to the baseline model of the two groups being compared. The metric invariance models were deemed good fits to the data based on the robust comparative fit index (CFI) and robust root mean square error of approximation (RMSEA) fit indices. Plausible fit is determined if the CFI value is greater than 0.90 and good fit is determined if the value is greater than 0.95. Plausible fit is determined if the RMSEA value is less than 0.08 and good fit is determined if the value is less than 0.05. For just-identified models, the metric invariance model cannot be compared to the baseline model using a chi-squared difference test. Instead, modification indices revealed if the factor loadings differed between the two groups examined. The indices are used to show the extent to which factor loadings would have to change so the metric invariance model would not differ statistically ($p < .05$) from the baseline model. If modification indices appeared in the output during the metric invariance analysis, it was determined that the model is not invariant between the two analyzed groups. If the metric invariance model fits well, then the associations between each item and the overall alcohol-related behavior factor are the same regardless of ethnic group. Poor model fit indicates that underlying ethnic group differences exist. If the metric invariance model fit well, then a factor variance/covariance invariance model, which is the most restrictive, was used to determine if each ethnic group has equivalent variability. Improved model fit indicates that each ethnic group has the same range of the continuum of scores. If model fit is not improved, it was concluded that real group differences or measurement bias exists in alcohol-related behaviors.
CHAPTER 3

RESULTS

A multiple group analysis was performed in order to determine model fit on the Alcohol-Related Behavior latent variable for Caucasian, Latino, African-American, and Asian American adolescents. The three items that assessed alcohol-related behaviors were highly correlated. The first item (“ever drank alcohol”) was correlated with the second and third items (values -0.681 and -0.655, respectively). The second (“days drank in last 30 days”) and third items (“on days drank how many drinks”) were also positively correlated (.591). Sample statistics and proportions of the ethnic group responses for each variable can be seen in Table 1. The correlations of each ethnic group responses and items can be viewed in Table 2. Because the data violated normality, the weighted least square estimation (WLSMV) was used. Confirmatory factor analysis models were used to determine model fit for the baseline models for each group. For all adolescents, a one-factor model was tested using CFA. The one-factor models fit well for each ethnic group, with all the unstandardized and standardized factor loadings of the observed variables being large and statistically significant (p’s < .001) for the “Alcohol-Related Behavior” factor (values ranged from .488 to .1.758) (as seen in Table 3). The variances for “Alcohol-Related Behavior” (values ranged $\sigma^2 = .716$ to $\sigma^2 = .862$; p’s < .001) were also all statistically significant.

A metric invariance model was then tested using multiple group analysis in Caucasian adolescents and in African American adolescents. This comparison can only be analyzed in a pairwise function. Each comparison model fit indices can be seen in Table 4. The model did not fit well statistically ($\chi^2 [3, N = 13875] = 101.738; p < .001$). However, it did fit well descriptively (CFI = .989; RMSEA = .069), which suggests that it is a good fit to the data (Bentler, 1990; Hu & Bentler, 1999; Steiger, 1990). Chi-Square estimates can be overly sensitive to sample size and may not be a good measure of model fit (Marsh, 1994). Large sample sizes inflate chi-square values, making descriptive statistics more accurate model fit indices (Babyak & Green, 2010). After examining the modification models, it was determined that the models were not invariant and that the factor loading of the “ever drank alcohol” on the “Alcohol-Related Behavior” latent variable was significantly larger for African American adolescents than for their Caucasian counterparts. The factor loading on
Table 1. The Variable Sample Statistics of Each Ethnic Group

<table>
<thead>
<tr>
<th>Observed Variable</th>
<th>CAUCASIAN AMERICANS</th>
<th>AFRICAN AMERICANS</th>
<th>ASIAN AMERICANS</th>
<th>LATIN AMERICANS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>“EVER DRANK ALCOHOL?”a</strong>*</td>
<td>Y = 36.2% N = 63.7%</td>
<td>Y = 31.8% N = 68.1%</td>
<td>Y = 21.6% N = 78.4%</td>
<td>Y = 35.9% N = 64.5%</td>
</tr>
<tr>
<td><strong>“DAYS DRANK IN LAST 30 DAYS?b</strong>*</td>
<td>M = 4.27; SD = 4.686</td>
<td>M = 3.16; SD = 3.72</td>
<td>M = 2.51; SD = 2.38</td>
<td>M = 4.28; SD = 5.04</td>
</tr>
<tr>
<td><strong>“ON DAYS DRANK, HOW MANY DRINKS?”c</strong>*</td>
<td>M = 4.81; SD = 5.29</td>
<td>M = 2.24; SD = 2.65</td>
<td>M = 3.24; SD = 2.80</td>
<td>M = 4.08; SD = 4.23</td>
</tr>
</tbody>
</table>

*Categorical variable: Yes=1, No=2

*Values can range from 1-30 depending on the number of days

*Values can range from 1-90 depending on the number of drinks

*Significant differences between groups (p < .001)

“number of days drank” was significantly larger for the Caucasian American adolescents than the African American adolescents. A larger, significant factor loading suggests that this item is a more predictive item of alcohol-related behaviors for that ethnic group. A metric invariance model was then tested using multiple group analysis in Caucasian adolescents and in Asian American adolescents. The model did not fit well statistically ($\chi^2 [3, N = 11833] = 13.825; p = .003$). However, it did fit well descriptively (CFI = .989; RMSEA = .025), as seen in Table 4. After examining the modification models, it was determined that the models were not invariant and that the factor loading of the “ever drank alcohol” on the “Alcohol-Related Behavior” latent variable was significantly larger for Asian American adolescents than for their Caucasian counterparts. The factor loading on “number of days drank” was significantly larger for the Caucasian American adolescents than the Asian American adolescents.

A metric invariance model was then tested using multiple group analysis in Caucasian adolescents and in Latin American adolescents. The model did not fit well statistically ($\chi^2 [3, N = 14770] = 13.311; p = .004$). However, it did fit well descriptively (CFI = .999; RMSEA = .022), as seen in Table 4. After examining the modification models, it was determined that the models were not invariant and that the factor loading of the “ever drank alcohol” on the “Alcohol-Related Behavior” latent variable was significantly larger for Latin American adolescents than for their Caucasian counterparts. The factor loading on
<table>
<thead>
<tr>
<th>Observed Variable</th>
<th>CAUCASIAN AMERICANS</th>
<th>AFRICAN AMERICANS</th>
<th>ASIAN AMERICANS</th>
<th>LATIN AMERICANS</th>
</tr>
</thead>
<tbody>
<tr>
<td>“EVER DRANK ALCOHOL?” by “DAYS DRANK IN LAST 30 DAYS?”</td>
<td>$r = 0.681$</td>
<td>$r = 0.628$</td>
<td>$r = 0.610$</td>
<td>$r = 0.649$</td>
</tr>
<tr>
<td>“EVER DRANK ALCOHOL?” by “ON DAYS DRANK, HOW MANY DRINKS?”</td>
<td>$r = 0.655$</td>
<td>$r = 0.598$</td>
<td>$r = 0.562$</td>
<td>$r = 0.627$</td>
</tr>
<tr>
<td>“DAYS DRANK IN LAST 30 DAYS?” by “ON DAYS DRANK, HOW MANY DRINKS?”</td>
<td>$r = 0.591$</td>
<td>$r = 0.524$</td>
<td>$r = 0.397$</td>
<td>$r = 0.529$</td>
</tr>
</tbody>
</table>
Table 3. Unstandardized and Standardized Factor Loadings for Each Examined Group

<table>
<thead>
<tr>
<th>Observed Variable</th>
<th>CAUCASIAN AMERICANS</th>
<th>AFRICAN AMERICANS</th>
<th>ASIAN AMERICANS</th>
<th>LATIN AMERICANS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Unstandardized/</td>
<td>Unstandardized/</td>
<td>Unstandardized/</td>
<td>Unstandardized/</td>
</tr>
<tr>
<td></td>
<td>Standardized</td>
<td>Standardized</td>
<td>Standardized</td>
<td>Standardized</td>
</tr>
<tr>
<td>“EVER DRANK ALCOHOL?”</td>
<td>0.864*/ 0.868*</td>
<td>1.121*/ 0.846*</td>
<td>1.758*/ 0.928*</td>
<td>1.001*/ 0.877*</td>
</tr>
<tr>
<td>“DAYS DRANK IN LAST 30 DAYS?”</td>
<td>1.158*/0.784*</td>
<td>0.892*/ 0.742*</td>
<td>0.592*/ 0.657*</td>
<td>1.000*/ 0.740*</td>
</tr>
<tr>
<td>“ON DAYS DRANK, HOW MANY DRINKS?”</td>
<td>1.11*/ 0.754*</td>
<td>0.502*/ 0.706*</td>
<td>0.488*/ 0.605*</td>
<td>0.854*/ 0.714*</td>
</tr>
</tbody>
</table>

*ps < .001

“number of days drank” was significantly larger for the Caucasian American adolescents than the Latin American adolescents.

A metric invariance model was then tested using multiple group analysis in African American adolescents and in Asian American adolescents. The model did not fit well statistically ($\chi^2 [3, N = 3238] = 16.097; p < .001$). However, it did fit well descriptively (CFI = .996; RMSEA = .052), as seen in Table 4. After examining the modification models, it was determined that the models were not invariant and that the factor loading of the “ever drank alcohol” on the “Alcohol-Related Behavior” latent variable was significantly larger for Asian American adolescents than for their African American counterparts.

A metric invariance model was then tested using multiple group analysis in African American adolescents and in Latin American adolescents. The model did not fit well statistically ($\chi^2 [3, N = 6175] = 31.890; p < .001$). However, it did fit well descriptively (CFI = .994; RMSEA = .056), as seen in Table 4. After examining the modification models, it was determined that the models were not invariant and that the factor loading of the “ever drank alcohol” on the “Alcohol-Related Behavior” latent variable was significantly larger for African American adolescents than for their Latin American counterparts.

Lastly, a metric invariance model was then tested using multiple group analysis in Asian American adolescents and in Latin American adolescents. The model did fit well
Table 4. Goodness of Fit Statistics From Metric Invariance Model Comparisons

<table>
<thead>
<tr>
<th>Comparison</th>
<th>$\chi^2$</th>
<th>CFI$^a$</th>
<th>RMSEA$^b$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caucasian v. African American</td>
<td>$\chi^2 (3, N = 13875) = 101.738^*$</td>
<td>0.989</td>
<td>0.069</td>
</tr>
<tr>
<td>Caucasian v. Asian American</td>
<td>$\chi^2 (3, N = 11833) = 13.825^*$</td>
<td>0.989</td>
<td>0.025</td>
</tr>
<tr>
<td>Caucasian v. Latin American</td>
<td>$\chi^2 (3, N = 14770) = 13.311^*$</td>
<td>0.999</td>
<td>0.022</td>
</tr>
<tr>
<td>African American v. Asian American</td>
<td>$\chi^2 (3, N = 3238) = 16.097^*$</td>
<td>0.996</td>
<td>0.052</td>
</tr>
<tr>
<td>African American v. Latin American</td>
<td>$\chi^2 (3, N = 6175) = 31.890^*$</td>
<td>0.994</td>
<td>0.056</td>
</tr>
<tr>
<td>Asian American v. Latin American</td>
<td>$\chi^2 (3, N = 4133) = 1.636$</td>
<td>1.000</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

Note. CFI = robust comparative fit index; RMSEA = robust root mean square error of approximation

*ps < .005.  $^a$ Plausible fit > .90, Good fit > .95.  $^b$ Plausible fit < .08, Good fit < .05.

Table 4 shows that the goodness of fit for various comparisons of metric invariance models is as follows. The fit for Caucasian vs. African American is good statistically ($\chi^2 (3, N = 13875) = 101.738^*$; p < .005) and descriptively (CFI = 0.989; RMSEA = 0.069), as seen in Table 4. Because no modification indices were given, a factor variance/covariance invariance model was tested. The factor variance/covariance invariance model did not fit well statistically ($\chi^2 [4, N = 4133] = 447.546; p < .001$) or descriptively (CFI = 0.843; RMSEA = 0.232). After examining the modification models, it was determined that the models were not invariant and that the factor loading of the “ever drank alcohol” on the “Alcohol-Related Behavior” latent variable was significantly larger for Asian American adolescents than for their Latin American counterparts. The overall conclusions made on the variables most predictive of alcohol-related behaviors in the ethnic group comparisons can be see in Table 5.
Table 5. The Variable Found to be Most Predictive in Ethnic Comparisons of Alcohol-Related Behaviors

<table>
<thead>
<tr>
<th>Observed Variable</th>
<th>Caucasian (C) v. African (Af)</th>
<th>Caucasian (C) v. Asian (As)</th>
<th>Caucasian (C) v. Latin (L)</th>
<th>African (Af) v. Asian (As)</th>
<th>African (Af) v. Latin (L)</th>
<th>Asian (As) v. Latin (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>“EVER DRANK ALCOHOL?”</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>“DAYS DRANK IN LAST 30 DAYS?”</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>“ON DAYS DRANK, HOW MANY DRINKS?”</td>
<td></td>
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</tbody>
</table>
CHAPTER 4

DISCUSSION

The present study examined the factorial invariance of an adolescent alcohol scale, administered as part of the National Survey on Drug Use and Health (NSDUH). The analyses revealed that associations between the alcohol items and the alcohol factor were not invariant across the four ethnic groups. This suggests that this alcohol scale does not provide the most representative conclusions on alcohol behaviors for each ethnic group. Therefore, analyses examining alcohol-related behaviors should be conducted within ethnic groups and cannot be generalized across groups. The NSDUH is conducted yearly and influences alcohol conclusions, prevention, and intervention programs. The results from this study question conclusions made pertaining to various ethnic-specific alcohol-related behaviors, and suggest this lack of invariance be considered when using this survey. Research has not been able to successfully uncover why ethnic groups value different alcohol behavior perceptions over others. However, this study highlights the necessary evaluation of these different perceptions, which may be stemming from deep-rooted ethnic classifications of healthy and unhealthy substance use behaviors.

When comparing the Caucasian adolescents to the ethnic minority adolescents, in order to be an “alcohol drinker,” “having ever consumed alcohol” was a more predictive item for the ethnic minority groups. However, the “number of days in the past month” item was more predictive for the Caucasian adolescents than for the ethnic minority adolescents. This suggests that ethnic minorities better classify alcohol behaviors by whether or not alcohol has ever been consumed. For Caucasian adolescents, the amount of days of consumption in the past month is a better classification of alcohol behaviors, regardless of the number of drinks consumed during those days. Within the ethnic minority groups, having ever consumed alcohol was most predictive for the Asian Americans. The lack of invariance of alcohol-related behaviors found suggests deep, established ethnic cognitions of varying classifications of alcohol behaviors.

Differences in ethnic perceptions of alcohol behaviors could stem from social and cultural factors rooted from ethnic influences. These different factors can range from various classifications of party etiquette to cognitions of acceptable social drinking behaviors.
People who have more liberal beliefs are more likely to be frequent heavy drinkers than those with conservative beliefs (Galvan & Caetano, 2003). Black and Hispanic groups are more likely to exhibit more conservative behaviors than White groups, which may explain the higher prevalence of White drinkers (Galvan & Caetano, 2003). The heightened presence of religiosity in Black and Hispanic families may also explain this more conservative outlook (Malka, Lelkes, Srivastava, Cohen, & Miller, 2012). Those expressing higher religiosity report lower and more accurate drinking patterns than those who are less religious (Rodriguez, Neighbors, & Foster, 2013). Religion has been shown to provide self-control as a protective factor against alcohol use (Desmond, Ulmer, & Bader, 2013). In the African American community, religious social support protects against heavy drinking behaviors, whereas general social support only marginally decreases the likelihood of heavy drinking (Debnam, Holt, Clark, Roth, & Southward, 2012). Because of these differences in social cognitions, ethnic groups may have varying views on their own alcohol-related behaviors.

Acculturation to American society influences drinking attitudes and norms (Galvan & Caetano, 2003). Those who are more acculturated exhibit drinking behaviors that resemble the highly acceptable drinking behaviors of most Americans. The drinking behaviors of acculturated Japanese and Hispanic groups resembled those of Americans, when compared to less acculturated Japanese and Hispanic groups (Galvan & Caetano, 2003). Higher levels of acculturation are associated with increased odds of lifetime alcohol use for Hispanics and Asians (Burnett-Zeigler, Bohnert, & Ilgen, 2013). Also, ethnic identity, which is related to lower acculturation levels in some populations, has been found to affect alcohol behavior perceptions. Higher ethnic identity resulted in lower levels of alcohol use for Black, Hispanic, and Asian ethnic groups (Burnett-Zeigler et al., 2013). Acculturating to a larger society, while identifying with one’s ethnic group, may cause problematic interpretation of alcohol-related behaviors.

Biologically, alcohol affects ethnic groups differently, which may affect their alcohol-related cognitions. Studies concerning biological ethnic minority differences in alcohol alleles are extremely sparse compared to those of Caucasian ethnic groups (McCarthy, Pedersen, Lobos, Todd, & Wall, 2010). However, some examinations have highlighted ethnic group allele variation differences. Asians are more likely than Whites to have an
allele that leads the body to break down alcohol in a way that causes facial flushing, nausea, headache, and dizziness after alcohol consumption (Galvan & Caetano, 2003). This allele may have caused Asians to form protective factors against heavy alcohol use. Furthermore, various genes that increase the susceptibility of alcohol dependence have been shown to differ among ethnic groups (Ehlers, Liang, & Gizer, 2012; McCarthy, Pedersen et al., 2010).

For example, the $ADH1B^*3$ allele has been found primarily in people of African descent and has been associated with lower levels of alcohol consumption and alcohol dependence (McCarthy et al., 2010). The allele is also associated with lower levels of family history of alcohol dependence and decreased risk of alcohol-related birth defects. Because continued alcohol use may not cause dependency and harmful effects in those of African descent with the presence of this allele, it may allow them to use alcohol more freely. Those who have more immediate and negative effects from alcohol use may have to pay better attention to their overall alcohol consumption. Finally, ethnic environments have been found to influence the expression of genes, qualifying epigenetic factors in alcohol behaviors. Epigenetic researchers have stressed the presence of ethnic group differences in alcohol use behaviors (Dick, 2011; Miller, Chen, & Parker, 2011). Various environmental stressors that are directly influenced by ethnic group identification can influence the differing expression of genes. These differences may be reflected in survey-based responses given by adolescents.

The present study had a number of limitations. First, findings from ACASI-administered surveys may not be generalizable to paper-and-pencil-based surveys. However, both paper-and-pencil-based and ACASI-administered surveys may not completely reflect actual behaviors. Second, the present study only focused on the need to examine the psychometric properties and invariance of alcohol-related scales. The results from this study are only related to the 2011 National Survey on Drug Use and Health. Therefore, other surveys examining alcohol-related behaviors should be examined for ethnic group invariance. Also, this study only examined three-items assessing alcohol-related behaviors. The examination of more items may lead to more precise results concerning ethnic group differences. However, if scales assessing alcohol-related behaviors are concerned with reliable and valid conclusions that are correct representations of various ethnic groups, then
further research considering the underlying cognitions of these ethnicities should be examined.
REFERENCES


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