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## Measurement Invariance of Alcohol Instruments with Hispanic Youth

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### Abstract

**Introduction**—Despite their widespread use across clinical and research settings, no study has yet investigated the fit of several standard alcohol measures for Hispanic youth, including those used to assess motivation to change, resistance self-efficacy, peer norms, and problem drinking. This study thus served to address this gap by evaluating measurement invariance with substance-using youth.

**Methods**—We enrolled a large sample of regular substance-using youth, who were involved with the justice system ( $N = 368$ ; 72.9% male; 76.9% Hispanic;  $M$  age = 16.17 years). Similar to the broader Hispanic population of the southwest United States (U.S.), Hispanic youth in the sample were, on average, 3.5<sup>th</sup> generation (with at least 1 foreign-born grand-parent). Following standard administration and scoring procedures, all youth completed measures of motivation to change (e.g., readiness rulers, intentions to change), self-efficacy (e.g., drink refusal in social situations), peer norms (e.g., peer norms for substance use), and problem drinking (e.g., substance use quantity/frequency; Alcohol Use Disorders Identification Test; Rutgers Alcohol Problems Index;

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#### Contributors

SFE and AB designed this study. SFE wrote the protocol and oversaw the study administration. AB oversaw all statistical analyses. EM and AB conducted all statistical analyses. SFE wrote the first draft of the manuscript. All authors contributed to and approved the final manuscript.

#### Conflict of Interest

The authors declare that they have no competing financial or other conflicts of interest relating to the data included in the manuscript.

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Timeline FollowBack). Measurement equivalence was evaluated via multiple group confirmatory factor analysis.

**Results**—Our results indicated that each measure evaluated herein worked equally well for Hispanic and Caucasian youth. We found measurement invariance at every level tested.

**Conclusions**—This study supports the validity and future use of these important and widely used alcohol use measures for high-risk substance-using Hispanic youth. Further, given the representativeness of this sample within the southwestern U.S., these results show promise for generalizability to U.S.-born Hispanic youth within this geographic region.

## Keywords

measurement invariance; adolescents; alcohol; Hispanic

## 1.1 Introduction

Comprising 17% of the United States (U.S.) and up to 47% of some states (USCensusBureau, 2013a), Hispanic Americans are projected to be the largest minority group by 2050 (USCensusBureau, 2013b). This is important, as there is a history of health disparities for Hispanic adults across alcohol use, related consequences, and treatment (Caetano, 2003). Similar patterns have been observed with youth. Hispanic adolescents initiate alcohol use very early (Feldstein Ewing, Magnan, Houck, Morgan, & Bryan, 2014) with serious consequences, including drinking and driving, riding with a drinking driver, physical violence, and sexual risk (CDC, 2012). Despite their need, Hispanic youth are unlikely to receive alcohol treatment (Garland et al., 2005). By implication, this suggests that a rapidly-growing segment of the U.S. is increasingly at risk for alcohol abuse and related outcomes, underscoring a critical health inequity.

While evaluations of alcohol treatment for high-risk Hispanic youth are emerging (Gil, Wagner, & Tubman, 2004; Prado et al., 2007), much work remains. Existing treatment comparisons fundamentally rely on the assurance that measured *constructs*, defined as concepts, ideas, or behaviors which are associated in a meaningful way, represent the same thing in each group. In other words, it is highly possible that youth of different race/ethnic groups, such as Hispanic versus Caucasian youth, do not interpret the same items in widely-used addiction measures in the same way. For example, Hispanic and Caucasian adolescents could interpret the meaning behind, “*How important has it been for you to change your alcohol use on a scale from 0–10?*”, in small but significantly different ways, such that group responses on these measures may appear to reflect group differences (such as significant differences in rates of use, and/or response to treatment between Hispanic and Caucasian youth), when in fact, they are an artifact of group differences in item interpretation (Miles, Shih, Tucker, Zhou, & D’Amico, 2012; Vandenberg & Lance, 2000). To address and avoid this critical measurement flaw in clinical and research contexts, it is therefore important to first establish “measurement invariance” or “measurement equivalence” (Widaman & Reise, 1997) across these widely-used addiction measures. Not only is ensuring measurement invariance a critical step for clinical and research work with Hispanic youth in this geographic location (southwestern U.S.), it may also be seen as an

integral step towards reducing existing health disparities for this important community of Hispanic youth (D'Amico, Tucker, Shih, & Miles, 2014; Lowman & Le Fauve, 2003).

Surprisingly, despite its prevalence in the broader behavior change (Paxton et al., 2008) and adolescent addiction literatures (Hall, Stewart, Arger, Athenour, & Effinger, 2014), we could find no published studies evaluating measurement invariance for a number of frequently used alcohol measures including motivation to change (Miller & Rollnick, 2013), resistance self-efficacy (Bandura, 1977), peer norms (D'Amico & Edelen, 2007), and problem drinking. Further, few existing studies have evaluated these measures with some of the youth who need it most, including high-risk (justice-involved), substance-using Hispanic youth.

### 1.1.2 Motivation to Change

Motivation to change is broadly defined as a person's readiness, ability, and willingness for behavior change. Despite its prevalence within the broader behavior change (Paxton et al., 2008) and adolescent alcohol literatures (Hall et al., 2014), we found no published studies examining measurement invariance for motivation to change with Hispanic youth. Now, however, studies are increasingly including Hispanic youth in their evaluations of this construct (Shih, Miles, Tucker, Zhou, & D'Amico, 2012; Tomaka, Palacios, Morales-Monks, & Davis, 2012). Across the board, studies with both Caucasian and Hispanic youth show a positive association between motivation to change and less drinking (Chung, Maisto, Cornelius, & Martin, 2004; Gaume, Bertholet, Daepfen, & Gmel, 2013). We thus anticipated that we would find measurement equivalence for Hispanic and Caucasian youth on this construct.

### 1.1.3 Self-Efficacy

Following Bandura (1977, 1986), self-efficacy represents an individual's confidence in their ability to engage in healthy behaviors or resist engaging in unhealthy behaviors (i.e., alcohol use). Self-efficacy is believed to be key to treatment success across a wide number of interventions (Moos, 2007). Typically, measures of self-efficacy focus on specific behavioral skills (e.g., ability to resist a drink offered in a social setting), rather than overall self-efficacy to change. In terms of adolescent alcohol use, some studies with predominantly Caucasian samples have found that self-efficacy was a key predictor of positive treatment outcomes (Ehret, Ghaidarov, & LaBrie, 2013; LaChance, Feldstein Ewing, Bryan, & Hutchison, 2009), whereas others have not (Armitage, Rowe, Arden, & Harris, in press; Newton, Barrett, Swaffield, & Teesson, 2014). We could find no studies examining measurement invariance for self-efficacy with Hispanic compared to Caucasian youth, emerging work has highlighted the relevance of this construct with Hispanic youth (Castro, Stein, & Bentler, 2009; Shih, Miles, Tucker, Zhou, & D'Amico, 2010; Shih et al., 2012). We therefore posited finding measurement equivalence for Hispanic and Caucasian youth on this construct.

### 1.1.4 Peer Norms

Across many cultures in the U.S., adolescents are expected to "separate and individuate," decreasing their time with parents, and concomitantly increasing time with peers (Windle et

al., 2008). While parents remain important, for many, peer input begins to take primacy, particularly for youth with strained parent relationships (Windle et al., 2008). At this life stage, drinking friends appear to be the single best predictor of adolescents' decisions to drink (~50% of the variance) (Chassin et al., 2004). The measurement of drinking friends is often approached via asking adolescents for their perception of their peers' alcohol use, or *peer norms*. Though we could find no direct comparisons, studies with larger samples of Hispanic and Caucasian youth suggest that this factor may be equally important to both groups (D'Amico & Edelen, 2007). We thus anticipated finding measurement invariance on this construct.

### 1.1.5

In sum, evaluations of measurement invariance with youth are emerging. While some have found that items do not function equivalently for race/ethnic minority individuals (Dawson, Sotelo, Roesch, & Klonoff, in press; Northrup, Malone, Follingstad, & Stotts, 2013), other evaluations of substance use and associated variables (e.g., familism, parental respect) have found evidence of measurement invariance (Feaster et al., 2010; Miles et al., 2012; Sterling, Ford, Park, & McAlister, 2013). Thus, we explored whether measures for key constructs associated with adolescent alcohol use (motivation to change, resistance self-efficacy, peer norms, problem drinking) functioned equivalently for this critical target population of Hispanic and Caucasian youth. It was our goal to ensure that these measures would show invariance for high-risk youth, who have the highest need of interventions to reduce alcohol abuse, and subsequently, are most in need of reliable and valid assessment. Therefore, we evaluated measurement equivalence with a sample of regular substance-using youth involved in the justice system.

## 2.1 Method

### 2.1.1 Participants and Procedures

Regular substance-using youth (N = 506) involved in a juvenile justice center volunteered to participate in a study aimed at reducing substance use. Consistent with the broader Hispanic population within this particular geographic location (southwest U.S.) (Salvador, DeVargas, & Feldstein Ewing, in press), over half of this sample self-identified as Hispanic (63%), including youth who described themselves as Mexican National (4.1%), Mexican American (35.5%), Spanish (17.9%), Central American (0.6%), South American (0.4%), and Hispanic bi-/multi-racial (Hispanic youth who endorsed more than one national origin; e.g., Mexican and Central American; 4.5%). (See Table 1 for details). As is true for Hispanic youth in this region (Salvador et al., in press), most youth in this sample were born in the U.S. (92%). Of foreign-born youth (n=27), the majority (66.7%) had lived in the U.S. for more than 10 years. On average, Hispanic youth described their generational status as 3.5 (SD=1.36; range 1–5), reflecting having between 1 and 2 grandparents foreign-born (Cuellar, Harris, & Jasso, 1980). In terms of language preference, 11% of Hispanic youth reported speaking both English and Spanish, and 75.5% reported speaking almost exclusively English at home (Caetano, 1987). In contrast, on average, Caucasian youth described their generational status as 4.5 (SD=0.98; range 1–5), reflecting having between 0–1 grandparents foreign-born (Cuellar et al., 1980). In terms of language preference, 97.6% of Caucasian youth reported

speaking exclusively English at home (Caetano, 1987). As Hispanic youth represented our target group of interest, we approached analyses by comparing all Hispanic youth ( $n=283$ ) with Caucasian youth ( $n= 85$ ), to yield the highest power comparison. This sample was predominantly male (72.9% male), with a mean age of 16.17 years. We found no significant group differences between Hispanic and Caucasian youth, except on generational status and preferred language at home (see Table 1).

This evaluation is part of a larger, randomized controlled trial examining two adolescent substance use treatments for high-risk, justice-involved youth (PI: first author). All analyses conducted herein used measures administered and scored in a standard clinical and research assessment manner prior to youths' randomization to treatment. To participate, youth were required to be age 13–18, involved with a justice program, a regular substance user [using alcohol or cannabis  $>1x$  per month for the past 6 months (Chung & Martin, 2001)], have documented parent/guardian consent, and their own assent. All youth were given the opportunity to complete the study in English or Spanish. Only 6 youth (1%) completed project measures in Spanish. For this baseline assessment, youth received \$20. All measures were completed on a laptop computer using audio-computer-assisted-self-interview (ACASI) (Williams et al., 2000).

Adolescents completed a series of assessments querying basic demographics (age, gender, race/ethnicity), generational status (Cuellar et al., 1980) and youth's preferred language at home (Caetano, 1987). Generational status was measured with a Likert scale (Cuellar et al., 1980), where youth were asked to "select the generation that best describes you." Response options ranged from 1 = *1<sup>st</sup> generation, you were born in other country*, to 5 = *5<sup>th</sup> generation, you and your parents were born in the U.S. and all of your grandparents were born in the U.S.* In line with other studies of Hispanic populations in the southwest (Caetano, 1987, 2003), we also measured youths' language preference, with the question: "What language do you prefer to speak at home?" (response options ranged from 1 = *Mostly English* to 6 = *Mostly Other*).

### 2.1.2 Motivation to change

We began by developing a latent factor, defined here as an unobserved variable that represents overlapping variance in observed variables or "indicators" (Bollen & Hoyle, 2012) (see Figure 1). For motivation to change, we used three indicators (e.g., three separate measured scales) to represent this latent factor. The first and second indicators were single items assessing the participant's self-reported 1) importance of changing their drinking and 2) readiness to change their drinking (on continuous scales from 0 = *not at all* to 10 = *extremely*) as derived from the readiness rulers (<http://casaa.unm.edu/inst/Readiness%20Ruler.pdf>). The third indicator was a four-item Likert scale assessing intentions to decrease alcohol use, with response options from 1 = *not at all likely* to 7 = *very likely* (adapted from Bryan, Aiken, & West, 1996). The four items were averaged to form a single score that served as the third indicator ( $\alpha = .93$ ).

### 2.1.3 Self-efficacy

Due to the particular importance of adolescents' self-efficacy to resist drinking in social contexts, we utilized the established social self-efficacy subscale from a widely-used adolescent drink refusal instrument (Drink Refusal Self-Efficacy Questionnaire Revised-Adolescents; DRSEQ-RA; Young, Hasking, Oei, & Loveday, 2007). Sample items included, "How sure are you that you could resist drinking alcohol when someone offers you a drink?"; "How sure are you that you could resist drinking alcohol when you are at a party?" All responses were on a Likert scale, ranging from 1 = *very sure I could NOT resist* to 6 = *very sure I could resist*. These 5 items served as the indicators of the latent variable for self-efficacy. While we did not average these items in a scale for these analyses, they nevertheless showed high reliability in the overall sample ( $\alpha = .902$ ).

### 2.1.4 Peer norms

This latent factor was comprised of three indicators adapted from an established peer norms measure targeting sexual risk to instead target peer norms around alcohol use. Items included one dichotomous question "Do most of your friends drink alcohol?" (*yes/no*), and two Likert scaled items "How often do most of your friends drink alcohol?" (0 = *never* to 4 = *always*) and "How often do most of your friends get drunk when they drink alcohol?" (0 = *never* to 4 = *always*) (Bryan, Rocheleau, Robbins, & Hutchison, 2005).

### 2.1.5 Problem Drinking

Following other adolescent addiction studies (Hendershot, Bryan, Feldstein Ewing, Claus, & Hutchison, 2011), for this latent factor, we used four indicators to represent the latent variable of problem drinking. The first was the total score on the Alcohol Use Disorders Identification Test (AUDIT), a 10-item Likert-scaled measure evaluating hazardous drinking measured with response items from 0 = *never* to 4 = *daily or almost daily* (Babor, Higgins-Biddle, Saunders, & Monteiro, 2006),  $\alpha = .82$  in this sample. The second was the Rutgers Alcohol Problems Index (RAPI), a 23-item Likert-scaled measure of alcohol-related problems with response options from 0 = *never* to 4 = *more than 10 times* (White & Labouvie, 1989),  $\alpha = .89$  in this sample. The third indicator was a brief alcohol use composite (White, Filstead, Labouvie, Conlin, & Pandina, 1988),  $\alpha = .64$  in this sample. This measure included 3 Likert-scaled items ("In the past 12 months how often did you consume at least one alcoholic drink?" with response options from 0=*never* to 8=*every day*; "In the past 12 months, how many drinks did you usually have at one time?" with response options from 0=*none* to 9=*more than 20 drinks*; and "In the past 12 months, when you drank alcohol, how often did you get drunk?" with response options from 0=*never* to 4=*always*). Items were averaged for a total score. The fourth indicator was number of binge drinking days in a 30-day time period derived via the Timeline FollowBack, an interviewer-administered, calendar-based recall measure where substance use over the last 30 days is queried and recorded (TLFB; Sobell & Sobell, 1992).

### 2.2.1 Procedure for Data Analysis

It is common in measurement invariance work to use a confirmatory factor analytic approach that utilizes the estimation of latent factors comprised of several different

indicators to assess the constructs of interest (e.g., Clark, 2014; Derringer et al., 2013; Janssens et al., 2014). As with other measurement invariance studies, sometimes that structure maps onto how a measure is used in clinical or research practice, but more often, this approach elucidates the nature and function of a set of constructs (and the measures within), rather than generating a set of latent variables that would be subsequently expected to be used in direct practice. In other words, every measurement invariance study uses latent variables to assess how indicators are interrelated and, theoretically, *interpreted*, by different groups, and this gives us information about whether that indicator (measure) is a useful measure of the construct in practice. For example, if the RAPI was strongly related to the latent variable for problem drinking in Caucasians but not in Hispanics, it would suggest the RAPI is measuring something different (i.e., not problem drinking) in that latter group. But it is the RAPI, not the latent variable of problem drinking that is used in clinical and research applications.

Thus, our goal within this examination was to evaluate the measurement invariance of each indicator across substance-using Hispanic and Caucasian youth involved in the juvenile justice system. All measures used as indicators of each latent factor were pulled from clinical research and scored according to standard practice. The indicators within each construct thus represent a widely-used and well-established set of measures from the clinical and research literatures for adolescent addiction. All models were based on how these measures are typically used in these settings (i.e., the Readiness Ruler is thought to measure “motivation to change”) (Miller & Rollnick, 2013).

We utilized a multiple group confirmatory factor analysis (CFA) framework to test validity and measurement invariance of each of our measures. A CFA assumes that relationships between scale items (items within a measure) are best represented by a latent factor that accounts for the common variance shared among items (Bollen, 1989; Bollen & Hoyle, 2012). Factor loadings represent the individual item’s relationship to the common factor. Significant loadings suggest that the indicators are valid representations of the underlying construct. The multiple group CFA incorporates a mean structure into the model, which tests relationship equivalence between indicators and factors, and each item’s intercept equivalence between groups.

Our approach to testing measurement invariance within this CFA framework followed established procedures (Reise, Widaman, & Pugh, 1993; Widaman & Reise, 1997). Broadly, it involved estimating a series of successive multi-group models. These models ranged from least (configural invariance) to most restrictive (factor covariance invariance) for each latent factor.

To assess the fit of each model, we used the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Hu and Bentler (1999) recommend that CFI values of .95 or greater, RMSEA values of .06 or below, and SRMR values of .08 or below suggest reasonably good fitting models. Model comparisons were subsequently conducted using the chi-square difference test ( $\chi^2$ ), where significant differences in fit indicated that the more restrictive model was a poorer fit for the data than the less restrictive model and should not be retained. All variables

were checked to make sure that they were not skewed or kurtotic prior to conducting all analyses in EQS 6.1 (Bentler & Wu, 2003) using maximum likelihood estimation (MLE).

## 3.1 Results

### 3.1.1 Indicator Differences

Differences between this sample of substance-using, justice-involved Hispanic and Caucasian youth were examined for each indicator (see Table 2), with significant differences only observed for 2 variables. Hispanic youth reported higher intentions to change (motivation to change) and higher ability to resist drinking when their boyfriend/girlfriend was drinking (self-efficacy).

### 3.1.2 Multi-Group Tests of Measurement Invariance

Models were estimated in the multiple group framework, ranging from least to most restrictive. Each model was compared to the previous model using a chi-square difference test ( $\chi^2$ ; Table 3). There were four separate models estimated, one for each latent factor (motivation to change, self-efficacy, peer norms, and problem drinking).

### 3.1.3 Configural Invariance

In model 1, factor structure was tested across the two groups (Hispanic vs. Caucasian youth) for the four factors of interest (motivation to change, self-efficacy, peer norms, and problem drinking). There were no constraints imposed on this model aside from those needed for model identification. All factor loadings and factor covariances were allowed to vary, and only the structure was constrained to be the same across the two groups.

For the *motivation to change model*, there were only three indicators, which results in no remaining degrees of freedom to test model fit. Thus a chi-squared test and additional measures of fit were not available. However, each item loaded significantly on this factor in both groups, suggesting that the structure of the motivation to change factor was equivalent across groups (see Figure 1 for models). The self-efficacy model fit the data adequately,  $\chi^2 = (3, N = 283 \text{ Hispanic and } 85 \text{ Caucasian}) = 3.34, ns$ ; CFI = 1.00; RMSEA = .000 90% (CI: .000 – .066); SRMR = .010, and each item loaded significantly on the factor, suggesting that the structure of the self-efficacy latent factor was equivalent across groups. The peer norms model had only three indicators. Thus, chi-squared and additional measures of fit were not computed. Here again, each item loaded significantly on the factor, suggesting that the structure of this CFA was equivalent across groups. For problem drinking, the model fit the data adequately,  $\chi^2 = (2, N = 283 \text{ Hispanic and } 85 \text{ Caucasian}) = .48, ns$ ; CFI = 1.00; RMSEA = .000 90% (CI: .000 – .100); SRMR = .006. Each item loaded significantly on the factor, confirming that the structure of the problem drinking latent factor was equivalent across groups.

### 3.1.4 Factor Loading Invariance

In model 2, the loading invariance for each of the factors (motivation to change, self-efficacy, peer norms, problem drinking) was examined, wherein each factor loading was constrained to equality across groups. The difference in fit between the factor loading

invariance model and configural invariance was not statistically significant for any of the factors (Table 3). This indicated factor loading invariance for each latent factor across groups, and this more restrictive model was therefore retained for each factor.

### 3.1.5 Item Intercept Invariance

In model 3, each item intercept was fixed to equality across groups and compared to model 2 for each factor. For peer norms and problem drinking, this model did not significantly differ from the model testing factor loading invariance (Table 3). This indicated item intercept invariance for these latent factors across groups. Thus, the most restricted model was retained as our final model. For motivation to change, there were significant differences in the intercept for the intentions item.

### 3.1.6 Partial Item Invariance

Releasing the constraint on intercept invariance for this item (model 4; motivation to change) resulted in a model that was not significantly different from model 2, and was an adequate fit to the data. In simple tests for group differences, Hispanic youth had higher intention to change their drinking than did Caucasian youth. This difference was maintained in the more complex model, though it is important to note that the factor loading (i.e., the strength of the relationship between this item and the latent motivation to change factor) did not differ between groups. Thus, though there were mean differences in this item across group, the item nonetheless appeared to function similarly across groups as an indicator of motivation to change. Similarly, for the self-efficacy factor, there were significant differences in the intercept for: “when your boyfriend or girlfriend were drinking”.

Releasing the constraints on intercept invariance for these items (model 4; self-efficacy) resulted in a model that was not significantly different from model 2, and was an adequate fit to the data. The effect for self-efficacy paralleled simple tests for group differences, wherein Hispanic youth had higher self-efficacy to resist drinking when their partner was drinking. Interestingly, while we found no group differences in the univariate test of self-efficacy to resist drinking when someone offers you a drink, in the context of the model there were significant group differences. Caucasian youth showed slightly higher scores on confidence in their ability to resist drinking when offered a drink than Hispanic youth. It is important to note, again, that we did not find group differences on factor loadings (i.e., the strength of the relationship between these items and the latent self-efficacy factor). Thus, although we found mean differences in these items across group, they functioned similarly as indicator of drinking resistance self-efficacy. In other words, our data show that the measured constructs function the same way for both groups. The difference in level (Hispanic youth reporting higher intentions, Caucasians reporting higher self-efficacy) thus reflects actual group differences in mean scores, rather than group differences in item interpretation.

In sum, these data provide strong statistical evidence for measurement invariance across motivation to change, self-efficacy, peer norms, problem drinking for substance-using, justice-involved Hispanic youth.

## 4.1 Discussion

The call for investigating patterns of substance use, treatment response, and active ingredients for Hispanic youth continues to resound (Feldstein Ewing, Wray, Mead, & Adams, 2012). However, ensuring measurement invariance is a critical first step in addressing existing these health disparities (Lowman & Le Fauve, 2003) as it identifies whether common and widely-used alcohol measures are interpreted the same way by high-risk, substance-using Hispanic youth as by the Caucasian majority. This step is requisite for effective service provision with underrepresented youth.

The goal of this study was to assess the measurement invariance of several commonly used measures of adolescent alcohol use and treatment response with high-risk (justice-involved), substance-using Caucasian versus Hispanic youth. Evaluating these standard measures is important due to their widespread use in clinical and research settings. Overall, our results support the equivalence of these measures of motivation to change, self-efficacy, peer norms, and problem drinking across this sample of Hispanic and Caucasian youth. This study contributes to the current paucity of published examinations of measurement invariance for Hispanic youth across these important alcohol use and treatment response measures. Further, one of the strengths of this study is the examination with Hispanic and Caucasian youth in high need of services (justice-involved, substance-using adolescents), rather than within a general youth population. This approach results in our ability to ensure that these measures are effective in the precise community where they are needed.

Despite a history of extreme response styles and acquiescence observed among Hispanic adults (Marin, Gamba, & Marin, 1992), recent studies with Hispanic youth have not found the same pattern of differential response across numerous factors (e.g., externalizing, family functioning; Feaster et al., 2010; familism, parental respect; Miles et al., 2012; self-efficacy, beliefs, intentions; Sterling et al., 2013). Our results of measurement invariance across high-risk, substance-using Hispanic and Caucasian youth were consistent with this emerging work.

Several foundational clinical and pediatric research programs have emphasized the importance of attending to generational status and language preference (Marin & Marin, 1991) particularly during adolescence, when ethnic identity formation is fully in development (Phinney, 1990). Despite significant differences in favor of greater Hispanic identification for Hispanic youth in comparison with Caucasian youth (e.g., fewer generations within the U.S., greater use of Spanish at home) (Gil et al., 2004), we found few differences across item response and overall measure function. For example, high-risk, substance-using Hispanic youth in this sample reported similar responses across measures with the exceptions of intentions to change drinking and two indicators of resistance self-efficacy. This is an unexpected finding that suggests exciting avenues for future work. In other words, while we cannot answer the question of how and why Hispanic and Caucasian youth had different mean responses on these measures with this examination, our demonstration of the invariance of the structure of these groups' responses across these measures forms the necessary foundation for this exact avenue of evaluation in future work. For example, it is possible that the absence of observed group differences across these

measures reflects this highly diverse region of the Southwest, where both Hispanic and Caucasian gain experience in, and comfort with, functioning bi-culturally (Crisp & Turner, 2011; Matsunaga, Hecht, Elek, & Ndiaye, 2010). It is equally possible that adolescents' response styles reflect the nature of their justice involvement; we look forward to disentangling these relationships in our future work with these validated measures.

Importantly, in this study, we found measurement equivalence between Caucasian and Hispanic youth who were highly representative of this geographic region (Salvador et al., in press). As with the larger community of Hispanic individuals in the southwest U.S. (Salvador et al., in press), most Hispanic youth within this sample had at least 1 foreign-born grandparent, and spoke a mix of English (predominantly) and Spanish at home. Consequently, in terms of potential generalizability, these findings may be extended to U.S.-born Hispanic youth in this geographic region. However, caution should be exerted in extrapolating results to Hispanic youth from other geographical regions, such as Caribbean youth, youth from the southeastern U.S. (e.g., Gonzalez-Guarda, Williams, Meriser, Cummings, & Prado, 2014), and/or primarily immigrant (foreign-born) youth, as we did not have a high representation of youth from any of those communities within this study.

Finally, the observed findings should be interpreted in light of limitations. Unlike many adult studies which contain large monolingual Spanish samples, the adolescent Hispanic community in the southwest U.S. is generally bilingual, and often primarily English speaking (Salvador et al., in press). In other words, only 6 youth in this study were Spanish-speaking only, so we could not compare results across Spanish-speaking Hispanic youth, English-speaking Hispanic youth, and Caucasian English speakers. This is an important direction for future research. Because of the composition of the juvenile justice system in the southwest U.S., our sample was imbalanced, with far more Hispanic youth than Caucasian youth. Such imbalances in the context of cross-groups confirmatory factor analytic approaches can result in Type II errors, wherein actual differences between groups are missed. Our only option for increasing power in this context would have been to collectively group all non-Hispanic youth and compare them to Hispanic youth. But combining such culturally distinct groups (e.g., Native American, African American, Asian) were, in our view, more problematic than imbalanced sample sizes across groups. With these caveats in mind, our data indicate the empirical validity of key alcohol use measures, which we found operate similarly for this sample of Hispanic youth. This offers the critical groundwork for exciting next steps, such as determining on which constructs the two groups differ (e.g., intentions, self-efficacy) and why. These data provide the requisite empirical support for evaluating alcohol use, treatment response, and salient active ingredients of alcohol use behavior change. This is a notable step to improve treatment development for Hispanic youth.

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Figure 1a.

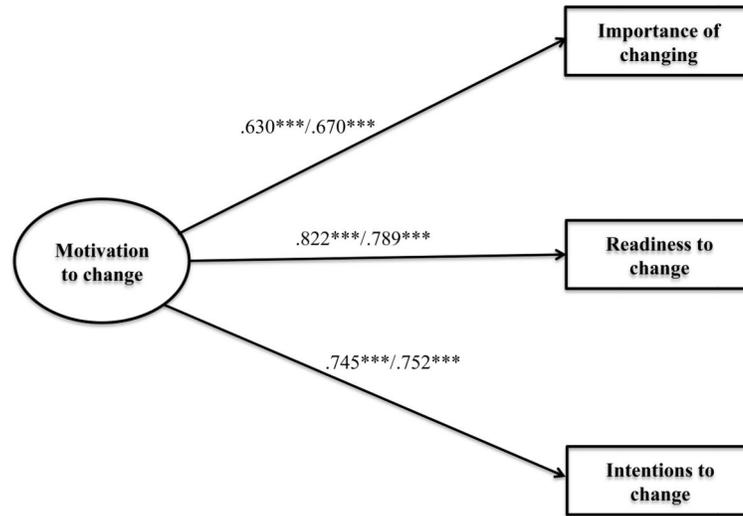


Figure 1b.

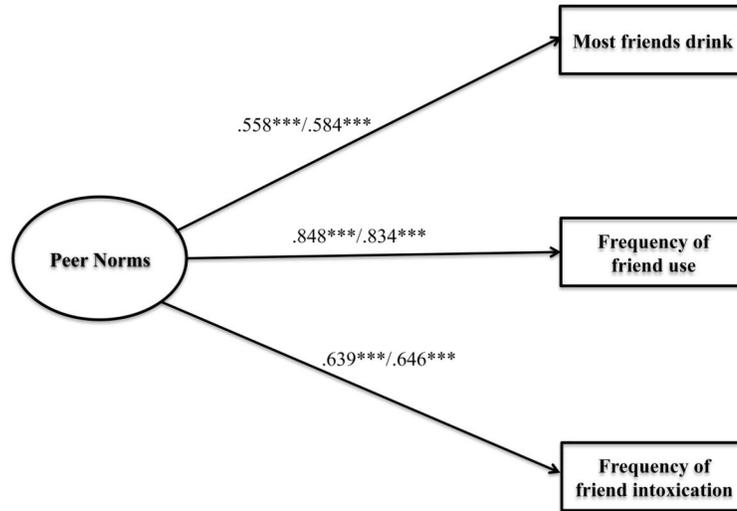


Figure 1c.

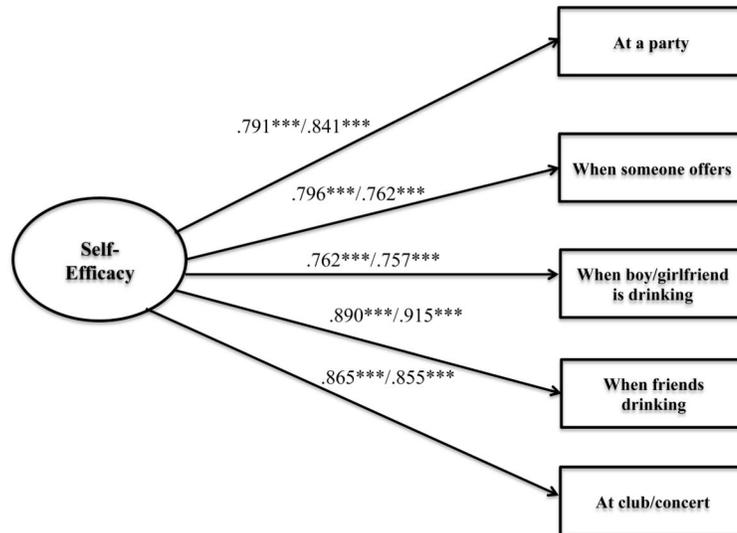


Figure 1d.

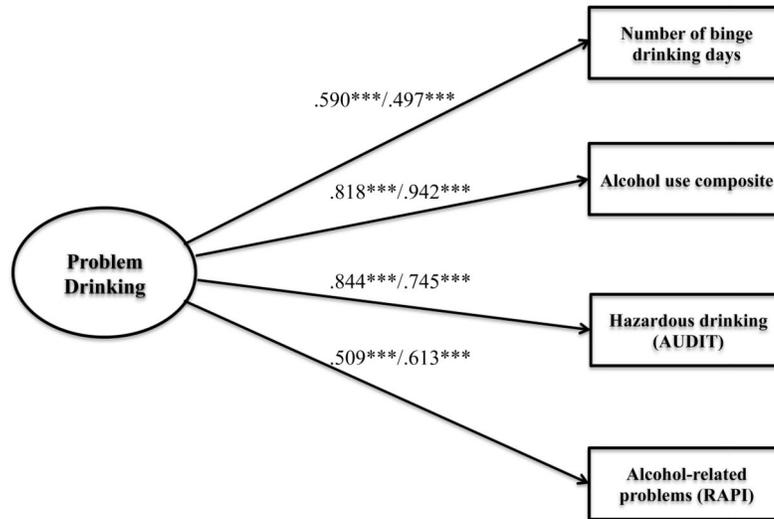
**Figure 1.**

Figure 1a. Motivation to Change. Hispanic/Caucasian.  $p < .05 = *$ ,  $p < .01 = **$ ,  $p < .001 = ***$ .

Figure 1b. Peer Norms. Hispanic/Caucasian.  $p < .05 = *$ ,  $p < .01 = **$ ,  $p < .001 = ***$ .

Figure 1c. Self-efficacy. Hispanic/Caucasian.  $p < .05 = *$ ,  $p < .01 = **$ ,  $p < .001 = ***$ .

Figure 1d. Problem Drinking. Hispanic/Caucasian.  $p < .05 = *$ ,  $p < .01 = **$ ,  $p < .001 = ***$ .

**Table 1**

## Demographics

	Hispanic Youth (N = 283)	Caucasian Youth (N = 85)	Test Statistic
Age	16.05 (1.28)	16.29 (1.20)	$t(366) = -1.55, ns$
Gender (% female)	26.1%	28.2%	$\chi^2 = .15, ns$
Highest Education (Grade)	9.46 (1.69)	9.72 (1.60)	$t(360) = -1.27, ns$
Financial assistance (i.e., food stamps)	35.6%	30.5%	$\chi^2 = .74, ns$
# of lifetime arrests	2.38 (2.61)	1.81 (2.05)	$t(359) = 1.84, ns$
Generational status	3.50 (1.36)	4.49 (.98)	$t(355) = -6.06, p < .001$
Preferred language at home	1.36 (.69)	1.07 (.49)	$t(364) = 3.61, p < .001$

*Note.* Highest education level = “What’s the highest grade you’ve completed?” ranges from 5<sup>th</sup> grade to technical college. Generational status = “Select the generation status that best describes you” ranges from 1<sup>st</sup> generation, you were born in other country, to 5 = 5<sup>th</sup> generation, you and your parents were born in the U.S. and all of your grandparents were born in the U.S. Preferred language = “Which language do you primarily speak at home?” range from 1 = mostly English to 6 = mostly other. Standard deviations in parentheses.

**Table 2**

Group Differences

	Range	Hispanic Youth (N=283)	Caucasian Youth (N=85)	Differences ( <i>t</i> -tests)
Motivation to change				
Importance of changing	1-10	2.71 (3.01)	2.34 (3.30)	.91
Readiness to change	1-10	4.50 (3.58)	3.72 (3.86)	1.66
Intentions to change	1-7	4.34 (1.99)	3.38 (2.04)	3.54***
Peer Norms				
Most friends drink	Yes/No	Yes: 80.1%	Yes: 83.5%	$\chi^2 = .30$
Frequency of friend use	0-4	2.13 (.76)	2.07 (.72)	.68
Frequency of friend intoxication	0-4	2.52 (1.00)	2.65 (.90)	-1.02
Self-Efficacy				
At a party	1-6	3.36 (1.71)	3.21 (1.80)	.70
When someone offers	1-6	4.10 (1.61)	4.28 (1.62)	-.94
When boy/girlfriend is drinking	1-6	4.04 (1.75)	3.44 (1.81)	2.78**
When friends drinking	1-6	3.71 (1.71)	3.54 (1.78)	.84
At club/concert	1-6	3.57 (1.79)	3.36 (1.77)	.93
Problem Drinking				
# of Binge Drinking Days	1-30	2.43 (3.10)	3.15 (3.85)	-1.66
Alcohol Use Composite	1-9	2.77 (1.38)	2.85 (1.07)	-.46
Hazardous Drinking	0-4	.83 (.53)	.91 (.56)	-1.25
Alcohol-related problems	0-4	.53 (.53)	.56 (.43)	-.48

*p* < .05,

\*\*\*

*p* < .01,

\*\*\*

*p* < .001.

**Table 3**

Overall Fit of Individual Confirmatory Factory Analysis (CFA) Models including Comparison of Sequential CFAs using  $\chi^2$  Difference Tests

Models	$\chi^2$ (df)	$\chi^2$ Difference	CFI	RMSEA	SRMR
<i>Motivation to Change</i>					
Model 1: Configural Invariance	N/A	N/A	N/A	N/A	N/A
Model 2: M1+Factor Loading Invariance	1.53 (3)	N/A	1.00	.00 (.00-.108)	.050
Model 3: M2+Item Intercept Invariance	13.93 (6)	2 vs. 3: $\chi^2$ (3) = 12.4, $p < .01$	1.00	.00 (.00-.120)	.046
Model 4: M2+Partial Item Intercept Invariance	5.80 (5)	2 vs. 4: $\chi^2$ (2) = 4.27, $p = .12$	1.00	.00 (.00-.109)	.049
<i>Self-Efficacy</i>					
Model 1: Configural Invariance	3.34 (6)	N/A	1.00	.00 (.00-.066)	.010
Model 2: M1+Factor Loading Invariance	13.30 (11)	1 vs. 2: $\chi^2$ (5) = 9.96, $p = .08$	.998	.034 (.00-.088)	.060
Model 3: M2+Item Intercept Invariance	29.93 (16)	2 vs. 3: $\chi^2$ (5) = 16.63, $p = .01$	.998	.038 (.00-.091)	.060
Model 4: M2+Partial Item Intercept Invariance	14.19 (14)	2 vs. 4: $\chi^2$ (3) = .89, $p = .83$	.998	.034 (.00-.088)	.060
<i>Peer Norms</i>					
Model 1: Configural Invariance	N/A	N/A	N/A	N/A	N/A
Model 2: M1+Factor Loading Invariance	2.51 (3)	N/A	1.00	.00 (.00-.116)	.085
Model 3: M2+Item Intercept Invariance	6.30 (6)	2 vs. 3: $\chi^2$ (3) = 3.79, $p = .29$	1.00	.00 (.00-.117)	.089
<i>Problem Drinking</i>					
Model 1: Configural Invariance	.48 (2)	N/A	1.00	.00 (.00-.10)	.006
Model 2: M1+Factor Loading Invariance	3.23 (3)	1 vs. 2: $\chi^2$ (1) = 2.75, $p = .10$	.999	.02 (.00-.13)	.102
Model 3: M2+Item Intercept Invariance	4.61 (6)	2 vs. 3: $\chi^2$ (3) = 1.38, $p = .71$	.999	.02 (.00-.13)	.103