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Construct validity of the Short Inventory of Problems among Spanish speaking Hispanics

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HIGHLIGHTS

- We assess the utility of the SIP across language and ethnicity in a trauma setting.
- We investigate the preferred factor structure of the SIP.
- We examine the measurement structure of this SIP among Hispanics.
- Data supports the first-order one-factor SIP model as the preferred factor structure.
- Findings support the use of the SIP across ethnicity and language.

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ABSTRACT

Objective: Research on ethnic health disparities requires the use of psychometrically sound instruments that are appropriate when applied to ethnically diverse populations. The Short Inventory of Problems (SIP) assesses alcohol-related consequences and is often used as a measure to evaluate intervention effectiveness in alcohol research; however, whether the psychometric properties of this instrument are comparable across language and ethnicity remains unclear.
Method: Multi-group confirmatory factor analysis (MGCFA) was used to test for the invariance of the measurement structure of the SIP across White Non-Hispanic English speaking (N = 642), Hispanic English speaking (N = 275), and Hispanic Spanish speaking (N = 220) groups.
Results: The MGCFA model in which factor loadings, measurement intercepts, and item residuals were constrained to be equal between English speakers and Spanish speakers exhibited a reasonable fit to the data, $\chi^2(221) = 1089.612$ $p < .001$, TLI = .926; CFI = .922, RMSEA = .059 (90% CI = .055–.062). The ΔCFI supported strict factorial invariance, ΔCFI = .01, across groups; no significant group differences were found between factor loadings, measurement intercepts, or item residuals between English speakers and Spanish speakers.
Conclusions: This study extends the existing confirmatory factor analysis results of the SIP by providing additional data to inform the utility of the SIP among Hispanics. Strict factorial invariance between Spanish and English speakers is necessary to: conclude that the underlying constructs have the same meaning across groups; test for group differences in the latent variables across groups; and presume that group differences are attributable only to true differences between groups. Thus, the SIP is strongly supported for evaluating the effectiveness of alcohol treatment among Hispanics.

1. Introduction

1.1. Ethnic differences in alcohol consumption and consequences

Over the next three decades, racial and ethnic minority groups are estimated to represent half of the US population (Centers for Disease Control and Prevention (CDC), 2011). Hispanics are currently the largest minority group in the US, representing 16.3%, with an increase of 43% since 2000 (Ennis, Ríos-Vargas, & Albert, 2011). In southwestern states, the proportion of Hispanics is

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already at this higher level: Texas, 38%; New Mexico, 46%; Arizona, 30%; and California, 38% (Ennis et al., 2011). Mexican Americans constitute about 60% of the US Hispanic population and are currently the largest Hispanic subgroup. Differences in alcohol consumption and alcohol-related problems currently exist between ethnically diverse populations (Galvan & Caetano, 2003). Compared to Caucasians, Hispanics tend to consume alcohol in higher quantities per occasion, are approximately twice as likely to die from cirrhosis of the liver, are more likely to report social consequences of drinking, and are more likely to report two or more dependence symptoms (Mulia, Ye, Greenfield, & Zemore, 2009; Stinson, Grant, & Dufour, 2001). Caetano and Clark (1998) found that the proportion of Caucasian and Black men reporting one, two, or three or more alcohol related consequences remained stable between 1984 and 1995 while the proportion of Hispanic men reporting three or more alcohol related consequences increased from 9% to 16% during this time period. Given the growth of the Hispanic population in the US and their increased risk for alcohol-related problems, evaluating the effectiveness of interventions in this population is essential to effectively address this health disparity (Atkinson, Bui, & Mori, 2001; Bernal & Scharró-del-Río, 2001). However, evidence on the effectiveness of treatments among ethnic minority groups is limited, in part, because of the necessity to use psychometrically sound instruments that are appropriate when applied to ethnically diverse populations.

1.2. Purpose

The Short Inventory of Problems (SIP) is a measure often used to evaluate intervention effectiveness in alcohol research (Soderstrom et al., 2007; Walters, Bennett, & Miller, 2000) The main goal of the SIP is to evaluate a person's drinking-related consequences independent from consumption, alcohol dependence, and help seeking behavior. Originally developed out of the 45-item DrInC, the 15-item SIP is particularly useful in time-limited settings like emergency rooms, trauma care settings, and primary care (Forcehimes, Tonigan, Miller, Kenna, & Baer, 2007; Longabaugh et al., 2001; Soderstrom et al., 2007). Findings of prior exploratory and confirmatory factor analyses on the SIP are somewhat mixed. Feinn, Tennen, and Kranzler (2003) suggest using a second-order five-factor model rather than a first-order one-factor or first-order five-factor model. However, Feinn et al. (2003) did report high correlations among the factors. Kenna et al. (2005) suggest that a first-order five-factor model showed no significant improvement in fit over the one-factor model, and therefore concluded that the first-order one-factor model may be most appropriate. The first-order one-factor model is also supported in drug consequence studies using the SIP (Blanchard, Morgenstern, Morgan, Labouvies, & Bux, 2003; Tonigan & Miller, 2002). Thus, one limitation of the SIP is the lack of consistent evidence regarding its factor structure. A second limitation of the SIP is whether scores on the instrument can be compared across language and ethnicity. In order to evaluate intervention effectiveness for minority groups, it is vital that researchers utilize valid instruments that have established measurement invariance across groups. In other words, the observed scores reflect the true mean score on the latent construct being measured and the scores are being measured similarly across groups (Stewart & Napoles-Springer, 2003). Thus, the goals of the present study were to 1) further investigate the measurement structure of the SIP and 2) inform the assessment and utility of the SIP across language and ethnicity.

2. Material and method

2.1. Participants

This study included 642 self-identified White Non-Hispanic English speaking patients, 275 Hispanic English speaking patients, and 220 Hispanic Spanish speaking patients (N = 1137) who agreed to participate in a randomized clinical trial conducted in a level-I trauma department. All participants had suffered a traumatic injury, were screened positive for high-risk drinking, and were admitted to a Level I Trauma Center in the South. See Field, Caetano, Harris, Frankowski, and Roudsari (2009) for a thorough description of study methods, recruitment, and interventions.

Demographic information collected on study participants includes age, gender, personal income, education level, employment status, percent of lifetime in the US, Glasgow Coma Scale (GCS) level, and insurance status. While not the focus of this study, significant differences across gender, age, income, employment status, and insurance status existed between the three groups. Tukey's post-hoc tests revealed that Hispanic Spanish speakers were significantly younger, had lower income levels, received less formal education, and had spent less time in the US compared to both Hispanic English speakers and White English speakers. See Table 1 for a summary of demographic results. Authors note that it is important to consider these potential differences when interpreting multi-group analysis, particularly when a measurement does not hold up across groups.

2.2. Measures

The SIP developed as a short form of the Drinker Inventory of Consequences (DrInC; Miller, Tonigan, & Longabaugh, 1995), a 45-item measure created to assess alcohol-related consequences independent from consumption, dependence, and help seeking behavior. The DrInC assesses alcohol-related consequences across five domains: physical, interpersonal, intrapersonal, social responsibility, and impulse control. The SIP uses the top three items that are most highly correlated with their corresponding subscale totals and combines them to form a 15-item short form of the DrInC (Miller et al., 1995). Compared to the DrInC, the SIP performs well in assessing overall levels of alcohol-related consequences with its total scores being strongly related to the corresponding DrInC scores (Alterman, Cacciola, Ivey, Habling, & Lynch, 2009; Forcehimes et al., 2007). However, there is some discrepancy as to whether or not the SIP yields subscale scores that reflect the presence of distinct subscales (Blanchard et al., 2003; Feinn et al., 2003; Forcehimes et al., 2007; Tonigan & Miller, 2002).

3. Data analytic strategy

3.1. Reliability

The reliability of the SIP instrument in this study was examined by calculating Cronbach's α coefficients using the White Non-Hispanic English speakers, Hispanic English speakers, Hispanic Spanish speakers, and the total sample.

3.2. Construct validity

Confirmatory factor analysis (CFA) was used to estimate predicted first-order one-factor, first-order five-factor, and second-order five-factor models using AMOS (Analysis of Moment Structures, version 18.0), a software commonly used to estimate structural equation models for manifest and latent variables. The three models were evaluated and compared, and the most appropriate model was selected based on the following fit indices: Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root-Mean-Square Error of Approximation (RMSEA), 90% confidence intervals (CI) for the RMSEA, the Standardized Root Mean Square Residual (SRMR; Bentler, 1995), and the chi square test statistic for overall model fit.