Anxiety Sensitivity as a Predictor of Latino Alcohol Use: 
A Moderated Mediational Model

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Although anxiety symptoms and alcohol use have been widely researched, recent work has begun to examine the role of anxiety sensitivity in contributing to these mental health indicators. Unfortunately, minimal research has investigated the relationships between anxiety sensitivity, anxiety symptoms, and alcohol use among Latinos. The role of acculturation within these 3 constructs together has yet to be examined. Among a sample of 120 Latino adults, moderated mediational analyses revealed statistically significant conditional indirect effects such that anxiety symptoms mediated the relationship between anxiety sensitivity and alcohol use while an Anglo orientation moderated the anxiety sensitivity to anxiety symptoms link. The main findings indicated that the indirect effects were the most robust within low Anglo orientation. Alternative models were tested but not supported suggesting that the pattern of results were indicative of the self-medication hypothesis. The discussion highlights theoretical and practical implications.

Keywords: anxiety sensitivity, anxiety, alcohol use, Latino mental health, acculturation

Recent empirical attention has focused on the factors that contribute to alcohol use among Latinos. This research emphasis has been partly due to the exponential growth of this ethnic group in the United States. Recent reports show that Latinos constitute approximately 17% of the population, and projections estimate that they will make up 30% of the population by 2050 (U.S. Census Bureau, 2013). Alcohol use has been identified as a significant problem within the Latino community with some evidence indicating that rates of abuse and binge drinking exceed that of other ethnic groups (Tran, Lee, & Burgess, 2010). A growing body of research has investigated how anxiety sensitivity relates to mental health. Anxiety sensitivity refers to an individual’s evaluation of autonomic arousal as dangerous or detrimental (Allan, Albanese, Norr, Zvolensky, & Schmidt, 2015; Reiss, Peterson, Gursky, & McNally, 1986). Although largely associated with the occurrence of anxiety disorders, anxiety sensitivity has also been linked to increased alcohol consumption (Allan et al., 2015; Kushner, Thuras, Abrams, Brekke, & Stritar, 2001; Schmidt, Buckner, & Keough, 2007). Understanding how anxiety sensitivity, anxiety symptoms, and alcohol use relate to one another among Latino adults is an understudied research topic with the potential to advance the application of explanatory models to ethnic minority individuals. Furthermore, examining the mechanisms which connect these factors can benefit from taking into account cultural variables.

Anxiety Sensitivity

Anxiety sensitivity has been traditionally defined as the fear of bodily sensations or autonomic arousal and the belief that these physical experiences have harmful consequences (Reiss et al., 1986). That is, individuals with high anxiety sensitivity believe physiological activation, such as increased respiration and heart palpitations, is a sign of impending negative physical, psychological, or social events (DeMartini & Carey, 2011; Stewart & Kushner, 2001). A more recent conceptualization has proposed that anxiety sensitivity is a multidimen-
sional construct that includes three robust factors: fear of physical sensations, fear of mental or cognitive dyscontrol, and fear of public observation or social rejection (Taylor et al., 2007). It has been suggested that conceptualizing and measuring anxiety sensitivity as a higher-order factor may limit potential assessment problems that stem from using instruments that were not designed in a multidimensional manner (Naragon-Gainey, 2010).

Anxiety sensitivity is considered to be relatively stable over time, but it differs from anxiety itself as the former refers to an individual’s response to anxiety symptoms while the latter involves fear or concern regarding life events (Naragon-Gainey, 2010). It is thought that anxiety sensitivity exacerbates the experience of anxiety symptoms and corresponding psychopathology (DeMartini & Carey, 2011). Such an amplifying effect can turn low-level anxiety symptoms into episodes of clinical anxiety (Kushner et al., 2001). A meta-analysis found that individuals diagnosed with anxiety disorders, including panic disorder, social anxiety disorder, and generalized anxiety disorder, reported increased anxiety sensitivity when compared with nonclinical control groups (Olatunji & Wolitzky-Taylor, 2009).

Anxiety sensitivity not only exacerbates psychological distress, but it is also thought to increase behaviors that reduce or control the fear of physiological activation, such as alcohol consumption (Stewart, Samoluk, & MacDonald, 1999). Schmidt and colleagues (2007) conducted a longitudinal study and reported that high levels of anxiety sensitivity predicted the development of alcohol use disorders two years later. Moreover, anxiety sensitivity predicted the use of depressants, such as alcohol, but not the use of stimulants, among a clinical sample of individuals with dual diagnoses of mood and anxiety disorders (DeHaas, Calamari, & Bair, 2002). Generally speaking, anxiety sensitivity appears to be associated with increased alcohol consumption and motives to engage in drinking behaviors (DeMartini & Carey, 2011). For example, the positive correlation between anxiety sensitivity and alcohol consumption appears to be particularly salient when individuals engage in drinking behaviors to cope with negative emotions (Novak, Burgess, Clark, Zvolensky, & Brown, 2003). As such, it is important to understand the role of anxiety symptoms in relation to anxiety sensitivity and alcohol use.

Several etiological models have been proposed in the empirical literature to help explain how anxiety sensitivity, anxiety, and alcohol consumption are related (Ruglass, Lopez-Castro, Cherif, Papini, & Hien, 2014). The first model is taken from the self-medication hypothesis (Figure 1A) and posits that anxiety sensitivity functions to exacerbate or amplify anxiety which, in turn, leads to increased alcohol use to cope with the distress (Kushner et al., 2001; Stewart et al., 1999). DeMartini and Carey (2011) reviewed the empirical literature on anxiety sensitivity and alcohol consumption and proposed a model by which anxiety symptoms and drinking motives mediated the relationship between anxiety sensitivity and alcohol use. Recent work has found evidence for the role of anxiety symptoms as a mediator between anxiety sensitivity and alcohol use in a sample of primarily non-Hispanic White adult smokers from the community (Allan et al., 2015). Similar findings were observed among a group of participants recruited from a substance abuse treatment program in that anxiety symptoms mediated the relationship between anxiety sensitivity and drinking alcohol to reduce negative affect (Kushner et al., 2001). As further support for the mediated mechanism of anxiety symptoms, recent research showed that a cognitive–behavioral treatment intervention effectively reduced anxiety sensitivity, which, in turn, decreased the motive to drink alcohol to cope with anxiety thus leading to less problematic drinking behaviors (Olthuis, Watt, Mackinnon, & Stewart, 2015; Watt, Stewart, Birch, & Bernier, 2006).

In contrast, a second etiological model, termed the substance-induced hypothesis (Figure 1B), suggests that alcohol use worsens anxiety symptoms and serves to mediate the relationship between anxiety sensitivity and anxiety (Smith & Randall, 2012; Ruglass et al., 2014). Much of the substance-induced hypothesis is taken from empirical work that has examined the co-occurrence of anxiety disorders and alcohol-related conditions. For instance, a prospective study with college students found that those diagnosed with alcohol dependence were four times more likely to
experience an anxiety disorder 6 years later (Kushner, Sher, & Erickson, 1999). Alcohol consumption may exacerbate anxiety symptoms given the social consequences and problems in daily function that typically accompany prolonged use along with an inability to engage in more effective coping skills (Smith & Randall, 2012). Alcohol use also involves physiological changes particularly in the form of withdrawal symptoms. It has been suggested that anxiety sensitivity intensifies withdrawal symptoms perhaps by increasing the magnitude or severity of these experiences as well as the intolerance of such a state (Stewart & Kushner, 2001), which, in turn, could result in greater anxiety.

Finally, the common factor model (Figure 1C) postulates that shared vulnerability factors, such as cognitive factors or neurobiological substrates, link together anxiety and alcohol use (Kushner, Abrams, & Borchardt, 2000). Anxiety sensitivity has been implicated as a common variable that functions to connect anxiety symptoms and alcohol use (Ruglass et al., 2014). Unfortunately, rigorous empirical examinations of the common factor model have remained

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**Figure 1.** Conceptual model. Self-medication hypothesis (A); substance-induced hypothesis (B); common factor model (C).
sparse (Smith & Randall, 2012), unlike the previous models described.

Overall, these etiological models provide varying explanations regarding the pathways by which anxiety sensitivity, anxiety symptoms, and alcohol use influence each other. Although all three models have some empirical support, with the bulk of research examining the self-medication and substance-induced hypotheses, further research is needed. A critique of the models and research examining the predictors of alcohol consumption has been that they have not fully accounted for contextual factors such as cultural norms or social interactions (Morris, Stewart, & Ham, 2005). Further, these mediator models have been examined primarily with non-Hispanic White populations and/or clinical samples. To date, minimal research has sought to establish these pathways with Latino adults. The examination of cultural variables within these mediational pathways will begin to address this limitation.

Acculturation

Like many other ethnic groups, Latinos have to navigate the demands and expectations of living in two or more cultures. The process of cultural adaptation has been generally referred to as acculturation, or the changes that take place when an individual comes into contact with various cultures (Berry, 2003). Acculturation is currently conceptualized as a bidimensional phenomenon, which takes into account an individual’s degree of reference to both the mainstream and traditional cultures. The extent to which an individual values establishing relationships with the mainstream U.S. culture is referred to as an Anglo orientation, whereas the importance of maintaining traditional Latino cultural customs and practices is termed Latino orientation, or at times enculturation (Berry, 2003; Cuéllar, Arnold, & Maldonado, 1995). Both dimensions function as independent but interrelated constructs. The relationship between acculturation and alcohol use has been widely examined among Latinos. For instance, the prevalence rates for alcohol abuse among U.S.-born Latinos are double, or higher, than that of their foreign-born counterparts (Alegria et al., 2007). More recent work with Latino adolescents and young adults indicated that adherence to the U.S. culture was associated with increased alcohol consumption (Schwartz et al., 2014), whereas a Latino cultural orientation was protective against the escalation of problematic drinking over time (Unger, Schwartz, Huh, Soto, & Baezconde-Garbanati, 2014). Still some research has reported no statistically significant associations between acculturation and alcohol use (Blume, Resor, Villanueva, & Braddy, 2009).

Minimal research exists examining acculturation and anxiety sensitivity, but it is plausible to postulate that an individual’s fear of anxiety symptoms and corresponding behaviors may be influenced by their adherence to cultural practices. The method by which individuals communicate psychological pain, or idioms of distress, is a culturally sanctioned process and can be determined by cultural contact (Torres, 2010), which may help to explain why Latinos tend to report more somatic symptoms when compared with non-Hispanic Whites (Varela & Hensley-Maloney, 2009). Among a group of Latino adults, somatic symptoms were positively correlated with Latino orientation but not associated with Anglo orientation (Alamilla, Kim, & Lam, 2010). In contrast, reports from an epidemiological study with Latinos indicated that greater acculturation, as measured by nativity status and life span in the United States, was associated with increased physical symptoms (Bauer, Chen, & Alegría, 2012). Despite some of the inconsistencies, the role of acculturation is particularly relevant for Latinos given that anxiety sensitivity, which includes fear of somatic or physical sensations, may be a culprit for further psychological problems including anxiety symptoms and alcohol use.

The relationship between acculturation and anxiety remain equivocal. Some research shows that the Latino prevalence rates for anxiety disorders increase with more exposure to the U.S. culture (Alderete, Vega, Kolody, & Aguilar-Gaxiola, 2000). In contrast, a meta-analysis examining the relationship between acculturation and mental health, including anxiety, across ethnic groups found that an orientation to the U.S. mainstream was significantly and negatively associated with anxiety symptoms. However, maintenance of the traditional culture showed a positive relationship with anxiety symptoms (Yoon et al., 2013). Yet other work with Latino adults indicated that acculturation, measured bidimensionally, did not function as a
significant risk factor for the occurrence of anxiety disorders (Alegria et al., 2007).

As noted previously, U.S.-born Latinos report worse psychological outcomes than their immigrant counterparts, a phenomenon often referred to as the immigrant paradox. Exposure to the mainstream U.S. culture has been thought to be associated with mental health declines while maintenance of the traditional Latino culture has been posited to serve a protective function (Alegria et al., 2007; Lara, Gamboa, Kahramanian, Morales, & Bautista, 2005). The cultural buffer hypothesis suggests that aspects of the traditional Latino culture may safeguard individuals from the circumstances that result in poor mental health but erode with increased adaptation to the mainstream (Horevitz & Organista, 2013; Hovey, 2000). Still, the mechanisms that lead to psychological problems is rather complex and may not be captured by a direct examination of the influence of acculturation on mental health, as is evidenced by the inconsistencies in the empirical literature. As such, it has been suggested that taking an expanded view of acculturation and examining it as a proximal variable within a broader framework may provide added insight into how the adaptation process contributes to Latino mental health (Horevitz & Organista, 2013; Torres, Driscoll, & Voell, 2012).

The purpose of the current study was to examine three moderated mediational models separately (see Figure 1) that attempt to explain the relationship between anxiety sensitivity, anxiety symptoms, and alcohol use among Latino adults (i.e., self-medication hypothesis, substance-induced hypothesis, common factor model) while considering acculturation, in the form of Anglo and Latino orientations, as a moderator within the mediational pathways. To limit the number of models to be tested, Anglo and Latino orientation were proposed to moderate the predictor–mediator link in each analysis. It was expected that Anglo orientation would serve to exacerbate the indirect effects while Latino orientation would act as a buffer. To evaluate the moderated mediational models proposed, the present study investigated conditional indirect effects that analyze the ability of a moderator to influence mediational pathways (Hayes, 2013; Preacher, Rucker, & Hayes, 2007). The analyses for conditional indirect effects controlled for gender and annual household income as covariates.

Method

Participants

There were 120 adult Latino participants from a moderately sized Midwestern city. The average age of the participants was approximately 41 years ($SD = 15.30$, range $= 18–75$). Majority of the participants were female ($n = 81; 68\%$) and identified being of Mexican origin (i.e., Mexican, Mexican American, or Chicano, $n = 111; 93\%$). Approximately half of the sample endorsed being born in a foreign country ($n = 59; 49\%$) and reported living in the United States for an average of 32.80 years ($SD = 18.86$, range $= 0–75$). The other half of the sample indicated being born in the United States ($n = 59; 49\%$). The median household annual income reported was between $20,000 and $50,000 ($n = 50; 42\%$) followed by $0–$20,000 ($n = 44; 37\%$) and over $50,000 ($n = 21; 18\%$). Almost one fourth ($n = 29; 24\%$) of the sample reported having some to no high school education. Thirty-four (28\%) of the participants reported having a high school degree or GED, and a majority of the participants ($n = 57; 48\%$) reported attending some college, a bachelor’s, or graduate degree.

Procedure

Appropriate approval was obtained from the affiliated institution’s Institute Review Board. Participants were recruited from local events and organizations that served the Latino community. Individuals received a brief summary of the procedures of the study and gave verbal informed consent. They then completed a packet of paper-and-pencil questionnaires that were available in both English and Spanish. Sixty-eight (57\%) participants completed the surveys in English, and 52 (43\%) completed the surveys in Spanish. To ensure privacy and confidentiality, responses were completely anonymous. The study took approximately 30 to 45 min to complete. Trained bilingual research assistants were available to answer questions the participants had about the survey packets. After completion of the surveys, participants received a list of mental health services and a $10 gift card as compensation for their time.
Measures

Anxiety sensitivity. The Anxiety Sensitivity Index—Third Edition (ASI-3; Peterson & Reiss, 1992; Taylor et al., 2007) is an 18-item self-report measure that evaluates one’s fear of bodily sensations or behaviors that typically occur with anxiety. The measure was developed in English and Spanish for both clinical and nonclinical samples. In addition to a composite score, the ASI contains three subscale scores of physical, cognitive, and social concerns to capture the multiple facets of anxiety sensitivity (Taylor et al., 2007). The physical subscale contains items that target the belief that physical symptoms will lead to severe illness. The cognitive subscale contains items that examine the fear that a lack of control over one’s thoughts will lead to insanity, and lastly, the social subscale contains items regarding the fear that one will be socially rejected if others see one’s symptoms of anxiety. Items from each subscale include, “When my stomach is upset, I worry that I might be seriously ill” (physical), “When my thoughts seem to speed up, I worry that I might be going crazy” (cognitive), and “I worry that other people will notice my anxiety” (social). Participants must rate how often they experience the item on a five-point Likert scale from 0 very little to 4 very much. A total summary score is computed ranging from 0 to 72 with higher scores indicating higher levels of anxiety sensitivity. The ASI has good internal consistency, and construct (Kemper, Lutz, Bähr, Rüddel, & Hock, 2012), factorial, convergent, discriminant, and criterion-related validity (Taylor et al., 2007; Wheaton, Deacon, McGrath, Berman, & Abramowitz, 2012). Specifically, the Spanish version of the ASI-3 was developed with a sample from Mexico and Spain (Taylor et al., 2007). In addition, the ASI-3 upheld its sound psychometric standards in a separate review by Sandin, Valiente, Chorot, and Santed (2007). The Cronbach’s alpha for the total ASI composite score was 0.96 (English α = .96, Spanish α = .96).

Anxiety symptoms. The Self-Rating Anxiety Scale (SAS; Zung, 1971) is a 20-item self-report questionnaire developed with the diagnostic criteria of anxiety disorders in mind and focus on various symptoms of anxiety. Sample items include, “I feel more nervous and anxious than usual” and “I feel afraid for no reason at all.” Participants must report how often they have felt these symptoms in the past week on a 4-point Likert scale from 1 none or a little of the time to 4 most or all of the time. Five of the items (5, 9, 13, 17, and 19) are reverse scored. A composite anxiety score is calculated by summing all 20 items. Total composite scores can range from 0 to 80 with higher scores indicating more anxiety symptoms. Olatunji, Deacon, Abramowitz, and Tolin (2006) separately reviewed the SAS with two nonclinical samples and reported good reliability and convergent validity. Wilkinson and colleagues (2014) used an English and Spanish version of the SAS with a Mexican American sample and reported a Cronbach’s alpha of 0.83. The Cronbach’s alpha for the current study was 0.87 (English α = .89, Spanish α = .83).

Alcohol use. The Alcohol Use Disorders Identification Test (AUDIT; Babor, de la de la Fuente, Saunders, & Grant, 1989) is a 10-item self-report questionnaire that was developed by six countries affiliated with the World Health Organization (WHO) to screen for alcohol use related problems. The survey screens for hazardous alcohol use, dependence symptoms, and harmful alcohol use. Therefore, response scales vary across items. Question 1 asks participants to identify how often they consume alcohol weekly on a 5-point scale from 0 (never) to 4 (or more times each week). Question 2 specifies if the participant is drinking, what quantity does the person consume that day on a 5-point scale from 0 (1 or 2) to 4 (10 or more). Questions 3–8 ask different questions regarding how often the person endorses a particular behavior related to alcohol use on a 5-point scale from 0 (never) to 4 (daily or almost daily). Last, Questions 9–10 ask content regarding annual alcohol use where the responses are 0 (no), 2 (Yes, but not in the last year), and 4 (Yes, during the last year). A total score is summed that can range from 0 to 40, where higher scores indicate higher alcohol use. Typically, scores from 8–15 indicate there are moderate problems regarding alcohol use, scores 16 and above are considered high levels of alcohol abuse, and scores of 20 or above indicate potential alcohol dependence problems (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). Many researchers continue to use the AUDIT across languages and countries, and several report sound psychometric properties of the AUDIT (Babor et al., 1989; de Meneses-
participants indicated some anxiety symptoms (M = 34.16), but the scores were consistent with past studies (M = 33.09; Olatunji et al., 2006). Anxiety symptoms were significantly and positively associated with both anxiety sensitivity and alcohol use. Still, the AUDIT mean scores for the current study (M = 3.59) were well below the clinical cut-off of 20 or higher suggesting that participants reported minimal use of alcohol. In terms of cultural orientation, respondent mean scores suggested moderate to high levels of both the Anglo and Latino orientation scales (M = 3.64, M = 3.79, respectively), which is similar to previous reports (Anglo M = 3.42, Latino M = 3.83; Torres et al., 2012). Anglo orientation was negatively correlated to Latino orientation.

Independent samples t tests were conducted to examine mean differences based on gender, nativity status, and language of survey for all the variables of interests. These analyses indicated a significant gender variation in which women scored higher than men on the Latino orientation scale (M = 3.92, SD = .90; M = 3.50, SD = .95) respectively; t(113) = −2.26, p = .03, but reported less alcohol use than men (M = 2.15, SD = 3.77; M = 6.77, SD = 9.57), respectively; t(114) = 3.74, p < .001. In terms of nativity status, foreign-born Latinos indicated higher Latino orientation when compared with U.S.-born individuals (M = 4.23, SD = .71; M = 3.34, SD = .90), respectively; t(114) = 5.911, p < .001, but, as expected, scored lower than U.S.-born Latinos on Anglo orientation (M = 3.18, SD = 1.00; M = 4.07, SD = .68), respectively; t(114) = −5.59, p < .001. For language chosen to complete the survey, English respondents scored higher on Anglo orientation when compared with Spanish

Results

Descriptive Analyses

Table 1 shows the descriptive statistics of the main study variables. Preliminary analyses revealed that the mean ASI-3 scores (M = 23.27) were higher than those previously reported among nonclinical samples of individuals from Mexico (M = 15.2) and Spain (M = 14.2; Taylor et al., 2007). According to the SAS, participants indicated some anxiety symptoms

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<th>Table 1</th>
<th>Correlations and Means of Study Variables</th>
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<td>1. Anxiety sensitivity</td>
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<td>3. Latino orientation</td>
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<td>5. Alcohol use</td>
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|M | 23.27 | 3.64 | 3.79 | 34.16 | 3.59 |
|SD| 18.94 | .96 | .92 | 10.09 | 6.37 |

Range: 0–68 1–5 1–5 20–80 0–40

†p < .10. *p < .05. ***p < .001.
respondents ($M = 4.07, SD = .68; M = 3.08, SD = .99$), respectively; $t(116) = 6.45, p < .001$, but reported lower Latino orientation ($M = 3.45, SD = .93; M = 4.23, SD = .71$), respectively; $t(116) = -5.00, p < .001$. A one-way analysis of variance was conducted to determine if any variations emerged across levels of annual household income. This analysis revealed significant differences for anxiety sensitivity, $F(2, 112) = 4.78, p = .01$, and anxiety symptoms, $F(2, 109) = 6.28, p = .003$. Post hoc tests indicated that individuals earning less than $20,000 reported higher anxiety sensitivity than those with an income of $50,000 or more. In terms of anxiety symptoms, participants with an income of $20,000 or less scored higher on the SAS than individuals in the other income groups. As mentioned earlier, gender and annual household income were entered as covariates in the major analyses.

Moderated Mediation Analyses

The test of moderated mediation was conducted via PROCESS and the procedures outlined by Hayes (2013, 2015). These techniques assess conditional indirect effects via bootstrapping, a resampling procedure which has been shown to effectively control Type I error rates while avoiding the assumptions of normality (Preacher & Hayes, 2008). Furthermore, this statistical method has been thought to be more effective than structural equation modeling when smaller samples are used (Hayes, 2013). As a resampling procedure, bootstrapping takes a large number of samples, 10,000 in the current study, and calculates the indirect effect for each, thus, creating 95% confidence intervals. Statistically significant indirect effects, at $p < .05$, are determined when the confidence intervals do not include the value of zero. More recently, Hayes (2015) introduced the index of moderated mediation as a formal measure to determine if the overall moderated mediational model is statistically different from zero.

Self-Medication Hypothesis

The first analysis examined the ability of anxiety symptoms to mediate the relationship between anxiety sensitivity and alcohol use with Anglo orientation moderating anxiety sensitivity–anxiety symptoms. The results showed that anxiety sensitivity was associated with anxiety symptoms which, in turn, were related to alcohol use (see Table 2). The interaction term of Anglo orientation × Anxiety sensitivity was a significant predictor of anxiety symptoms providing evidence for conditional indirect effects. The Index of Moderated Mediation and corresponding 95% confidence intervals suggest that this model is statistically significant and differ-

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Outcome – Alcohol use

$R^2 = .19, F(4, 102) = 5.88, p < .001$

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**Table 2**

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<td>R2 = .30, F(5, 101) = 8.80, p &lt; .001</td>
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<td>Predictor: Anxiety sensitivity</td>
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<td>Moderator: Anglo orientation</td>
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<td>Interaction: Anxiety sensitivity × Anglo orientation</td>
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**Note.** Gender and annual household income were covaried in all analyses. CI = confidence interval.

*p < .05. **p < .01. ***p < .001.
ent from zero (index = −.02, SE = .02; 95% CI = −.07, −.003). The conditional indirect effects were examined at three levels of the moderator (1 SD below the mean, at the mean, and 1 SD above the mean) with the strongest effect observed at low levels of Anglo orientation. For high levels of Anglo orientation, the 95% confidence intervals did include the value zero suggesting that the conditional indirect effect was not significant at one SD above the mean. Figure 2 shows the interaction effect of Anxiety sensitivity × Anglo orientation on anxiety symptoms and illustrates that the combination of low Anglo orientation and high anxiety sensitivity is associated with greater anxiety symptoms when compared with high Anglo orientation. These results provide support for the self-medication hypothesis which was most salient for those at low levels of Anglo orientation.

A second moderated mediational analysis was conducted testing Latino orientation as the moderator in the anxiety sensitivity–anxiety symptoms link. The results indicated nonsignificant conditional indirect effects (index = .001, SE = .02; 95% CI = −.03, .03). In other words, the model proposing that anxiety symptoms mediates the relationship between anxiety sensitivity and alcohol use, which is further dependent on the level of Latino orientation, was not supported by the current analyses.1

Substance-Induced Hypothesis

Another set of analyses examined the pathway in which alcohol use mediated the relationship between anxiety sensitivity and anxiety symptoms. Anglo and Latino orientation were tested as moderators at the anxiety sensitivity–alcohol use link. The analyses revealed nonsignificant findings for both Anglo orientation (index = −.007, SE = .01; 95% CI = −.04, .01) and Latino orientation (index = −.007, SE = .02; 95% CI = −.05, .03) as moderators. As such, the lack of significant conditional indirect effects indicates that the substance-induced hypothesis was not supported by the current findings.

Common Factor Model

Finally, analyses were conducted to determine if anxiety sensitivity mediated the relationship between anxiety symptoms and alcohol use with acculturation as a moderator at the anxiety symptoms–anxiety sensitivity link. The results revealed nonsignificant findings for both Anglo orientation (index = .008, SE = .01; 95% CI = −.01, .05) and Latino orientation (index = −.003, SE = .01; 95% CI = −.04, .01). Thus, no significant conditional indirect effects were observed to support the common factor model.

Discussion

The current study sought to investigate the relationships between anxiety sensitivity, anxiety symptoms, and alcohol use among Latino adults. The present study also examined the role of acculturation within three moderated mediational models derived from the empirical literature. These etiological models described different pathways by which anxiety sensitivity, anxiety symptoms, and alcohol use could be associated with one another. An examination of alternative theoretical models advances the field by providing insight into the mechanisms and cultural factors that contribute to the mental health of Latino adults. Overall, the major findings provided support for the self-medication hypothesis in that anxiety sensitivity was associated with anxiety symptoms, which was, in turn, related to alcohol use. Anglo orientation served to moderate the relationship between anxiety sensitivity and anxiety symptoms such that low levels exacerbated the mediational pathway. Taken together, anxiety sensitivity appears to be connected to increased alcohol use via the experience of anxiety symptoms, which is worsened when Latinos report low levels of adherence to the U.S. mainstream culture. These results implicate the role of anxiety sensitivity as a potential precursor to psychological problems and highlight the importance of taking into account the influence of acculturation.

1 Simple mediation analyses were conducted testing the three etiological models. As in the moderated mediational analyses, support was observed for the self-medication hypothesis (indirect effect = .05, Boot SE = .02, 95% CI = .02, .20) but not for the substance-induced hypothesis (indirect effect = .01, Boot SE = .02, 95% CI = −.02, .04) or the common factor model (indirect effect = −.02, Boot SE = .03, 95% CI = −.07, .03).
As mentioned previously, anxiety sensitivity is thought to amplify symptoms of anxiety (Naragon-Gainey, 2010). As such, individuals with high anxiety sensitivity may be more responsive to the dampening effects of alcohol (DeMartini & Carey, 2011). Alcohol use is then reinforced as a method of coping with reducing anxiety and other distressing internal sensations. Among Latinos, the anxiety sensitivity–anxiety symptoms–alcohol use pathway appears to be more robust for those who have lower levels of Anglo orientation, thus, placing them at risk. These findings are in contrast to the study hypothesis which, based on the broader empirical literature on Latino mental health, predicted worse outcomes for high Anglo orientation while protective effects with Latino orientation. Given that language preference is a major indicator of acculturation, as in the current study, it could be the case that a reduced English fluency impacts an individual’s ability to effectively manage a fear of physical sensations and/or to find ways of decreasing anxiety beyond alcohol consumption. At a basic level, greater acculturation may allow for the acquisition of critical language skills that facilitate negotiating key life demands within the mainstream context thus resulting in less stress and/or anxiety (Yoon et al., 2013).

Similar to the current findings, past research with Asian American college students indicated that low Anglo orientation was associated with psychological distress whereas orientation toward the traditional culture was not related to mental health (Hwang & Ting, 2008). In their meta-analysis, Yoon and colleagues (2013) reported that decreased adherence to the mainstream culture was associated with increased anxiety symptoms. As such, the capacity to engage in successful person-environment interactions within the mainstream society may contribute to one’s psychological health (Ryder, Alden, & Paulhus, 2000). Exposure to the U.S. culture may provide individuals alternative resources or cop-

![Figure 2. Interaction effect of anxiety sensitivity (ASI) and Anglo orientation (AOS) on anxiety symptoms (SAS).](image-url)
As Anglo orientation increases, individuals may become more adept at managing the pressures from the mainstream U.S. environment, which could reduce the frequency of anxiety events and instances of anxiety sensitivity. It could also be the case that the form in which an individual communicates emotional pain changes with continued intergroup contact so that it is more consistent with mainstream idioms of distress.

The current findings revealed that acculturation was not directly associated with alcohol use, which is consistent with previous work (Blume et al., 2009). Given the discrepancies in the empirical literature regarding the role of cultural factors on alcohol use, it could be the case that acculturation’s influence on alcohol consumption is better conceptualized as a distal factor in the overall model thus having more of an influence on the precursor variables. The nonsignificant findings with Latino orientation as a moderator signal that the dimensions of acculturation may influence different aspects of well-being, and their contribution may depend on the specific mental health outcome. For instance, although Yoon and colleagues (2013) found evidence for the relationship between adherence to the traditional culture and increased anxiety, they also concluded that enculturation may be more strongly associated with positive mental health factors (i.e., self-esteem, life satisfaction).

Alternative models that explain the relationships between anxiety sensitivity, anxiety symptoms, and alcohol use (i.e., substance-induced hypothesis, common factor model) were not supported by the current findings. Instead, the pattern of results suggests that anxiety sensitivity and anxiety symptoms contribute to increased alcohol use especially for individuals with a low Anglo orientation. The onset and maintenance of these conditions may involve different processes. That is, it has been suggested that, once established, the connection between anxiety sensitivity, anxiety symptoms, and alcohol use “become intertwined in a reciprocal, perpetuating cycle” (Smith & Randall, 2012, p. 419). Such a positive feedback loop can result in one set of symptoms worsening a latter condition, which, in turn, influences the former. For example, an individual who drinks alcohol to cope with anxiety symptoms may experience negative physiological changes associated with substance use (e.g., withdrawal), which, in turn, further strengthens the initial anxiety sensitivity resulting in greater anxiety symptoms and alcohol use. This vicious cycle can significantly increase the severity and chronicity of these mental health problems as well as influence the treatment response (Smith & Randall, 2012).

There are several limitations of the current study that should be noted. First, the correlational nature of the methodology makes it difficult to determine causality regarding the mediational pathways discussed. The most effective way to establish causal relationships would be through longitudinal research. Future research should seek to employ prospective methods in order to examine how these variables are temporally associated. This is particularly salient when examining acculturation which, by definition, involves a change process initiated by contact with multiple cultural groups. Unfortunately, acculturation is often assessed in a cross-sectional manner that minimizes the ability to measure variations across time in the adaptation process. The measure of acculturation in the current study assessed primarily language preferences and did not take into account cultural values or identity, which are key aspects of cultural adaptation. Longitudinal work is well suited to test competing theoretical models whereas the current study was restricted to using the cross-sectional data to assess the same constructs across models. Second, some of the sample characteristics may restrict the generalizability of the major findings. For instance, the relatively small sample size means that further research should seek to replicate the current findings. Although individuals of Mexican-descent constitute the largest Latino subgroup, the fact that the current sample identified primarily as Mexican or Mexican American constrains the ability to apply these results to the broader Latino community. Another potentially unique feature is that the participants reported a relatively high education level and minimal amounts of alcohol use, which may set them apart from other Latino groups. As such, further empirical work should seek to test these etiological
models among Latinos with diagnosable alcohol abuse conditions. Finally, the use of self-report measures is vulnerable to memory bias and social desirability. For instance, it could be the case that reports of drinking behaviors are an underestimate given the potential social stigma for endorsing problematic alcohol use.

In terms of theoretical implications, the findings of the current study provide pertinent information regarding the mechanisms by which anxiety sensitivity contributes to alcohol consumption among Latino adults. Furthermore, this research provides evidence for a moderated mediational model that incorporates cultural variables. Future research with Latinos should integrate cultural processes to augment the explanatory and predictive power of the models of interest. Practical implications are suggested by the present results. That is, clinicians working with Latino adults experiencing alcohol use and/or anxiety problems should seek to address the fear of internal sensations, or anxiety sensitivity, as a potential antecedent.

Abstracto

Aunque los síntomas de ansiedad y el consumo de alcohol han sido ampliamente investigados, reciente interés ha aumentado con respecto a cómo la sensibilidad a la ansiedad contribuye a estos indicadores de salud mental. Desafortunadamente muy pocas investigaciones han examinado las relaciones entre sensibilidad a la ansiedad, los síntomas de ansiedad, y el consumo de alcohol en latinos y mucho menos han incorporado aculturación. En este estudio con 120 adultos latinos, los análisis de mediación moderada revelaron efectos indirectos condicionales de tal manera que los síntomas de ansiedad sirvieron de variable mediadora entre la sensibilidad a la ansiedad y el consumo de alcohol, mientras que una orientación anglo moderó la sensibilidad a la ansiedad para vincular los síntomas de ansiedad. Los principales resultados indican que los efectos indirectos fueron determinantes dentro de la orientación anglo baja. Modelos alternativos fueron evaluados sin efectos significativos. Los resultados eran indicativos de la hipótesis de la automedicación. El análisis destaca las implicaciones teóricas y prácticas.

References


ANXIETY SENSITIVITY AND LATINO ALCOHOL USE


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