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Moderating Influence of Enculturation on the Relations Between Minority Stressors and Physical Health via Anxiety in Latinx Immigrants

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Objectives: The Latinx population in the United States has grown rapidly, now standing at over 56 million people. Discrimination and acculturative stress have been found to affect the mental and physical health of Latinx immigrants, yet enculturation has been identified as an important cultural strength for this population. The purpose of this study was to examine the relations among minority stressors, anxiety, and physical health in a sample of Latinx immigrants living in the United States. A secondary aim was to examine whether the direct and indirect effects among these variables were moderated by enculturation (i.e., moderated mediation). ***Method:*** A community sample of 202 Latinx immigrants completed questionnaires measuring these constructs. ***Results:*** Both acculturative stress ($b = -1.68$, $p < .001$) and discrimination ($b = -1.69$, $p < .001$) yielded direct effects on physical health, as well as indirect effects ($b = -.10$, 95% confidence interval [−.23, −.01]; $b = -.21$, 95% confidence interval [−.40, −.08], respectively) through anxiety. ***Conclusions:*** Psychologists and allied health care providers are recommended to assess for the impact of minority stressors on anxiety and physical health when providing care to Latinx immigrants. Future intervention research targeting Latinx mental and physical health can consider ways to include innate cultural strengths like enculturation and partner with Latinx cultural centers, churches, and local communities to make enculturation more salient.

Public Significance Statement
Latinx immigrants living in the United States experience daily discrimination and acculturative stress related to navigating a different country's customs. This study found that in Latinx immigrants, discrimination and acculturative stress were associated with physical health through their effects on anxiety. The more that Latinx immigrants adhered to the cultural customs of their country of origin (enculturation), the less that these stressors impacted anxiety and health. Mental health professionals and health care providers are encouraged to assess for discrimination experiences and acculturative stress when providing treatment to Latinx immigrants.

Keywords: Latin immigration, anxiety, physical health, enculturation

Latinxs account for more of the overall population growth in the United States than any other race or ethnicity (Krogstad, 2017; Taylor, Lopez, Martínez, & Velasco, 2018). This growth is attributed to increased growth of Latinx immigration to the United States from Mexico, and Central and South America (Takeuchi, Alegría, Jackson, & Williams, 2007). Public opinion about immigration is polarizing, and recent sociopolitical events have exacerbated the divide (Valentino, Brader, & Jardina, 2013). For example, Arizona State Senate Bill 1070 (S.B. 1070, 2010) permitted police to check citizenship status of any individual suspected to reside in the United States illegally (Arizona State Senate, 2010). Current presidential promises to build a Mexican border wall, remove protection of immigrants in the Deferred Action for Childhood Arrivals program, and forcibly separate immigrant children from their parents (Dickerson, 2018) intensify anti-immigrant tensions (Zengerle, 2019). In part because of this sociopolitical tension, immigration to the United States can be a particularly stressful experience and may have health implications (Gerber, 2011; Nichols, LeBrón, & Pedraza, 2018). For example, Lopez et al. (2017) found a decline in Latinx health following immi-

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gration raids. Increases in anti-immigrant sentiment directed particularly toward Latinx immigrants may exacerbate the discrimination the community already experiences (Araújo Dawson & Panchanadeswaran, 2010).

The challenges experienced throughout the adjustment to or integration into a new host culture are defined as acculturative stress (Hovey, 2000). Caplan (2007) postulated three dimensions of acculturative stress as interrelated rather than discrete entities: instrumental/environmental stressors, social/interpersonal stressors, and societal stressors. Instrumental/environmental acculturative stress reflects difficulties in meeting day-to-day challenges including financial needs, language barriers, unsafe neighborhoods, unemployment, and dangerous working conditions. Changes in relationships, gender roles, behaviors, and cultural norms resulting from acculturation are examples of social/interpersonal acculturative stress (Caplan, 2007). Lastly, societal acculturative stress constitutes the experiences of stigma related to undocumented status (Caplan, 2007). These types of acculturative stress are specific to acculturation and require discrete changes in routine and meaningful adaptation (Turner & Wheaton, 1995). Typical acculturative stressors are rooted in navigating between two different cultures, as well as managing intercultural conflict and opposing cultural values/roles (Araújo Dawson & Panchanadeswaran, 2010). If an individual is unable to cope effectively with the chronic strain and negative experiences, the stress can affect psychological functioning (Lazarus & Folkman, 1984). As acculturative stress is a unique and excess stressor experienced by diverse immigrant groups often based in part on race or ethnicity, it is referred to as a minority stressor (Meyer, 2003).

A related construct to acculturative stress and another minority stressor is discrimination, which is typically defined as experiencing negative events based on group membership (Araújo Dawson & Panchanadeswaran, 2010). Approximately 50% of Latinx adults report discrimination as part of their daily experience and a lifetime discrimination exposure of 79.5% (Arellano-Morales et al., 2015; Pérez, Fortuna, & Alegria, 2008). Discrimination experienced by Latinxs can range from acute events, such as a hate crime, to daily microaggressions, such as differential treatment at grocery stores (Ryan, Gee, & Laflamme, 2006). Self-reported experiences of discrimination are psychosocial stressors that negatively impact mental and physical health in Latinxs (Lewis, Cogburn, & Williams, 2015). As a psychosocial stressor, discrimination triggers the sustained activation of stress responses including elevated blood pressure, increased heart rates and cortisol secretions that over time negatively affect health and increase vulnerability to physical illness (Pascoe & Smart Richman, 2009). Due to this increased vulnerability and the current lack of evidence supporting the impact of discrimination on health in Latinx immigrants, further investigation is warranted.

Given the prevalence of minority stressors, it is important to examine their impact on mental and physical health; further, it is possible that minority stressors affect physical health via mental health. Although this mediation has not been tested, prior work in Latinx immigrants has supported relations between (a) minority stressors and mental health, (b) minority stressors and physical health, and (c) mental health and physical health. Experiences of minority stressors vary across Latinx nationality and individuals, but their effects on mental health are fairly consistent. As anxiety is rooted in feelings of fear, and the process of adjusting to a new environment is often distressing, anxiety is a particularly relevant index of mental health to consider among immigrant Latinxs. In addition, many Latinx immigrants experience high levels of worry, stress, and fear, and for some this has been found to exacerbated by undocumented status and local immigration enforcement efforts (Perreira & Pedroza, 2019), positioning anxiety as a critical variable to consider in studies of Latinx immigrant experiences. Smart and Smart (1995) were among some of the first researchers who found that stress and anxiety can be acute at the beginning of the acculturation process in Mexican immigrants. Acculturative stress has since then been associated with a host of negative outcomes, such as endorsement of lifetime anxiety (Leong, Park, & Kalibatseva, 2013), marital distress (Negy, Hammons, Reig-Ferrer, & Carper, 2010), elevated prenatal maternal depression (D'Anna-Hernandez, Aleman, & Flores, 2015), alcohol and drug use in Latinx immigrants (Savage & Mezuk, 2014), and even auditory hallucinations among Latinxs wherein younger age at immigration increased psychotic risk (Devylder et al., 2013). Self-esteem has been shown to be negatively affected by acculturative stress, which, in turn, has been associated with decreased psychological well-being in Latinx immigrants (Leong et al., 2013). Low self-esteem has also been found to exacerbate the negative effect of acculturation stress on first-generation Mexican immigrants' psychological well-being (Kim, Hogge, & Salvisberg, 2014). As acculturative stress is associated with lifetime anxiety and overall wellbeing, the current study is investigating anxiety as a potentially important mediator of acculturative stressors' effects on physical health outcomes. With parallel effects to acculturative stress, discrimination has been related to psychological distress and overall stress in Latinxs (Araújo Dawson, 2009), anxiety and substance abuse in Mexican Americans (Finch, Kolody, & Vega, 2000), and psychological distress in Puerto Rican–born women (Bekteshi, van Hook, & Matthew, 2015). McLaughlin, Hatzenbuehler, and Keyes (2010) found discrimination was positively associated with depression, posttraumatic stress disorder and anxiety in Latinxs. Similarly, Leong et al. (2013) found a positive association between discrimination and depression/anxiety in Latinx immigrants. As many Latinx immigrants currently report experiencing fear related to deportation, state level restrictive immigrant integration policies, and overall negative public sentiment toward immigrants, the current study is investigating anxiety as an important mediator of discrimination's effects on health outcomes (Perreira & Pedroza, 2019).

Research on minority stressors and physical health among Latinx immigrants is sparse, yet several studies have found physical health to be negatively associated with acculturative stress (Caplan, 2007). Reduced physical health has been linked to legal status, language conflicts (Finch et al., 2000; Finch & Vega, 2003), preoccupation with disclosure and deportation (Cavazos-Rehg, Zayas, & Spitznagel, 2007), and acculturative stressors (Finch, Frank, & Vega, 2004). Linking a number of these constructs, one study found that acculturative stress mediated the relationship between discrimination and physical health (Finch, Hummer, Kol, & Vega, 2001). Molina et al. (2019) found discrimination was directly associated with poorer physical health related quality of life in Latinx living in the United States. Extremely limited research has studied conjointly both the mental and physical health of Latinx immigrants. Immigration-related stress has been associ-

ated with higher levels of psychological distress in Latinx immigrants, and unplanned migration has been associated with reduced physical health status (Torres & Wallace, 2013). Further, Dey and Lucas (2006) found that U.S.-born adults rated their mental and physical health more positively than Latinx immigrant adults. Variability among self-reported physical and mental health across Latinx generations and the limited work yielding support for aspects of the proposed mediation model provide rationale for the importance of examining whether acculturative stress and discrimination predict physical health via anxiety.

In addition to testing the processes underlying Latinx immigrants' physical health, it is also important to test factors that may buffer these negative relations, such as enculturation, which can be understood through the Hispanic paradox (Franzini, Ribble, & Keddie, 2001). Enculturation is defined as "the processes by which individuals are socialized to indigenous cultural norms, that is, values, behaviors, attitudes or worldviews" (Alamilla, Kim, & Lam, 2010, p. 57). Herskovits (1948) related enculturation as "the process of learning one's culture [. . .] which permits us to account for the fact that culture maintains a recognized form generation after generation" (p. 626). Acculturation, by comparison, is defined as the dual process of cultural and psychological change that takes place as a result of contact between two or more cultural groups and their individual members; acculturation incorporates involvement in the host culture's ideas and behaviors and enculturation consists of involvement in one's heritage culture's ideas and behaviors (Berry, 2005). This overall acculturation process is a crucial adaption for migration to a new sociocultural environment (Berry, 2005). Less acculturated immigrants appear to exhibit better health outcomes than more acculturated individuals (Dey & Lucas, 2006). Even though Latinxs rank low on most socioeconomic indexes, Latinxs' mortality and health outcomes are equal to or better than other ethnic groups in the United States, known as the Hispanic paradox (Borrell & Crawford, 2009; Markides & Coreil, 1986; Riosmena, Wong, & Palloni, 2013). This relatively low mortality rate in Latinx immigrants is longstanding and well documented (Hummer, Rogers, Nam, & LeClere, 1999). U.S.-born Whites and foreign-born Latinxs appear to exhibit similar health outcomes, while Latinxs born in the United States are at high risk for both psychological and medical concerns (Abraído-Lanza, Dohrenwend, Ng-Mak, & Turner, 1999; Borrell & Crawford, 2009; Teruya & Bazargan-Hejazi, 2013).

It is possible that a mechanism responsible for these disparate outcomes is enculturation, such that Latinx immigrants have higher levels of enculturation compared to U.S.-born Latinx individuals. Though paradoxical, Latinx immigrants of low socioeconomic status who are least likely to have health insurance and to experience acculturation and immigration stressors typically show better health compared to their U.S.-born counterparts (Jasso, Massey, Rosenzweig, & Smith, 2004). However, immigrant health advantages may occur because normally healthy individuals migrate to the United States, known as the migrant health selectivity (Crimmins, Kim, Alley, Karlamangla, & Seeman, 2007). These advantages may also be due simply to the underreporting of deaths among those who are undocumented (Franzini et al., 2001). Researchers also postulate that samples supporting the Hispanic paradox may only consider selective healthy groups, and therefore finding may not be representative of the wider Latinx population (Nalini-Junko, 2011). In general, the Hispanic paradox is inconsistent and variable (Teruya & Bazargan-Hejazi, 2013), and as such further investigation is warranted. One aim of the current study is the investigation of enculturation that may moderate (buffer) the meditational relationship between minority stressors, anxiety and Latinx immigrant physical health thereby providing greater insight into the Hispanic paradox.

Immigrants tend to identify with their ethnic culture more than their U.S.-born counterparts (Rumbaut, 1994), and this could be one possible source of the effects for the Hispanic paradox. Barrera, Gonzales, Lopez, and Fernandez (2004) found enculturation to be protective for Latinx adolescents due to social and familial support, traditional values, and a shared sense of ethnic connection. As Latinx immigrants remain more encultured they may be less vulnerable to minority stressors due to adherence to values that promote cohesiveness and support from family members or religious or spiritual orientations (Barrera et al., 2004). No prior work to our knowledge tested whether enculturation is protective in the associations between minority stressors and physical health via anxiety.

The dramatic increase in the size of the Latinx population in the United States, as well as the current sociopolitical climate, suggest a great need for targeted research on the unique experiences and challenges faced by immigrants including acculturative stress, discrimination, anxiety and physical health. Despite the research documenting the often bivariate connections among these constructs, no research to date has attempted to link this set of variables in a series of theoretical mediational chains, incorporating potential moderation effects (i.e., enculturation) consistent with theory underlying the Hispanic paradox. As a result, the primary aim of the current study was to examine the hypothesized mediational effect of anxiety on the hypothesized positive relationships between minority stressors and physical health among a sample of Latinx immigrants living in the United States. A secondary aim was to examine whether the direct and indirect (mediational) effects among these series of variables are moderated by enculturation (with a hypothesized attenuating effect), resulting in a moderated mediation. A visual model linking these variables and respective aims appears in Figure 1.

Method

Procedure and Participants

This study was approved by the host university's institutional review board. The study was conducted in a southeastern urban city and surrounding suburbs. Participants recruited for the study

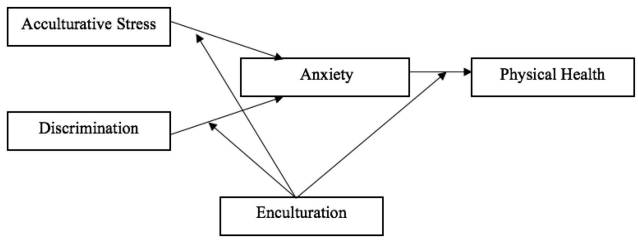

Figure 1. Relationships among minority stressors, anxiety, and physical health and these direct and indirect effects moderated by enculturation.

were first screened for eligibility criteria. Participants who met criteria were provided a consent form in Spanish for the survey. Upon completion of the consent form, participants completed the questionnaires and demographic information in a paper-and-pencil format. After completion of the survey, participants were paid an incentive of $5 cash.

An initial convenience community sample ($N = 207$) of participants was recruited from (and the study was conducted at) churches, restaurants, barber shops, primary care clinics, social service organizations, and Latinx sports associations, among other similar community organizations between 2015 and 2017. Participants were recruited, consented, and completed surveys at the same time, although research assistants returned to many of the sites more than once. Inclusion criteria included the following: (a) all participants must have been over the age of 18, (b) participants must have been born in Latin America (including Puerto Rico and Brazil); and (c) participants must have been able to read and write in Spanish via self-report. To ensure participants met these criteria, they were prescreened prior to beginning the informed consent. Of these initial 207 participants, five participants' data were removed from the database due to greater than 50% missingness. As a result, the final sample size was $N = 202$. For the measures in the study, the following numbers of participants were missing at least one item for each variable, respectively: anxiety (20), discrimination (38), acculturative stress (22), enculturation (zero), and general health (four).

The average age of the 202 participants was 36.62 ($SD = 12.47$). The age groupings suggest a diverse sample with respect to age, with 36.7% ages 18–30, 41.7% ages 31–45, and 17.1% ages 45–60, and 4.5% over age 61. In terms of gender, 63.9% were women, and 33.7% were men (gender data were missing from three participants). The average duration of participants living in the United States was 14.03 years ($SD = 11.95$), ranging from 1 to 65 years. Although the most common romantic relationship category was married (47.5%), there was also a diverse set of relationship statuses including single (31.7%), open unions (8.9%), and divorced (5.4%). The sample also tended to be on the lower-income spectrum with the majority of sample earning less than $15,000 per year (42.1%) and another quarter earning between $15,000 and $35,000 per year (25.7%). The range of educational attainment also varied substantially with the majority of the sample finishing primary or high school education (primary 21.8%, secondary 15.8%, GED 22.3%). Participants' levels of employment ranged from full time (37.1%) to part time (14.9%) to unemployed (10.4%), with approximately a fifth of the sample reporting homemaking (19.3%). Participants were from a diverse set of Spanish-speaking countries, with the largest representations from Mexico (28.2%), El Salvador (19.8%), Guatemala (14.9%), Honduras (9.4%), Dominican Republic (5.4%), Peru (3.4%), Colombia (2.9%), Nicaragua (2.5%), Bolivia (1.5%), and Cuba (1.5%), with the remaining 3.5% among Venezuela, Argentina, Brazil, and Paraguay.

Measures

All scales used in the current study had a Spanish version readily available, except for the Daily Life Experiences Scale, Religious Commitment Inventory, and the Riverside Acculturation Stress Inventory, which were translated into Spanish using Carter and Chapman's method (Chapman & Carter, 1979). This involved translation from English to Spanish by a bicultural and bilingual researcher and then back-translation into English by a second bicultural and bilingual researcher. Any discrepancies between the versions were mutually resolved through discussion by the research team.

Short-Form Health Survey (SF-36). The Spanish SF-36 is a short-form questionnaire for measuring general health concepts (Alonso, Prieto, & Antó, 1995). In the current study, the General Health subscale was used to tap physical health, and higher scores reflect greater health-related quality of life. Items include "In general, would you say your health is:" with responses range from excellent to poor and "I seem to get sick a little easier than other people" with responses ranging from definitely true to definitely false. Within a Latinx sample, the SF-36 General Health subscale has been found to have acceptable internal reliability with a Cronbach's $\alpha = .69$ (Augustovski, Lewin, Elorrio, & Rubinstein, 2008). Cronbach's $\alpha = .79$ for the General Health subscale of the SF-36 in the current sample.

Generalized Anxiety Disorder-7 (GAD-7). The Spanish GAD-7 is a seven-item anxiety module that scores a subset of the 13 *Diagnostic and Statistical Manual of Mental Disorders–IV* criteria (García-Campayo et al., 2010). Scoring in the current study used the mean of all items; higher mean scores indicate higher levels of anxiety in daily life. Items include "Feeling nervous, anxious or on edge" and "Not being able to stop or control worrying" with responses ranging from not at all to nearly every day. The GAD-7 has the following clinical cut-off scores: 5 = *mild anxiety*, 10 = *moderate anxiety*, and 15 = *severe anxiety* (Spitzer, Kroenke, Williams, & Löwe, 2006). Within a Latinx sample, the GAD-7 has been found to have excellent internal reliability with a Cronbach's $\alpha = .94$ (García-Campayo et al., 2010). The GAD-7 sensitivity was found to be 87% and specificity at 94%. Cronbach's $\alpha = .92$ for the total score of the GAD-7 in the current sample.

Bicultural Involvement Scale (BIS). The Spanish BIS measures biculturalism ranging from monoculturalism to biculturalism as well as cultural involvement ranging from cultural marginality to cultural involvement (Birman, 1998). Items include "How comfortable do you feel speaking Spanish at home?" with responses ranging from not at all comfortable to very comfortable as well as "How much do you like Latin music?" with responses range from not at all to very much. The BIS allows the calculation of both Hispancism and Americanism subscales. However, in the current study, enculturation is measured using the Hispanicism subscale of the BIS by taking the mean of the Hispanicism/Spanish items (Birman, 1998). Within a Latinx sample, the Hispanicism subscale of the BIS has been found to have excellent internal reliability with a Cronbach's $\alpha = .90$ (Birman, 1998). Cronbach's $\alpha = .85$ for the Enculturation subscale of the BIS in the current sample.

Riverside Acculturation Stress Inventory (RASI). The RASI measures acculturative stress through five domains of cultural challenges including work challenges, language skills, intercultural relations, discrimination, and cultural isolation (Benet-Martinez, 2003). The inventory is comprised of 15 items, and the total score was used for the current study with higher scores reflecting higher levels of acculturative stress. Items include "I feel that there are not enough Hispanic people in my living environment" and "I often feel misunderstood or limited in daily situations

because of my English skills" with responses ranging from strongly disagree to strongly agree. The RASI has been found to have good internal reliability with a Cronbach's $\alpha = .85$ (Miller, Kim, & Benet-Martínez, 2011). Cronbach's $\alpha = .88$ for the total score of the RASI in the current sample.

Daily Life Experiences Scale (DLE). The frequency of discriminatory experiences due to race was assessed with the Spanish DLE; a subscale of the Racism and Life Experience Scale (Mayoral, Underwood, Laca, & Mejía, 2013). The DLE assesses the frequency of daily hassles, and respondents indicate how often experiences occurred in the past year "because of your race." Items include "How many times have you been ignored, or overlooked (in a restaurant, store, etc.) because of your race?" and "How many times have you been excluded from conversations or activities because of your race?" with responses ranging from less than once a year to once a week or more. Total scores are calculated by averaging the item scores, with greater scores reflecting greater experiences of racism. The DLE has been found to have good internal reliability with a Cronbach's $\alpha = .75–.84$ (Evans, 2011). Cronbach's $\alpha = .94$ for the total score of the DLE in the current sample.

Results

Data Analysis Plan

Preliminary analyses. Prior to conducting the primary statistical analyses in line with the study's aims, descriptive statistics (i.e., means, standard deviations, frequencies, and percentages) of participants' discrimination, acculturative stress, anxiety, and physical health were computed. Based on the clinical cutoff scores empirically derived by scale developers, the percentages of participants that reported clinically significant scores on the anxiety subscales were reported.

Normality tests (i.e., skewness and kurtosis) were conducted to determine whether the scales were normally distributed. Critical values of 2.0 were used to identify variables that were skewed or kurtotic. Data were checked for multicollinearity via correlation coefficients among all independent variables (with a goal $r < .70$, tolerance <1, and variance inflation factor <2 among all predictors). To examine bivariate correlations among acculturative stress, discrimination, anxiety, physical health, and enculturation, a correlation matrix was created. A cutoff point of 3.0 was used to identify outliers by converting total scale scores to z scores. Missing data were imputed using the expectation maximization algorithm.

Mediational models. Two mediational models were developed using the PROCESS macro (Hayes, 2014) to examine direct and indirect effects using 5,000 bootstrap samples. In the first model, acculturative stress was specified to lead to anxiety symptoms, which were then specified to lead to physical health. This same statistical procedure was performed for discrimination as the initial predictor variable. Subsequently, these two mediational models were expanded to moderated mediations (producing two moderated mediation models) with the PROCESS macro with enculturation included as the moderator. To perform a moderated mediation in Model 59 of the PROCESS macro, the macro splits the data file into five groups at the 10th, 25th, 50th, 75th, and 90th percentiles of the moderator and runs the mediation separately for each of these groups. A clear moderated mediation occurs when there is a linear increase or decrease across the five groups in the magnitude of the b weight of the indirect effects and the indirect effects vacillate in statistical significance such that they become either statistically significant or nonsignificant (depending on the direction of the moderator's effect) at higher levels of the moderator.

Power Analysis

A power analysis was performed using G*Power 3.1 to provide an approximate estimate of power with the current sample size of 202 participants (with a regression containing five predictors and one criterion variable, the largest number of predictors in any regression in the PROCESS macro). With 80% power ($1 - \beta$), the sample of 202 participants generated enough power to uncover all large-sized, medium-sized, and small-sized effects $\geq f^2 = .07$.

Preliminary Analyses

Although primary study variables were below the 2.0 cutoff in terms of skewness, one variable was kurtotic: enculturation (2.77). Given that multivariate analyses, particularly with large sample sizes, are robust to moderate deviations from normality, it was decided to retain enculturation in its original form, particularly in an effort to enhance interpretability of the study's findings. Univariate outliers identified in the sample were few (approximately 1% or 2% of the total sample), and not very extreme (all below 5.0). All data analyzed were retained, consistent with recommendations by Cohen, Cohen, West, and Aiken (2003). In the correlation matrix (see Table 1), most of the variables were associated with each other as would be expected, yet none at a level that approached multicollinearity. However, enculturation was only correlated at a small-sized effect with anxiety and not with any other variables.

Table 1
Overall Correlation Matrix

Variable	1	2	3	4	*M*	*SD*	Range
1. Anxiety					4.61	5.11	0–21
2. Physical health	−.418**				62.64	21.85	10–100
3. Enculturation	−.190**	.131			52.76	8.45	12–60
4. Acculturative stress	.164*	−.216**	−.055		39.9	13.77	15–75
5. Discrimination	.243**	−.185**	−.105	.517**	20.56	10.22	9–65

Note. Because expectation maximization was used to impute missing data, the sample size of the data from which these values were calculated was $N = 202$.
* $p < .05$. ** $p < .01$.

The descriptive statistics (i.e., means and standard deviations) of participants' acculturative stress, discrimination, anxiety, physical health, and enculturation appear in Table 1. Based on the clinical cutoff item total of 5 for the GAD-7 (Spitzer et al., 2006) 37.75% of participants met or surpassed the threshold for clinically significant anxiety symptoms, with 22.10% of participants having mild symptoms (total score 5–9), 9% of participants having moderate symptoms (total score 10–14), and 7% of participants having severe symptoms (total score 15+).

Mediation Models

In the first mediation model, acculturative stress was specified to have a direct effect on physical health, as well as an indirect effect through anxiety symptoms. The direct path from acculturative stress to anxiety symptoms ($b = .06$, $p = .020$), as well as the direct path from anxiety to physical health ($b = -1.68$, $p < .001$) were statistically significant. Further, the indirect effect of acculturative stress on physical health through anxiety was statistically significant ($b = -.10$, 95% confidence interval [CI] [−.23, −.01]), indicating a partial mediation because the direct path from acculturative stress to physical health (c' path) was statistically significant in the model ($b = -.24$, $p = .020$). The overall model explained 19.7% of the variance in physical health.

In the second mediation model, discrimination was specified to have a direct effect on physical health, as well as indirect effect through anxiety symptoms. The direct path from discrimination to anxiety symptoms ($b = .12$, $p < .001$) as well as the direct path from anxiety to physical health ($b = -1.69$, $p < .001$) were statistically significant. The indirect effect of discrimination on physical health through anxiety was also statistically significant ($b = -.21$, 95% CI [−.40, −.08]), indicating a full mediation because the direct path from discrimination to physical health (c' path) was not statistically significant in the model ($b = -.19$, $p = .182$). The overall model explained 18.2% of the variance in physical health.

Moderated Mediation Models

Follow-up analyses were conducted to examine whether the two significant mediational models—(a) acculturative stress, anxiety, physical health and (b) discrimination, anxiety, physical health—found above were moderated by participants' level of enculturation. Thus, the two mediational models were each expanded to moderated mediations (producing two moderated mediation models) with PROCESS macro.

Acculturative stress. The first overall moderated mediation model with acculturative stress as the predictor and physical health as the criterion was significant, $F(5, 196) = 9.86$, $p < .001$, $R^2 = .201$. Within this model, there was a significant direct effect of acculturative stress on anxiety (a path) when enculturation and the interaction were included in the model ($b = .06$, $p = .031$). The acculturative stress x enculturation interaction with anxiety symptoms as the criterion variable was not significant ($b = .00$, $p = .316$). There was a significant direct effect of anxiety symptoms (b path) on physical health ($b = -1.63$, $p < .001$) when enculturation, acculturative stress, and the interactions were included in the model. Acculturative stress was significant (c' path) in this model ($b = -.23$, $p = .024$), although enculturation was not significant ($b = .14$, $p = .414$). With physical health as the criterion variable, the Anxiety × Enculturation interaction was not significant ($b = .00$, $p = .990$), nor was the Acculturative Stress × Enculturation interaction ($b = .01$, $p = .552$). This pattern of results suggested that none of the direct effects in the model were moderated by enculturation.

Indirect effects were calculated at different levels of the moderator (see Table 2). Anxiety was a significant mediator when enculturation was moderately low (25th percentile), but this effect progressively faded at higher levels (50th–90th percentile). Although the indirect effect was the largest at the 10th percentile of enculturation, it was not statistically significant, likely due to the wide CI. The linear decrease in the magnitude of the indirect effect at higher levels of enculturation reflected the presence of a moderated mediation or conditional indirect effect.

Discrimination. The second overall moderated mediation model with discrimination as the predictor and physical health as the criterion was significant, $F(5, 196) = 8.95$, $p < .001$, $R^2 = .186$. There was a significant direct effect of discrimination on anxiety (a path) when enculturation and the interaction were included in the model ($b = .10$, $p = .004$). The discrimination x enculturation interaction with anxiety symptoms as the criterion variable was not significant ($b = -.01$, $p = .053$). There was a direct effect of enculturation on anxiety symptoms ($b = -.10$, $p = .016$). There was also a direct effect of anxiety symptoms (b path) on physical health ($b = -1.63$, $p < .001$) when enculturation, discrimination, and the interactions were included in the model. Discrimination was not significant (c' path) in predicting physical health ($b = -.17$, $p = .241$), nor was enculturation ($b = .13$, $p = .455$). The Anxiety × Enculturation interaction was not significant ($b = .00$, $p = .914$), nor was the Discrimination × Enculturation interaction ($b = .01$, $p = .552$). This pattern of results suggested that none of the direct effects in the model were moderated by enculturation.

As before, indirect effects were calculated at different levels of the moderator (see Table 3). Anxiety was a significant mediator when enculturation was low or moderate (10th–50th percentile), but this effect progressively faded in magnitude and statistical significance at higher levels (75th–90th percentile). The linear decrease in the magnitude of the indirect effect at higher levels of enculturation again reflected the presence of a moderated mediation or conditional indirect effect.

Table 2
Conditional Indirect Effects of Acculturative Stress on Physical Health via Anxiety at Levels of Enculturation (N = 202)

Enculturation percentile range	Effect	Estimate (*SE*)	95% Bias-corrected bootstrap confidence interval
10th	−.15	.10	[−.41, .00]
25th	−.11[a]	.06	[−.25, −.01]
50th	−.08	.05	[−.20, .01]
75th	−.06	.07	[−.19, .07]
90th	−.06	.07	[−.19, .07]

[a] Effects are considered statistically significant if the 95% bias-corrected bootstrap confidence interval does not encapsulate zero.

Table 3
Conditional Indirect Effects of Discrimination on Physical Health via Anxiety at Levels of Enculturation (N = 202)

Enculturation percentile range	Effect	Estimate (*SE*)	95% Bias-corrected bootstrap confidence interval
10th	−.30[a]	.18	[−.79, −.06]
25th	−.20[a]	.09	[−.41, −.07]
50th	−.14[a]	.07	[−.29, −.03]
75th	.08	.07	[−.26, .02]
90th	.08	.07	[−.27, .02]

[a] Effects are considered statistically significant if the 95% bias-corrected bootstrap confidence interval does not encapsulate zero.

Discussion

The purpose of this study was to examine the relations between minority stressors and physical health via anxiety, as well as potential moderation effects of enculturation, among a sample of Latinx immigrants living in the United States. Previous research has documented associations between some of these constructs, yet no research to date has investigated the links between these variables in a series of mediation and moderation effects. The community sample was diverse across country of origin, age, marital status, and employment. Both acculturative stress and discrimination yielded direct effects on physical health, as well as indirect effects through anxiety. Higher levels of enculturation weakened both of these indirect effects, reflecting moderated mediations.

In the current study, 37.75% of the sample reported clinically significant levels of anxiety. Compared to a previous study, the rates were a bit higher than previously found among Latinxs in the United States (Alegría et al., 2008). Despite the clinically significant levels, approximately 22% of the sample reported mild symptoms. Approximately, 16% of the sample reported symptom severity necessitating a mental health intervention. This percentage of participants is similar to previously reported levels of anxiety (Alegría et al., 2008). Despite the potentially high-risk nature of this sample, the levels of self-reported mental health problems were quite similar to previous studies on Latinx immigrants. Participants in the current study reported lower health-related quality of life compared to the original scale validation sample of patients from health clinics in the United States with minor medical conditions (McHorney, Ware, & Raczek, 1993), as well as lower than the mean from a sample of patients in a university-based ambulatory center in Buenos Aires, Argentina (Augustovski et al., 2008).

Conversely, participants in the current study reported higher levels of enculturation than the mean from the original validation sample of Latinx adolescents (Birman, 1998), which would be expected given the immigrant status of the current sample. They also reported slightly lower rates of discrimination than some other marginalized groups. As compared to a sample of lesbian, gay, bisexual, transgender, and queer people of color that also assessed discrimination with the DLE, the current study reported slightly lower rates of racial/ethnic discrimination (Sutter & Perrin, 2016). Acculturative stress in the current sample was measured by the RASI, and the original sample of Chinese Americans living in the United States did not report average total scores. The RASI is measured using a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). On average, the current sample reported a score of 2.67 which falls in the agree to neutral (moderate) range.

An inverse association between anxiety and physical health was consistent with previous national Latinx immigrant research (Torres & Wallace, 2013). This finding is also similar to Ortega, Feldman, Canino, Steinman, and Alegría's (2006) study that found anxiety was associated with diabetes and cardiovascular disease in Latinx immigrants. Acculturative stress and anxiety were positively related, which was similar to Leong et al.'s (2013) finding of acculturative stress' association with lifetime anxiety. Discrimination and acculturative stress were both found to be negatively associated with physical health, which is congruent with previous literature (Flores, Tschann, Dimas, Pasch, & de Groat, 2010). Finch et al. (2004) found that acculturative stress has a negative effect on self-reported health. Enculturation was negatively correlated with anxiety in the current study, which is in the opposite direction as the effect found in Alamilla et al.'s (2010) study of Latinx adolescent mental health.

The first mediational model investigated the relationships between acculturative stress and physical health via anxiety. Anxiety symptoms partially mediated the relationship between acculturative stress and physical health. Our findings were similar to previous research for the direct relation between acculturative stress and physical health (Cavazos-Rehg et al., 2007; Finch et al., 2004), as well as the direct relation between anxiety and physical health (Wong, Correa, Robinson, & Lu, 2017). The mediational effect of anxiety in this model may in part explain the impact of acculturative stress on the physical health of Latinx immigrants. Latinx immigrants experiencing acculturative stress may be expressing the distress through anxiety that is thereby decreasing their overall physical health. As anxiety symptoms only partially mediated the association, there may be other variables impacting this association. No previous research has identified the impact of acculturative stress on physical health through anxiety symptoms, so future research is warranted in this area.

The second mediational model found that anxiety symptoms fully mediated the relation between discrimination and physical health. Previous research findings found direct relations wherein discrimination predicted poor general health (Flores et al., 2010), as well as direct relations between discrimination and anxiety in Mexican-origin immigrants (Leong et al., 2013; Otiniano Verissimo, Grella, Amaro, & Gee, 2014). No research to date has explored the impact of discrimination on physical health through anxiety symptoms. This finding similarly indicates that discrimination may lead to physical health problems in Latinx immigrants via anxiety. As Latinxs are experiencing adverse conditions including discrimination, their mental and physical health may be negatively impacted through this process (Williams, Yu, Jackson, & Anderson, 1997).

This study documented two moderated mediations with enculturation as a moderator: (a) the mediation of anxiety on the relation between acculturative stress and physical health and (b) the mediation of anxiety on the relation between discrimination and physical health. Enculturation buffered the effects of minority stressors on physical health through anxiety.

The moderational effects of enculturation are in line with the current study's postulation about enculturation being a possible mechanism in the Hispanic paradox, but are different from Alamilla et al.'s (2010) negative association between enculturation

and Latinx adolescent mental health. As Latinx immigrants identify with their ethnic culture to a large extent, enculturation may be an important cultural strength and buffer against minority stressors (Rumbaut, 1994). As no previous research has investigated the relations between minority stressors and physical health via anxiety with enculturation as a moderator, the current study provides benchmark data for future investigations. Enculturation may be protective due to social and familial support, traditional values, and a shared sense of ethnic connectedness, which may be impacting the current sample's effects of minority stressors through anxiety to physical health (Barrera et al., 2004).

Results of this study may have the potential to inform clinical intervention, research, medical practice, community-level interventions, and policy. Specifically, the results contribute to a greater understanding of possible systematic forces that influence the mental and physical health of Latinx immigrants, particularly in areas with a recent and dramatic increase in the influx of Latinx immigrants. As many southeastern cities and their surrounding areas, including where the data were collected, have a very short history of Latinx settlement (approximately 10–20 years), the implications of the current study may be applicable across similar cities as they begin to diversify in terms of Latinx immigration (Cavalcanti & Schleef, 2005).

As discrimination and acculturative stress were found to impact physical health, mental and physical health care providers working with Latinx immigrants are recommended to assess the levels of environmental stressors potentially impacting anxiety and presenting medical issues. When creating treatment plans and recommendations, health care providers may refer Latinx immigrant patients to social work services for an integrated treatment approach to address possible environmental stressors. Thus, targeting services for the purpose of reducing acculturative stress may have a significant impact on mental and physical health of Latinx immigrants. As anxiety was found to be a significant mediator, targeted clinical interventions focused on psychological well-being may be helpful in addressing physical health issues. As enculturation buffered these mediational effects, community-level interventions focused on collaboration with cultural centers to reinforce Latinx cultural identities are recommended to improve the mental and physical health of Latinx immigrants. For example, many cultural centers host Latinx cultural festivals that involve food, music, and dancing to promote cultural expression and community engagement. At a policy level, a hostile political environment for Latinx immigrants may increase minority stressors and anxiety, which can have a direct impact on physical health. More supportive public policies for immigrants may decrease the minority stressors and anxiety that Latinx immigrants experience and as a result reduce health care costs.

The findings from the current study should be considered in the context of several limitations, which also present opportunities for future research. First, inclusion criteria for the current study required individuals to read and write in Spanish. As 22% of the Latinx immigrant community in the United States is illiterate in Spanish (Taylor, Lopez, Martínez, & Velasco, 2018), this inclusion criterion excluded approximately one fifth of the Latinx immigrant community. Timmins (2002) found an association between illiteracy and health care access, as language barriers adversely affected quality of care. Those who are illiterate may experience greater minority stressors due to systemic barriers, and as a result, future investigations are encouraged to include Latinx immigrants at all literacy levels with scales administered orally. Similarly, this study's recruitment occurred at multiple locations well-known among Latinx immigrants. An explicit effort was made to recruit from a diversity of locations (e.g., primary care clinics, restaurants, churches, etc.), and though this is generally a strength of the study design, individuals who were more connected to the greater Latinx community or to social services may have been more likely to complete the study than those who were less connected. Future research should employ other approaches such as Internet-based designs that may better be able to recruit less-connected Latinx immigrants.

An additional limitation that was not examined and has been shown to be important in previous literature is reception or the level of friendliness a community displays to an immigrant population (Forster, Grigsby, Soto, Schwartz, & Unger, 2015; Grigsby et al., 2018; Schwartz et al., 2014). As communities differ in openness toward immigrants, including language preferences and cultural practices, future investigation of receptions' impact on acculturative stress and discrimination in Latinx immigrants would be critical to contribute to the literature (Forster et al., 2015). The current study also did not investigate the impact of discrimination nor acculturative stress on mental health variables besides anxiety which could include depression or posttraumatic stress disorder. Adding additional indices of mental health into future studies could help construct a more comprehensive picture of the mental health and psychosocial functioning of Latinx immigrants and shed light on alternate pathways through which acculturative stress and discrimination may affect physical health.

The majority of the current sample reported their country of origin as Mexico, El Salvador, and Guatemala, with many other countries being represented. Although this diversity of countries of origin is a strength of the article, caution should be exercised in making generalizations to all Latinx immigrants given that the sample was not a fully representative sample of all Latinx immigrants living in the United States. The sample was in fact a convenience sample not collected at random or with attempts to make it population-based. Thus, results may not be fully generalizable to Latinx immigrants living in the United States whose country of origin is from other Central and South American countries or to the entire United States. Latinx immigrant population. Future researchers are recommended to ask similar research questions from larger population-based random samples. Also, the current sample's average age was 36.26 ($SD = 12.45$) and generally age diverse with the exception of individuals over the age of 61. Caution is also recommended when generalizing the current study findings to individuals over the age of 61 years old.

Another limitation is the lack of investigation of the impact of gender on the direct and indirect relationships. As Latinx women and men may experience distress and/or enculturation differently, future investigations are encouraged to investigate how gender role conformity may impact mental and physical health in the context of Latinx immigration. Previous research has found differences in levels of enculturation between Latinx men and women (Lorenzo-Blanco & Cortina, 2013), so an inclusion of gender and more importantly gender role conformity may help illuminate differential protective effects of enculturation. Finally, the current study solely included Latinx immigrants. First- and second-generation Latinxs were not included in the sample, limiting the investigation

of the immigrant paradox across multiple generations. Because U.S.-born Latinxs do not experience the immigrant paradox that is an exclusive advantage of foreign-born Latinxs (Abraído-Lanza et al., 1999; Borrell & Crawford, 2009; Teruya & Bazargan-Hejazi, 2013), future investigations are recommended to include multiple generations of Latinxs living in the United States. Investigation and identification of factors contributing to the immigrant paradox across generations may facilitate the creation of culturally competent interventions that incorporate buffers identified within the immigrant paradox to all Latinx generations.

The current study adds to the understanding of the relations among minority stressors, anxiety, physical health, and enculturation in Latinx immigrants living in the United States. The current investigation is the first study to the authors' knowledge that investigated the indirect effects of minority stressors on physical health via anxiety. Additionally, the present investigation was also the first to examine the impact of enculturation as a potential moderating effect on these relations. Health care providers are recommended to assess for the impact of these minority stressors when discussing treatment plans and diagnoses with Latinx immigrants living in the United States. Future intervention research targeting Latinx mental and physical health can consider ways to bootstrap cultural strengths reflected in measures of enculturation and partner with Latinx cultural centers, churches, and local communities to make enculturation more salient.

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