Lifetime Adversities, Risk, Resilience and Family Cohesion Among a
National Sample of Latinx Immigrants Living in the U.S.

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Dedication

The dissertation is dedicated to:

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My dad, who taught me to face my fears, and

My clients, who showed me the heights of human resilience.

Abstract

Background: The research literature provides strong evidence of the adverse impact of cumulative stress on individual and family life. The purpose of this study was to (a) examine the construct validity of a cumulative measure of lifetime adversities and (b) assess the moderating effects of several cultural risk (acculturation stress, perceived discrimination) and protective factors (social support, ethnic identity) on the relationship between cumulative lifetime adversities and family cohesion among U.S. Latinx immigrants.

Method: Data came from a cross-sectional secondary dataset, called the HCHS – SOL Sociocultural Ancillary Study. The sample ($N = 3,632$) was identified using stratified random probability sampling in four of the largest Latinx metropolitan areas: the Bronx, San Diego, Chicago, and Miami. Six Latinx subgroups were included in this study: Puerto Ricans, Cubans, Mexicans, Dominicans, South Americans, and Central Americans.

Results: Results from a confirmatory factor analysis supported a three-factor model of cumulative lifetime adversities, including childhood trauma, current stress, and chronic stress. Invariance testing suggested that the measure functioned equivalently across the six Latinx subgroups. Results from a latent moderation analysis suggested that social support buffered the association between cumulative lifetime adversities and family cohesion; whereas discrimination exacerbated the association between cumulative lifetime adversities and family cohesion. Unexpectedly, acculturation stress buffered the

association between cumulative lifetime adversities and family cohesion. Several

potential explanations are discussed.

Conclusions: Results can be used to inform the development of mental health

interventions and prevention programs tailored to the specific needs of Latinx immigrant

populations exposed to adversity and cultural stressors. Implications for the immigrant

paradox are also discussed.

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The prevalence of trauma and lifetime adversities is disproportionately high among first-generation Latinx immigrant populations (Alcántara, Casement, & Lewis-Fernández, 2013). According to a recent study of Latinxs in the United States (U.S.), 30% of participants reported experiencing four or more adverse events during childhood (Llabre et al., 2017). Another study found that nearly half of Latinx immigrant youth in the sample reported experiencing an adverse event during the migration process (Cleary et al., 2018). Ample research has demonstrated the harmful effects that these adversities can have on individual and family functioning (Gallo et al., 2014; Myers et al., 2015). Experiencing lifetime adversities is associated with increased risk for anxiety, depression, substance abuse, and posttraumatic stress disorder (Kinderman, Schwannauer, & Pontin, 2013; Ramos et al., 2017). Moreover, studies suggest that exposure to lifetime adversities is linked with disruptions in family functioning, which is a key resource for Latinx immigrant families (Ibañez et al., 2015; Singh et al., 2011).

There are several limitations to past studies examining lifetime adversities with Latinx populations. First, traditional measures of adversity have centered on discrete, short-term events, such as experiencing a mugging, sexual assault, or witnessing an act of violence (e.g., McGrath et al., 2017). Few studies have examined the cumulative impact of discrete and chronic life adversities on Latinx immigrant families. This is problematic because stressors often co-occur and can have overlapping effects (Green et al., 2010). Experiencing multiple lifetime adversities can place families at a heightened risk for dysfunction and mental health problems (Myers et al., 2015). Additionally, no studies have examined the extent to which the understanding of cumulative lifetime adversities

may differ across Latinx subgroups, such as Cubans or Puerto Ricans. This is an important limitation because Latinx immigrants have immense within-group variability, coming from over 20 different countries, each with their own unique culture and set of experiences.

The objective for my dissertation was to respond to these limitations by (a) testing the construct validity and measurement invariance of a comprehensive measure of lifetime adversities across six Latinx subgroups and (b) identifying various risk and protective factors that influence the association between cumulative lifetime adversities and family cohesion.

Theoretical Frameworks Guiding my Research

My program of research is guided by critical postmodern theories, intersectionality, the bioecological model of human development, and the family stress model. Postmodernism is a paradigm, or worldview, that posits that an objective reality or absolute truth does not exist (Lyotard, 1984). It challenges grand narratives about social reality and what constitutes science, such as the belief that a theory or intervention could be developed that applies equally well to all members of a population (Denzin & Lincoln, 2011). Postmodern thinkers argue that the world is composed of small socially constructed truths, or phenomena that are true for certain groups of people in certain historical, political, and socioeconomic periods (Gergen, Lightfoot, & Sydow, 2004). Likewise, I do not believe that I could develop an intervention that is equally effective across groups. In my research, I aim to improve the understanding of how context and culture shape human development in order to develop effective, sustainable, scalable

interventions. My long-term goal is to develop and implement preventive mental health interventions that are tailored to meet the needs of diverse populations exposed to traumatic stress and adversity.

Critical and intersectional theories emphasize the role of power, privilege, and social location, and aim to dismantle systems of oppression (Cole, 2009). Critical theories emphasize issues such as race, ethnicity, gender identity, sexual orientation and consider how these social locations influence how we operate in the world (McDowell & Feng, 2007). In line with these theories, I believe that research should be used to challenge structures of oppression, highlight the lived experiences of marginalized groups, and increase equity in mental health practices. My research focuses on the role of social location (e.g., race and culture) on mental health. Specifically, I examine the influence of cultural risk and protective factors, such as ethnic identity, acculturation stress, and discrimination, on individual, family, and community mental health.

The bioecological model of human development (Bronfrenbrenner & Morris, 2006) posits that individuals are influenced by various biological and social forces, including their genetics, physiology, family, community, culture, and the institutions/organizations with which they are connected. The model suggests that efforts focused on decreasing mental health disparities must take into account interacting influences that operate across multiple ecological levels. This framework informs how I approach prevention and intervention research with trauma-affected populations. I intend to implement multi-level interventions that promote changes at various levels, such as the

individual, family, community, and organizational levels, to support minority mental health.

The family stress model (Patterson, 1989) explains the processes by which families adjust and adapt to stress. The family stress model assumes that families' ability to positively adapt to a stressor depends on the resources, or coping skills, families have at their disposal to manage the stressor. Experiencing multiple, ongoing stressors can deplete families' resources and increase their vulnerability to future stressors. Families who are unsuccessful in managing the stressor, or who face excessive demands and depleted resources, are assumed to be experiencing a crisis, or a disruption in family functioning that requires families to make structural changes. According to the family stress model, migration could be viewed as a crisis because families are experiencing immense adversity, while at the same time experiencing diminished resources for managing stress (e.g., less social support). However, differences in the number of existing resources and the quality of coping skills can directly influence families' response to stress. A main focus of my research agenda involves identifying risk and protective factors related to positive adaptations to stress. The family stress model helps inform my conceptualization of this process.

Researcher Positionality

Positionality refers to the practice of identifying how individuals' social locations impact their understanding of the world. I believe this practice is critical for understanding the ways in which my biases affect my thinking and research. I am a 29-year-old, mixed-race (African American and Euro-American), cisgender, able-bodied,

heterosexual male. I was raised by two middle-class parents in a wealthy suburb of Madison, Wisconsin and experienced immense privilege.

My interest in working with people of color (e.g., Latinx immigrants) stemmed from experiences growing up as a light-skinned mixed-race individual. I was raised in a predominantly White Euro-American neighborhood and my light skin tone allowed me to blend in with my White peers. I rarely had to think about my race. In middle school, my peers began asking me about my racial background. I realized that although I was mixed Black and White, I did not feel like I fully belonged to either group. The majority of my teachers and peers did not acknowledge my ethnic identity, and many challenged or discredited my ethnic identity. This led to a sense of confusion, frustration, and embarrassment. These experiences shaped the way I perceived myself and others and influenced my selection of friend groups. I became skilled at alternating between different racial/ethnic friend groups. I closely observed the differences between African American and European American culture. I craved acceptance from both of these groups.

As I grew older and I met more people, I learned that many first- and second-generation immigrants shared similar types of experiences. I felt a sense of connection to individuals who struggled to integrate conflicting parts of their cultural/ethnic identities. This led to an interest in working with immigrant families. While pursuing my undergraduate degree, I studied abroad in South America. After receiving my bachelor's degree, I returned to South America to teach English, engage in community work, and master my Spanish skills. These experiences helped shape my passion for engaging in

research and clinical work with Latinx immigrant families. Although, I did not share the cultural or ethnic background of Latinx immigrants, I understood the experience of living in two distinct ethnic/cultural worlds and the influence this could have on ethnic identity development and family functioning. I became passionate about improving the understanding of cultural/ethnic identity development and working with immigrant families.

Traumatic Stress. My desire to work with trauma-affected populations grew from an interest in human resilience and a passion for working with Latinx immigrants and populations of color. I was fascinated by how some individuals thrived despite experiencing traumatic events whereas others suffered. Through my readings and clinical work, I was struck by the disproportionate exposure to traumatic events among populations of color. The stories my clients told me of family members getting deported, experiencing family violence/abuse, and witnessing community violence highlighted the role of traumatic events in my clients' lives. I learned about the need for trauma-informed, culturally appropriate approaches for working with Latinx immigrants exposed to traumatic events. I pursued training in several evidence-based treatments for traumatic stress. Engaging in this work has shown me the strength and resilience of Latinx families and the role of community in the healing process.

Overview of Research Papers

My purpose in conducting this dissertation research was to examine risk, resilience, and family cohesion using a national sample of Latinx immigrants living in the U.S. I have organized the dissertation into two analytical papers. In the first paper, I

discuss the validity of a cumulative measure of lifetime adversities among Latinx immigrants living in the U.S. The second paper is an investigation of the degree to which several risk and protective factors moderate the relationship between cumulative lifetime adversities and family cohesion. Finally, I conclude the dissertation by discussing the implications of these analyses for future research and clinical practice.

Paper 1: Construct Validity and Measurement Invariance of Cumulative Lifetime Adversities Among U.S. Latinx Immigrants

It is well-known that lifetime adversities can negatively affect the health of Latinx immigrant populations. Latinxs are disproportionally exposed to lifetime adversities, including traumatic events. A recent study found that approximately 30% of Latinxs experienced traumatic events during the migration process (Perreira & Ornelas, 2013). Another study found that 77% of Latinxs in the U.S. reported experiencing an adverse childhood event; 30% of these individuals experienced four or more adverse childhood events (Llabre et al., 2017). Several types of lifetime adversities commonly experienced by Latinx immigrants include: physical violence (Cleary et al., 2018), financial stress, acculturation stress (Dillon et al., 2013), separation from family members (Perreira & Ornelas, 2013), and discrimination (Molina et al., 2013).

These types of stressors can have a cumulative effect on individual and family functioning (Green et al., 2010; Myers et al., 2015; Seery et al., 2010; Singh et al., 2011). However, few studies have assessed cumulative life adversities – the total adversity that an individual has experienced – within Latinx populations in the US. Instead, most studies have used discrete measures of lifetime adversities, assessing different types of

lifetime adversities separately, such as childhood trauma or acculturation stress (e.g., Kimbro et al., 2012; Llabre et al., 2017). Hence, there is a significant need for a cumulative measure of adversity to improve the understanding of Latinx immigrant mental health. To address this need, this study aimed to test the psychometric properties of a cumulative assessment of lifetime adversities in a national sample of US Latinx immigrants.

Assessing Cumulative Lifetime Adversities

Most extant literature on lifetime adversities focuses on a specific type of life event or experience, such as childhood sexual abuse or combat exposure. However, different types of life adversities often co-occur and may have overlapping effects (Breslau et al., 2008; Gallo et al., 2014; Green et al., 2010; Myers et al., 2015). One study found that levels of traumatic stress, perceived stress, and chronic stress were associated with one another (Gallo et al., 2014). Another study found a high prevalence and significant associations between different types of childhood adversities, such as maladaptive family functioning, interpersonal loss, abuse and neglect in a nationally representative US sample (Green et al., 2010). In fact, 87% of people in their study who reported experiencing family violence also reported experiencing at least one other childhood adversity. There is also evidence that certain types of life adversities may be more harmful than others (Green et al., 2010; McGrath et al., 2017). McGrath and colleagues (2017) found that individuals who reported experiencing childhood sexual trauma were more likely to exhibit signs of psychosis early in childhood, whereas, individuals who experienced other adverse events were more likely to exhibit signs of

psychosis in adolescence. These findings underscore the importance of assessing for exposure to multiple forms of life adversities. Assessing multiple types of life adversities together, in the same measurement framework, could represent a more effective way to measuring this lifetime adversity than relying on discrete measures.

Several studies have examined cumulative lifetime adversity. These studies measured cumulative lifetime adversity by assessing for the presence of various types of stressful experiences or events, including workplace stress, family/relationship stress, or community stress (Gallo et al., 2014; Kwak et al., 2017; Myers et al., 2015; Seery et al., 2010; 2012; Shrira, 2014).

One study measured cumulative lifetime adversities with 37 items targeting seven categories of lifetime adversities: illness/injury, violence, bereavement, social/environmental stress, relationship stress, disaster (Seery et al., 2010; 2012). One of the most comprehensive efforts to measure cumulative lifetime adversity used 66 items that assessed discrimination, adverse childhood experiences, child sexual traumas, severe child traumas, chronic life stresses, and adult traumas (Myers et al., 2015). However, none of these studies have conducted a robust assessment of the construct validity of cumulative lifetime adversities. This is a major limitation because construct validity serves as the foundation from which we make our study inferences.

Construct Validity

A contemporary model for understanding construct validity, called the *unified construct-based model of validity*, defines construct validity as the extent to which test scores can be interpreted based on evidence and theory (Messik, 1995). This model

specifies various dimensions of construct validity including: content, substantive, structural, generalizability, external, and consequential. The *content aspect* of validity determines the boundaries of a construct – which items align within the definition of the construct and which fall outside of that definition. The *substantive aspect* of validity determines the degree to which theory and evidence support the observed response patterns in the survey. The *structural aspect* of validity determines the internal structure of the construct. The *generalizability aspect* of validity determines the degree to which the measure functions the same across different groups and occasions. The *external aspect* of validity determines the degree to which the construct relates to other constructs in the way we would expect (i.e., convergent and divergent validity). Finally, the *consequential aspect* of validity examines the unintended consequences as taking the assessment, such as causing psychological distress.

Measurement Invariance. One important element of construct validity - generalizability - involves testing measurement invariance, an element that has been left out of past assessments of cumulative lifetime adversities. Evaluating measurement invariance (also known as factorial invariance) answers the question: Am I measuring the same construct in each subgroup? Establishing measurement invariance allows researchers to have confidence that group differences in a given construct are based on true group differences rather than differences in the ways in which measures were interpreted (Dimitrov, 2010). Without testing for measurement invariance, it is impossible to determine the accuracy of a measure across all members of a population. This is particularly problematic when conducting research with populations that have

large within-group diversity, such as Latinx immigrants. Latinx immigrants come from over 20 different countries, each with its own culture and context, therefore, researchers cannot assume that psychological instruments perform equivalently across all Latinx populations. For example, studies suggest that two common measures of PTSD may function differently across ethnic groups (Contractor et al., 2019). However, researchers have not examined the measurement invariance of cumulative lifetime adversities.

The Present Study

The purpose of this study was to assess the construct validity (i.e., structural, generalizability, and external aspects) of a comprehensive measurement model of lifetime adversities with a national sample of Latinx immigrants. In this study, I (a) examined the factor structure of cumulative lifetime adversities in the full sample by testing bi-factor, three-factor, and five-factor models; (b) tested for configural, weak, strong, and strict invariance across six Latinx subgroups (Mexicans, Cubans, Puerto Ricans, Dominicans, Central Americans, and South Americans); (c) examined the internal consistencies of the cumulative lifetime adversities and its subscales in the full sample and in each subgroup, and (d) tested convergent and discriminant validity with other constructs. I hypothesized that (a) a three-factor model of cumulative lifetime adversities that includes: childhood trauma exposure, current stress, and chronic stress will be the best fit to the data and (b) cumulative lifetime adversities will function equivalently across six Latinx subgroups. My measurement model was informed by the methodological framework used by Myers and colleagues (2015). I expected to find moderate positive associations with depression and acculturation stress, and moderate negative associations with life engagement and

self-esteem. Selection of these comparison constructs was based on past literature

documenting the associations between these constructs (Kinderman et al., 2013; Reiland

& Lauterbach, 2008; Ward et al., 2018).

Method

Sample

Data used for this study were from the Hispanic Community Health Survey/Study

of Latinos (HCHS/SOL), conducted from 2009-2011 (Gallo et al., 2014). The

HCHS/SOL study is one of the largest and most comprehensive surveys of U.S. Latinx

health and associated risk and protective factors in existence (N = 16,415). Researchers

used a household probability sampling procedure to identify potential participants in four

of the largest Latinx metropolitan areas including the Bronx, Chicago, Miami, and San

Diego. They oversampled participants in older age groups based on the goals of the

original study. This epidemiological cohort study involved anthropometric assessment,

fasting blood draw, and self-report measures related to sociodemographic characteristics

and health problems. The sampling, design and methodology have been previously

documented (Levange et al., 2010; Sorlie et al., 2010).

The Sociocultural Ancillary Study was launched to examine cultural, economic,

and psychological factors in a representative subsample (N = 5,280) of the HCHS/SOL

parent study (Gallo et al., 2014). Refer to Gallo and colleagues (2014) for further

information regarding the study design and procedure. For the purposes of the present

study, I included only participants born outside the US (N = 3,642). Participants included

individuals aged 18-74 from various Latin American countries, including Mexico (N =

1340), Puerto Rico (N = 397), Central America (N = 447), Cuba (N = 684), Dominican

Republic (N = 446), and South America (N = 286). Most participants were above the age

of 45, had completed high school, and had a yearly household income of less than

$30,000. Interviews were conducted by bilingual staff and were offered in English or

Spanish - the majority of which were completed in Spanish (92%).

Measures

    Cumulative lifetime adversities were assessed using 25 self-report items from the

following scales: (a) the adverse childhood experiences (Felitti et al., 1998) scale; (b) the

perceived stress scale-10 (Cohen, Kamarack, & Mermelstein, 1983); and (c) the chronic

stress scale (Bromberger & Matthews, 1996). These subscales were assessed as factors of

the overarching latent construct of cumulative lifetime adversities. Individual items

within each subscale were modeled as indicators of the subscale. The rationale for this

model comes from the findings of past studies examining the factor structure of lifetime

adversities (e.g., Ford et al., 2014; Myers et al., 2015). The internal consistency for the

cumulative lifetime adversity scale was α = .83 in this sample.

    Childhood trauma exposure was assed using the adverse childhood experiences

(ACE) scale. This scale is composed of 10 self-report items assessing exposure to various

adverse events including: emotional abuse, emotional neglect, physical abuse, physical

neglect, sexual abuse, witnessing female parent being abused, living with a substance

abuser, living with a mentally ill person, imprisonment of a household member, and

parental divorce or separation. The total score is obtained by calculating the sum of the

number of items endorsed, ranging from a score of 0 to 10. The ACE scale has been

shown to be psychometrically sound (Felitti et al., 1998) and is not required to be internally consistent. However, the internal consistency for the present sample was α = .74.

Current stress was assessed using the perceived stress scale (PSS). This scale is composed of 10 self-report Likert-type items (0 = never, 1 = almost never, 2 = once in a while, 3 = often, 4 = very often) assessing the global perceived stress experienced in past 30 days. Sample items include: "in the last month, how often have you found that you could not cope with all the things that you had to do," and "in the last month, how often have you felt that difficulties were piling up so high that you could not overcome them." Four items were reverse coded because they were positively worded (e.g., "in the last month, how often have you felt that things were going your way"). Three items were removed based on poor factor loadings. The total score is the sum of the remaining seven items, and ranges from 0 to 28. Internal consistency for the current sample was α = .84.

Chronic stress burden was evaluated with an 8-item scale that assesses the number of current ongoing problems in an individual's life (e.g., financial, work, relationship, health problems). Participants reported "yes," or "no" to experiencing a certain type of ongoing stressor (e.g., "Have you had a serious ongoing health problem," or "Have you had ongoing difficulties with your job and ability to work"). Those who denied experiencing the ongoing stressor were given a score of "0." Those who responded "yes," were then asked to rate the duration of this stressor (i.e., 0 = less than six months, 1 = greater than six months). The total score is the sum of the eight items, and ranges from 0 to 8. This scale has been used in several multiethnic cohort studies

(Bromberger & Matthews, 1996; Shivpuri, Gallo, Crouse, & Allison, 2012). The chronic stress scale is not required to be internally consistent, nonetheless, the internal consistency for the current sample was $\alpha = .56$.

Analysis Plan

Steps to analysis included: (a) preliminary data analysis, (b) identifying and evaluating a baseline measurement model, (c) testing for measurement invariance, (d) assessing convergent and discriminant validity. Analyses were conducted using SPSS 23 and Mplus 8 (Muthén & Muthén, 2017).

The measurement model was estimated using robust weighted least squares (WLS). This estimator was chosen because it is the most accurate method for estimating model parameters when dealing with ordinal data (Bowen & Masa, 2015). For model identification purposes, the factor means were fixed to 0 and the factor variances and items residuals were all fixed to 1. The following indicators were used to assess adequate model fit: a non-significant χ^2 value for model fit (p > .05), a comparative fit index (CFI) exceeding .95, a root mean square error of approximation (RMSEA) below .06, and an SRMR below .08 (Kline, 2016). The best-fitting model was then compared with alternative models. Missing data was handled by using full information maximum likelihood (FIML).

Measurement Invariance. To test measurement invariance, I used multi-group CFA, which involves comparing parameter estimates and model fit between the six Latinx subgroups, after setting various equality constraints. This is a recommended strategy for determining the extent to which survey instruments function differently

across groups (Dimitrov, 2010). Equality constraints force the computer to compute the

same estimates across groups, consistent with the null hypothesis that no group

differences exist (Kline, 2016). For example, if model fit is different across groups, after

setting equality constraints, this would indicate measurement non-invariance, or that the

model's fit to the data depends on ethnic group membership.

The following steps were utilized, based on Bowen and Masa's (2015) approach

to measurement invariance with ordinal data. I assessed for: *configural invariance* (all

parameters are freely estimated), *weak invariance* (factor loadings are held constant),

strong invariance (factor loadings and thresholds are held constant) and *strict invariance*

(factor loadings, thresholds, and item residuals are held constant). My criteria for

significant model fit change consisted of fulfilling two out of the following three criteria:

ΔRMSEA $\leq$ .03, ΔCFI $\leq$ -.02, and a significant robust χ^2 difference test for weak

invariance. For establishing strong and strict invariance, significant change in model fit

was determined when two out of the following three criteria were met: ΔRMSEA $\leq$ -.01,

ΔCFI $\leq$ -.01, and a significant robust χ^2 difference test. These criteria were based off of

recommendations from Rutkowski & Svetina (2014).

Configural invariance indicates whether the same number of latent variables with

the same pattern of factor loadings, thresholds, and measurement errors underlie a

construct. In other words, it determines whether the construct is organized the same way

in different cultures. It is tested by first fitting the baseline model to each group

separately, then fitting the model to all groups simultaneously. If configural invariance is

not met, modifications indices are considered. If configural invariance is met (the same

measurement model fits each group equally well), then *weak invariance* is tested. Testing

for weak invariance involves constraining the factor loadings to equal across groups and

examining the difference in model fit between the constrained and freely estimated

models. Assessing for weak invariance determines whether indicators are linked to the

construct in a similar way. If weak invariance is met, *strong invariance* is tested. Testing

for strong invariance determines whether the items are operating similarly across groups.

If met, strict invariance is assessed. *Strict invariance* is tested by constraining item

residuals to be equal across groups. This determines whether the variance of an item not

shared with a factor and the error variance are similar across groups. If met, it means that

items were measured with the same level of precision across groups. This step is often

omitted from invariance testing because failing strict invariance does not affect

interpretation of latent mean differences (Putnick & Bornstein, 2016).

Finally, I assessed the convergent and discriminant validity of cumulative lifetime

adversities by examining its relationship to other constructs. Convergent validity was

supported if cumulative lifetime adversities was positively associated with acculturation

stress and depression and negatively associated with self-esteem and life engagement.

Results

Preliminary Analyses

I conducted preliminary analyses by examining the descriptive statistics (e.g.,

mean, standard deviation, and internal consistencies) for the full sample as well as for

each Latinx subgroup. Participants reported experiencing an average of 13.96 ($SD = 3.50$)

lifetime adversities and the average composite score was 14.37 ($SD = 7.41$). The average

number of childhood traumatic events experience by Latinx immigrants was 2.32; the

most common were parent separation/divorce (41%), being sworn at, insulted, or

physically harmed (30%), being pushed, grabbed, slapped (29%), and living with a

drinker or drug user (29%). The average composite score for current stress was 10.53 (*SD*

= 5.54). The average composite score for chronic stress was 3.61 (*SD* = 3.65).

The internal consistency of the sum score of all cumulative lifetime adversity

items across Latinx subgroups ranged from .83 to .87. The internal consistencies for the

current stress subscale ranged from .82 - .86. The internal consistencies for the childhood

trauma exposure subscale ranged from .69 - .76. The internal consistencies for the

chronic stress subscale ranged from .51-.59. Refer to Table 1 for complete results.

Table 1

Reliability of Cumulative Lifetime Adversities Across Six Latinx Subgroups

Variables	Mexican	Puerto Rican	Central American	Cuban	Dominican	South American
Childhood Trauma	.75	.75	.75	.76	.69	.69
Current Stress	.85	.84	.84	.86	.85	.80
Chronic Stress	.59	.55	.52	.51	.57	.53

About 92% of participants completed the surveys in Spanish. This percentage was similar

across Mexicans, South Americans, Central Americans, Dominicans, and Cubans.

However, only 69% of Puerto Ricans completed Spanish surveys. In order to determine

that subgroup differences were not due to language differences, I performed invariance

testing between the Spanish and English versions of the survey. Results suggested that

both versions of the test functioned equivalently.

Baseline Measurement Model

In order to accomplish the first objective of this study, I fit a baseline measurement model to all participants in the sample (see Figure 1). The hypothesized model did not fulfil adequate model fit criteria. Therefore, I respecified the model by removing the three worst performing items (e.g., lowest factor loadings). The respecified measurement model for lifetime adversities fit the data well according to the goodness of fit criteria, CFI = .96, RMSEA = .04, SRMR = .08. The significant χ^2 value (3237.81, $p <$ .05) was expected because χ^2 is influenced by sample size. All factor loadings were significant (ranged from .34 to .91) and most were larger than $b = .60$, suggesting that the individual items were strong indicators of the factors. As expected, chronic stress, current stress and childhood trauma exposure were significantly associated with one another. Chronic stress and current stress had correlation of $r = .65$, chronic stress and childhood trauma exposure had a correlation of $b = .39$, and childhood trauma exposure and current stress had a correlation of $b = .56$. Alternative solutions were fit to the data, including two-factor, four-factor, and five-factor models, all of which had worse model fit than the three-factor solution.

Figure 1

Three-Factor Solution of Cumulative Lifetime Adversities

Note. Single-headed arrows represent factor loadings and double-headed arrows represent covariances. All factor loadings were significant, and most were above $b = .60$.

Measurement Invariance

The second objective of this study was to test the equivalency of measurement functioning between Latinx subgroups, and was conducted using multi-group CFA (i.e., factorial invariance testing). This involved testing for weak, strong, and strict factorial invariance (as described in the previous section). First, the measurement model was fit to each Latinx subgroup individually, known as configural invariance. This step determines whether the same basic pattern of factors and indicators can be used to assess the construct in each subgroup and is necessary before engaging subsequent tests of invariance. The model fit the data adequately in each of the subgroups according to my model fit criteria. The model fit statistics and factor loadings for each Latinx subgroup are included in Table 2 and Table 3.

Table 2

Baseline Confirmatory Factor Analysis Model Fit for Six Latinx Subgroups

Latinx Subgroup	Mexican	Puerto Rican	Central American	Cuba	Dominican	South American
Robust χ^2 (*df*)	862.21*** (272)	430.89*** (272)	488.96*** (272)	587.87*** (272)	499.68*** (272)	437.20*** (272)
CFI	.965	.963	.952	.960	.948	.935
RMSEA	.040	.038	.042	.041	.043	.046
SRMR	.063	.078	.086	.076	.093	.102

Note. ***$p < .001$

Table 3

Standardized Factor Loading Estimates for Six Latinx Subgroups

	Items	Estimated factor loadings					
		Mex	**PR**	**CA**	**Cuba**	**DR**	**SA**
Adverse Childhood Experiences							
Item 1	Did a parent or other adult in the household often or very often swear at you, insult you, put you down, or humiliate you? Or Act in a way that made you afraid that you might be physically hurt?	0.89	0.97	0.95	0.91	0.89	0.83
Item 2	Did a parent or other adult in the household often or very often push, grab, slap, or throw something at you? Or Ever hit you so hard that you had marks or were injured?	0.82	0.86	0.88	0.88	0.83	0.81
Item 3	Did an adult or person at least 5 years older than you ever touch or fondle you or have you touch their body in a sexual way? Or attempt to actually have oral, anal, or vaginal intercourse with you?	0.59	0.64	0.46	0.68	0.58	0.76
Item 4	Did you often or very often feel that no one in your family loved you or thought you were important or special? Or, your family didn't look out for each other, feel close to each other, or support each other?	0.76	0.75	0.76	0.80	0.83	0.66
Item 5	Did you often or very often feel that you didn't have enough to eat, had to wear dirty clothes, and had no one to protect you? Or, your parents were too drunk or high to take care of you or take you to the doctor if you needed it?	0.60	0.65	0.67	0.59	0.63	0.55
Item 6	Were your parents ever separated or divorced?	0.36	0.36	0.38	0.47	0.25	0.27
Item 7	Was your mother or stepmother: Often or very often pushed, grabbed, slapped, or had something thrown at her? Or, sometimes, often or very often kicked, bitten, hit with a fist, or hit with something hard? Or, ever repeatedly hit at least a few minutes or threatened with a gun or knife?	0.70	0.69	0.70	0.76	0.67	0.58

	Items	Estimated factor loadings					
		Mex	**PR**	**CA**	**Cuba**	**DR**	**SA**
Item 8	Did you live with anyone who was a problem drinker or alcoholic or who used street drugs?	0.64	0.65	0.63	0.73	0.53	0.64
Item 9	Was a household member depressed or mentally ill, or did a household member attempt suicide?	0.57	0.45	0.46	0.61	0.51	0.64
Item 10	Did a household member go to prison?	0.44	0.33	0.55	0.50	0.35	0.39
Chronic Life Stress							
Item 11	Have you had a serious ongoing health problem for six months or more?	0.40	0.32	0.40	0.42	0.41	0.51
Item 12	Has someone close to you had a serious ongoing health problem for six months or more?	0.37	0.38	0.49	0.26	0.44	0.38
Item 13	Have you had ongoing difficulties with your job or ability to work for six months or more?	0.71	0.55	0.53	0.61	0.56	0.62
Item 14	Have you experienced ongoing financial strain for six months or more?	0.68	0.63	0.48	0.66	0.68	0.66
Item 15	Have you had ongoing difficulties in a relationship with someone close to you for six months or more?	0.74	0.74	0.76	0.70	0.89	0.56
Item 16	Has someone close to you had an ongoing problem with alcohol or drug use for six months or more?	0.50	0.49	0.40	0.51	0.43	0.49
Item 17	Have you been helping someone close to you who is sick, limited, or frail for six months or more?	0.42	0.37	0.29	0.33	0.35	0.36
Item 18	Have you had another ongoing problem not listed here for six months or more?	0.71	0.51	0.72	0.31	0.48	0.68
Current Life Stress							
Item 19	In the last month, how often have you been upset because of something that happened unexpectedly?	0.78	0.76	0.73	0.75	0.77	0.72
Item 20	In the last month, how often have you felt that you were unable to control the important things in your life?	0.85	0.81	0.80	0.79	0.79	0.79
Item 21	In the last month, how often have you felt nervous and "stressed"?	0.81	0.77	0.74	0.82	0.77	0.79
Item 22	In the last month, how often have you felt that things were going your way?	0.40	0.41	0.50	0.53	0.55	0.29
Item 23	In the last month, how often have you found that you could not cope with all the things that you had to do?	0.62	0.62	0.62	0.65	0.64	0.68

	Items	Estimated factor loadings					
		Mex	**PR**	**CA**	**Cuba**	**DR**	**SA**
Item 24	In the last month, how often have you been angered because of things that were outside of your control?	0.71	0.74	0.73	0.73	0.71	0.70
Item 25	In the last month, how often have you felt that difficulties were piling up so high that you could not overcome them?	0.83	0.81	0.76	0.81	0.84	0.77

Note. Mex = Mexicans, PR = Puerto Ricans, CA = Central Americans, DR = Dominicans, and SA = South Americans. Items 1-18 were categorical (0 = *not present*, 1 = *present*). Items 19-25 were rated on a 5-point Likert scale (0 = *never*, 1 = *almost never*, 2 = *sometimes*, 3 = *fairly often*, 4 = *very often*). All standardized factor loadings were significant at *p* < .001.

Second, weak invariance (also known as metric invariance) was tested to determine the equivalence of item loadings on the factors across Latinx subgroups. This step involves constraining factor loadings to be equal across subgroups. Model fit was adequate, CFI = .966, RMSEA = .036, SRMR = .084, χ^2 = 3087.35, *p* < .001. Model fit did not significantly decline between the weak invariance model and the configural model, according to our change criteria: ΔCFI > -.02, ΔRMSEA > -.03, and a non-significant robust χ^2 difference test. This suggested that indicators were linked to the construct in similar ways. Table 4 includes the results of the four steps of invariance testing.

Table 4

Results of Measurement Invariance Testing: Configural, Metric, Scalar, & Residual

Invariance (N = 3,600)

Model	Robust χ^2 (*df*)	CFI	RM-SEA	SR-MR	Model comp	Robust $\Delta\chi^2$ (Δdf)	ΔCFI	ΔRM-SEA	ΔSR-MR	Decision
M0: Configural invariance	3237.81 *** (1632)	.959	.040	.078	--	--	--	--	--	--
M1: Weak Invariance	3087.35 *** (1742)	.966	.036	.084	M0	161.51 *** (1210)	.007	-.004	.006	Accept
M2: Strong Invariance	3836.13 *** (1957)	.952	.040	.085	M1	1130.69*** (215)	-.014	.004	.001	Accept
M3a: Strict Invariance	3683.28 *** (1832)	.953	.041	.082	--	--	--	--	--	--
M3b: Strict Invariance	3836.13 *** (1957)	.952	.040	.085	M3a	316.32 *** (125)	.001	-.001	.003	Accept

Note. Model comp = model comparison. Strict invariance was established based on

model comparison criteria. *p < .05, **p < .01, ***p < .001

Third, strong invariance (also known as scalar invariance) was tested to determine

the equivalence of item thresholds across Latinx subgroups. This step involves

constraining the item thresholds to be equal across subgroups and assessing changes in

model fit between the strong invariance and the weak invariance model. Model fit was

adequate, CFI = .952, RMSEA = .040, SRMR = .085, χ^2 = 3836.13, *p* < .001. Model fit

did not significantly decline between the strong and the weak invariance models;

therefore, strong invariance was assumed. This suggested that item thresholds were similar across the six Latinx subgroups.

Fourth, strict invariance (also known as residual invariance) was tested to determine the equivalence of item residuals across Latinx subgroups. This step involves constraining item residuals to be equal across subgroups and assessing changes in model fit between the strict invariance model and the strong invariance model. In the previous steps, item residuals were fixed at 1. Therefore, I (a) fitted a model in which the item residuals were freely estimated, (b) fitted a model in which the item residuals were constrained to be equal across groups, and (c) compared the model fit across these two models. Model fit did not significantly decline between the constrained and freely estimated models; hence, strict invariance was assumed. This suggested that item residuals were similar across the six Latinx subgroups.

Convergent and Discriminant Validity

To complete the third objective of this study, I assessed convergent validity based on examining the associations between cumulative lifetime adversities and two similar constructs (acculturation stress and depression). Higher cumulative lifetime adversities were associated with higher acculturation stress ($r = .43$, p < .001) and higher depression ($r = .66$, p < .05). To assess discriminant validity, I tested the relationship between cumulative lifetime adversities and conceptually distinct constructs (self-esteem and life engagement). Higher cumulative lifetime adversities were associated with lower self-esteem ($r = -.34$, p < .001) and lower life engagement ($r = -.28$, p < .001).

Discussion

There is substantial evidence linking lifetime adversities to negative individual and family health outcomes (Myers et al., 2015; Seery et al., 2010; Gallo et al., 2014). Having an effective culturally valid measure of cumulative lifetime adversity is critical for understanding and promoting the mental health of populations exposed to stress and psychological trauma. Overall, the results of this study provide support for the construct validity (i.e., structural, generalizability, and external) of a cumulative measure of lifetime adversities among U.S. Latinx immigrant populations. This measure assessed for the presence of past, current, and chronic stressors. Findings suggest that the hypothesized model fit the data well and were equivalent across six Latinx subgroups, including Mexicans, Cuban, Puerto Ricans, Dominicans, South Americans, and Central Americans. Chronic stress, current stress, and childhood trauma exposure were good indicators of cumulative lifetime adversities.

Using confirmatory factor analysis, I found that my hypothesized three-factor solution, including chronic stress, current stress, and childhood trauma exposure was the best fit to the data. This finding provides support for the structural aspect of construct validity (Messik, 1995). As expected, these factors were significantly associated with one another, however, they did not raise concerns for multicollinearity. These findings differ from the only other factor analyses of lifetime adversities with Latinxs (Myers et al., 2015). These researchers found support for a five-factor structure, which included childhood trauma, adult trauma, chronic stress, childhood adversities, and discrimination. However, I found that adding factors worsened my model's fit to the data. These

differences in factor-structure could be due to differences in the populations assessed in our respective studies. Myers and colleagues (2015) used convenience sampling and included U.S.-born and foreign-born Latinxs. In contrast, the present study applied random sampling techniques and included only foreign-born Latinxs. Immigrant status is particularly important to consider when examining lifetime adversities because exposure to lifetime adversities is often higher among first-generation immigrants as compared to later generations due to increases in exposure to migration-related stressors (Perreira & Ornelas, 2013).

Based on multi-group confirmatory factor analyses, I found my hypothesized measurement model met the criteria for configural, weak, strong, and strict invariance across six Latinx subgroups. Although several survey items functioned differently across groups, the overall model fit did not decrease when factor loadings were constrained to equal across groups. This indicates that Latinx immigrant groups interpreted these survey items in a similar way. Findings provide support for the generalizability aspect of construct validity (Messik, 1995) and correspond with past studies assessing measurement invariance for mental health constructs within Latinx populations (Merz et al., 2014; Perera et al., 2017). However, a meta-analysis examining the invariance of posttraumatic stress disorder (PTSD) reported partial equivalence in several measures of PTSD (Contractor et al., 2019). Authors reported numerous studies in which PTSD assessments did not function equivalently across ethnic groups. Testing measurement functioning within and across groups is critical and can help us improve the precision of our measures and increase the validity of research findings (Hsaio & Lai, 2018). If

measurement invariance is not assessed across Latinx subgroups, researchers cannot be sure that their results are accurate or generalizable across Latinx populations.

Findings from this study supported the convergent and discriminant validity of cumulative lifetime adversities. I found that cumulative lifetime adversities were positively linked with acculturation stress and depression and negatively linked with self-esteem and life engagement. These findings were expected because the literature documents that increases in acculturation stress and depression are linked with increases in exposure to stress and psychological trauma (Ellis et al., 2008; Myers et al., 2015). Likewise, past literature has suggested that higher levels of lifetime adversities are linked with lower levels of self-esteem and life engagement (Krause, 2004; Reiland & Lauterbach, 2008). Establishing convergent and discriminant validity provides support for the external aspect of construct validity (Messik, 1995).

Overall, the results from this study provide promising evidence for the use of a cumulative measure of lifetime adversities with Latinx immigrants from Mexico, Puerto Rico, Cuba, Dominican Republic, South American and Central America. It could also be beneficial for researchers exploring the effects of lifetime adversities on Latinx health as well as for health professionals working with trauma-affected Latinx immigrants.

Limitations

It is important to note several limitations of this study. First, we tested only one indicator of within-group difference – country of origin. Future studies could benefit from using more intricate measures of within-group diversity, such as by using latent class or latent profile analysis to assess many overlapping individual characteristics.

Second, this study included an older adult immigrant population in four large Latinx metropolitan areas in the U.S. This limits the generalizability of the findings across all locations and age groups. Third, it was necessary to combine people from Central and South American countries into composite groups because there were not enough participants from these countries to allow for separate analyses. Therefore, one should refrain from making definite conclusions about the validity of this scale for all immigrants from Central and South America. Fourth, my measurement model may have been more appropriately modeled with formative indicators. Formative indicators are seen as causing rather than being caused by the latent variable (Diamantopoulos & Winklhofer, 2001). Accordingly, I did not expect the scale items to be associated with one another because they are often random events that occur independently of one another (e.g., health problem, unexpected accident). Future studies would benefit from assessing cumulative lifetime adversities with formative indicators. Fifth, findings from this study should be interpreted with caution as this represents the first effort to provide construct validity for cumulative lifetime adversities among Latinx immigrants. Additional studies are needed to substantiate these findings.

Implications

Despite these limitations, the present study is the first to examine the construct validity of a cumulative measure of lifetime adversities among U.S. Latinx immigrants and has important implications for researchers and clinicians working with these populations. Examining multiple indicators of lifetime adversities within the same methodological approach may improve the understanding of lifetime adversities and our

ability to accurately evaluate the effects of lifetime adversities on mental health (Gallo et al., 2014). Researchers can improve the conclusion validity and generalizability of their findings by assessing for measurement invariance of the constructs they are assessing. Additionally, the measure tested in this study can serve as an important tool for health professionals focused on improving the mental health of Latinx immigrant populations. Future studies are needed with a wider range of age groups and in different geographic areas. Findings from this study provide preliminary evidence supporting the use of a cumulative measure of lifetime adversities with U.S. Latinx immigrant populations.

Paper 2: Lifetime Adversities, Risk, Resilience and Family Cohesion Among Latinx

Immigrants

Latinx immigrant families are commonly exposed to significant adversity before, during, and after migration (Leong, Park, & Kalibatseva, 2013). There is ample evidence that lifetime adversities, such as trauma exposure, can increase the risk of developing mental health problems and increase vulnerability to other stressors (e.g., Reuben et al., 2016). *Lifetime adversities* can be defined as events or experiences that cause psychological distress, such as exposure to violence, incarceration of family member, illness or loss, or economic stress. For example, higher rates of trauma exposure are associated with higher levels of acculturation stress for immigrants (Ehlers et al., 2016). Stress due to acculturation and exposure to traumatic events "may accumulate in insidious ways" (DiGangi et al., 2016; p. 7), affecting individual and family relationships (Singh et al., 2011).

Although experiencing lifetime adversities and migration-related stressors present challenges for most immigrant families, differences in risk and resilience processes can shape how families respond to these stressors (Phipps & Degges-White, 2014). These differences may partially account for the conflicting findings related to Latinx immigrant mental health (Alcántara & Lewis-Fernández, 2015; Leong et al., 2013). For example, some studies report that first-generation Latinx immigrants are better off than their second-generation counterparts, or that immigrants' health declines as time in the U.S. increases (Breslau et al., 2011; Salas-Wright et al., 2016). Conversely, other studies suggest that health improves with subsequent generations of immigrants (Alegría et al.,

2008; Shor, Roelfs, & Vang, 2017). Alegría and colleagues (2008) refer to these disparate findings regarding Latinx health as the *immigrant paradox*.

Using the family adjustment and adaptation response model (FAAR), also known as family stress model (Patterson, 1989), this study examined how individuals adapt to different lifetime adversities by testing the association between these stressors and family cohesion. In this study, I tested the extent to which acculturation stress and discrimination exacerbated the effects of lifetime adversities and ethnic identity and social support buffered the effects of lifetime adversities.

The family stress model involves examining the process by which families and individuals are able to adjust and adapt to life stressors. *Family adaptation* is the central concept within this theory. Experiencing life adversities, acculturation stress, and discrimination could be conceptualized as experiencing a stress pile-up, or *crisis*, according to family stress theory. *Family resources* is another concept from family stress theory that relates to the present study. Family resources allow families to better manage stress, including individual, family and community resources. Social support and ethnic identity could be conceptualized as resources within the family stress framework and protect against the effects of stress. I refer to these resources and pile up stressors as risk and protective factors in this paper.

Risk Factors: Lifetime Adversities and Cultural Stressors

Lifetime Adversities. Latinx immigrants often experience multiple types of lifetime adversities, such as traumatic events, general daily stress, and chronic stress (Myers et al., 2015). However, few studies have used comprehensive measures of

lifetime adversities (i.e., *cumulative lifetime adversities*) to assess Latinx mental health. This is problematic because different types of lifetime adversities often co-occur and may have overlapping effects (Breslau et al., 2008; Gallo et al., 2014; Green et al., 2010). One of the few studies on cumulative lifetime adversities with Latinxs found that lifetime adversities were linked with negative mental health outcomes, such as depression, anxiety, and PTSD (Myers et al., 2015). Assessing multiple aspects of lifetime adversity in the same measurement framework is necessary for understanding the experiences of Latinx immigrant families.

Acculturation Stress. One major cultural risk factor shown to influence Latinx mental health and resilience is acculturation stress (Bacallao & Smokowski, 2007; Dillon et al., 2013). *Acculturation stress* is defined as stress created from two cultures coming into contact with one another, including difficulties associated with learning a new language, finding stable employment, or managing conflicting cultural values (Lorenzo-Blanco & Unger, 2015). Most longitudinal studies have found that higher levels of baseline acculturation stress were associated with greater disruptions in family functioning and child outcomes at later time points (Cano et al., 2016; Schwartz et al., 2016; Zeiders et al., 2016). Nonetheless, several studies found that family cohesion declined over time after arriving in the U.S. (Dillon et al., 2013; Ibañez et al., 2015; Lorenzo-Blanco et al., 2016b). However, none of these studies used nationally representative samples of Latinxs living in the U.S. and none examined the interaction between acculturation stress and other lifetime adversities. Understanding how different

rates of acculturation stress interact with other risk and protective factors to influence Latinx families is vital to supporting Latinx immigrants' metal health.

Discrimination. Another risk factor related to Latinx mental health is perceived ethnic discrimination. One study found that about 70% of Latinxs experienced discrimination, a two-fold increase since 2003 (Southern Poverty Law Center, 2009). Ample research has linked increases in discrimination to impaired mental health functioning (Lorenzo-Blanco & Cortina, 2013; Molina et al., 2013; Moradi & Risco, 2006; Yip et al., 2008). For example, one study found that higher discrimination was linked with greater symptoms of depression and substance use for Latinxs (Lorenzo-Blanco et al., 2015). Another study using a nationally representative survey of Asian Americans found that increases in discrimination were associated with decreases in family cohesion (Yip et al., 2008). Experiencing discrimination can be particularly challenging for Latinx immigrants, who were not likely facing discrimination in the home countries.

Protective Factors: Social Support & Ethnic Identity

Social Support. There are also various factors that have been shown to protect against the effects of stress and adversity. One such factor is social support, which can be defined as the interpersonal resources that individuals perceive as being available to them (Gottlieb & Bergen, 2010). Research suggests that social support is associated with positive mental health outcomes and is possibly one of the most important factors in determining an individual's response to adversity (Prati & Pietrantoni, 2010; Ward et al., 2018). Accordingly, the *buffering hypothesis* states that social support is protective

against the negative effects of lifetime adversities (Cohen & Wills, 1985). For example, one study found that social support buffered the effects of lifetime adversities on the mental health of immigrant and native-born men in Kazakhstan (Ward et al., 2018). For Latinx immigrants, who have lost many of their personal connections in their home countries, social support may be especially important.

Ethnic Identity. Possessing a strong ethnic identity is important for minority mental health and can be protective against the effects of adversity and migration-related stress (Smith & Silva, 2011). Ethnic identity can be defined as the "the degree to which individuals perceive themselves to be included and aligned with an ethnic group" (Smith & Silva, 2011, p. 42). Results from a meta-analysis indicated that higher levels of ethnic identity were linked with lower levels of mental health problems (Smith & Silva, 2011). Moreover, two studies suggested that ethnic identity was associated with higher growth in family functioning over time (Baer & Schmitz, 2007; Stein et al., 2016). Ethnic identity may be particularly important for individuals experiencing multiple stressors, such as discrimination (Brittian et al., 2015; Ikram et al., 2016).

Family Cohesion. Latinxs place immense importance on family (Gallo, Penedo, Espinosa de los Monteros, & Arguelles, 2009). *Familism* or *familismo* is the Latinx cultural value that refers to a strong dedication to immediate and extended family members (Gallo et al., 2009). Similarly, family cohesion can be defined as a families' sense of togetherness. Strong family cohesion has been linked with positive mental outcomes for Latinxs (Lorenzo-Blanco et al., 2015; Rivera et al., 2008; Sarmiento & Cardemil, 2007). Family cohesion may be particularly important for Latinx immigrants,
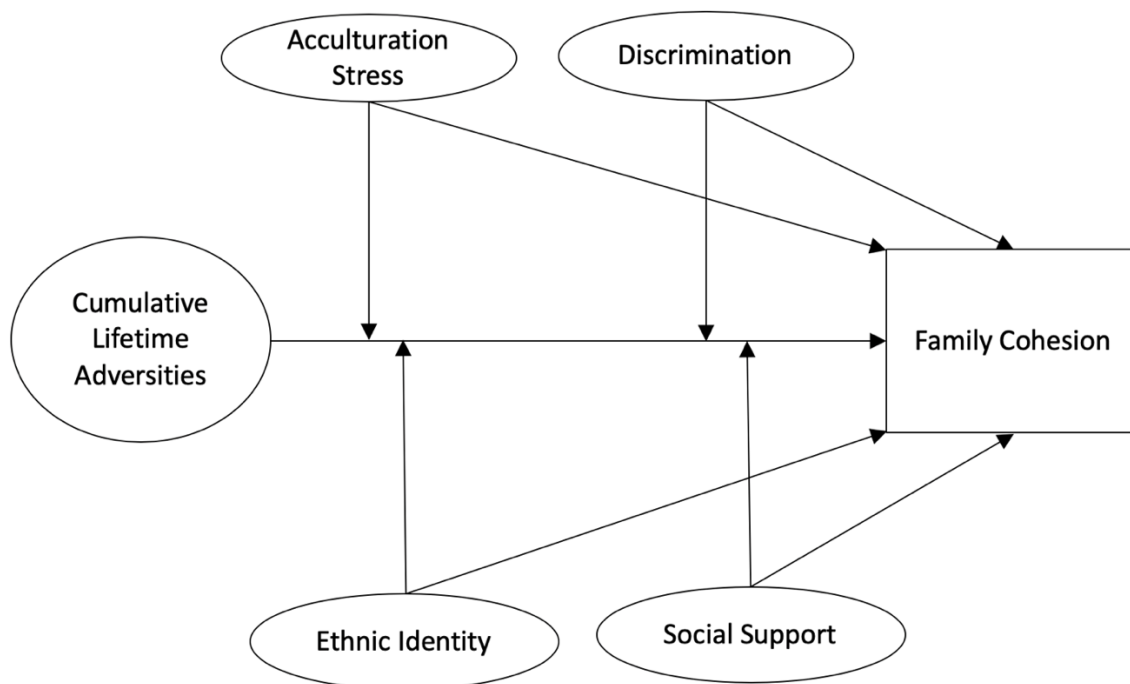
who are facing the stress of migration and the loss of important social connections. Several studies have shown that migration-related stressors are associated with disruptions in Latinx family functioning, which may increase families' vulnerability to future stressors (Dillon et al., 2013). Therefore, understanding the ways in which lifetime adversities and migration-related stressors impact family cohesion is critical for supporting Latinx immigrant mental health.

The Present Study

The objective of the present study was to assess the influence of various risk and protective factors on the relationship between cumulative lifetime adversities and Latinx immigrant family cohesion. To accomplish this objective, I tested (a) the influence of several risk (i.e., acculturation stress, discrimination) and protective factors (i.e., social support, ethnic identity) on Latinx immigrants' family cohesion and (b) the extent to which these risk and protective factors moderated the relationship between cumulative lifetime adversities and family cohesion. My hypothesis related to Objective 1a was that acculturation stress and discrimination would be negatively associated with family functioning; and social support and ethnic identity would be positively associated with family functioning. My hypothesis related to Objective 1b is acculturation stress and discrimination will exacerbate the association between CLA and family functioning and social support and ethnic identity will buffer the association between CLA and family functioning. See Figure 2 for a visual representation of the hypothesized model.

Figure 2

Hypothesized Analytical Model: Relationships between cumulative lifetime adversities, risk and protective factors, and family cohesion.

Note. Control variables (age at time of survey, age at time of migration, gender, income, and health insurance) were omitted for parsimony.

Method

Sample

I used data from the baseline assessment of a comprehensive survey of Latinx health, called the Hispanic Community Health Study - Study of Latinos (HCHS – SOL) Sociocultural Ancillary Study, conducted in 2009-2011. Participants were identified using stratified probability sampling in four of the largest Latinx metropolitan areas including Chicago, San Diego, Miami, and the Bronx. Researchers oversampled (a)

households in areas with high Latinx populations and (b) households with higher

probabilities of having adults over the age of 45 (LaVange et al., 2010). The original

study included many generations of Latinx immigrants, however, for the purposes of this

study, I only included first-generation immigrants (N = 3,632). Participants ranged from

18-74 years of age and most had at least a high school degree and a yearly household

income of less than $30,000. Participants were from various Latin American countries,

including Mexico (N = 1353), Puerto Rico (N = 402), Cuba (N = 689), Dominican

Republic (N = 449), South America (N = 290), and Central America (N = 449). Refer to

Gallo and colleagues (2014) for further information regarding the study design and

procedure.

Measures

Cumulative Lifetime Adversities (Latent). I assessed latent cumulative lifetime

adversities using 28-items the following scales: (a) the Adverse Childhood Experiences

(ACE) scale (Felitti et al., 1998) and (b) the perceived stress scale (Cohen, Kamarack, &

Mermelstein, 1983), and (c) the chronic stress scale (Bromberger & Matthews, 1996).

These scales were assessed as indicators of the overarching latent construct of cumulative

lifetime adversities. The internal consistency for all cumulative lifetime adversity items

was α = .83 in this sample.

Childhood trauma exposure was measured using the ACE scale, composed of 10

items that assess the number of adverse and traumatic events people experienced during

childhood, including emotional abuse, sexual abuse, physical abuse, emotional or

physical neglect, witnessing female parent being abused, parental separation or divorce,

living with someone abusing substances or who has a mental illness, and imprisonment of a household member. The total score is the sum of the 10 items, ranging from 0 to 10. The ACE scale has sound psychometric properties (Felitti et al., 1998) and is not required to have internal consistency. Nonetheless, the internal consistency for the present sample was α = .74.

Current stress was evaluated with a 10-item self-report measure, called the perceived stress scale (PSS). Items are on a five-point Likert-type scale (0 = *never*, 1 = *almost never*, 2 = *once in a while*, 3 = *often*, 4 = *very often*) and assess appraisals of stress experienced within the past 30 days. Sample items include: *how often have you felt that you were unable to control the important things in your life*, and *how often have you felt nervous and 'stressed.'* Positively worded items were reverse coded (e.g., *in the last month, how often have you felt that things were going your way*). I removed three items based on poor factor loadings and large modification index values. The total score was the sum of the remaining seven items and ranged from 0 to 28. The internal consistency for the current sample was α = .84.

Chronic stress burden was assessed using an 8-item scale that ascertains the number of current ongoing problems in an individual's life (e.g., financial, work, relationship, and health problems). Participants indicated "yes," or "no" to experiencing various chronic stressors for six months or more (e.g., *have you had a serious ongoing health problem for six months or more*, or *have you experienced ongoing financial strain for six months or more*). The total score is the sum of all eight items, and ranges from 0 to 8. This measure has been used in numerous multiethnic cohort studies (Bromberger &

Matthews, 1996; Shivpuri, Gallo, Crouse, & Allison, 2012). The internal consistency for the current sample was α = .56.

Acculturation Stress (Latent). I assessed acculturation stress using a 17-item version of the Hispanic Stress Inventory (HSI; Cavazos et al., 2006). Response items focus on various stressful experiences associated with transitioning into living in a new culture, such as parental and familial stress, immigration stress, and occupational/economic stress. Participants reported whether or not they experienced a particular type of acculturation stress (0 = "no," 1 = "yes"), and rated the level of stress that item caused (1 = "not at all worried/tense," 5 = "extremely worried/tense"). I modeled acculturation stress as a latent variable with three indicators, including occupational/economic stress, parental/familial stress, and immigration stress. Higher scores indicate higher levels of acculturation stress. The internal consistency of the scale was α = .85 for this sample.

Perceived Ethnic Discrimination (Latent). I evaluated perceived discrimination using a 17-item Brief Perceived Ethnic Discrimination Questionnaire-Community Version (PEDQ) (Kwok et al., 2011). Items focused on lifetime experiences of discrimination based on race and ethnicity in various arenas, including the workplace and other social contexts. The PEDQ examines four dimensions of perceived ethnic discrimination: threat/aggression, work/school discrimination, exclusion/rejection, and stigmatization/evaluation (Gallo et al. 2014) and has been widely used Latinx populations (Molina et al., 2013). Participants reported how often they had been discriminated against because of their race or ethnicity (1 = "never," 5 = "very often"). I modeled perceived

discrimination as a latent variable with three indicators: (a) exclusion/rejection and work/school discrimination, (b) stigmatization/evaluation, and (c) threat/aggression. Higher scores represent greater perceived discrimination. The internal consistency in the current sample was α = .88.

Social Support (Latent). I assessed social support with a 12-item version of the Interpersonal Support Evaluation List (ISEL) (Brookings & Bolton, 1988). Items are scored using a four-point Likert-type scale (0 = "definitely false," 3 = "definitely true"). The ISEL consists of positive and negative statements assessing three types of social support: tangible (help or assistance), appraisal (advice or guidance), and sense of belonging (empathy or acceptance). Example items include: *if I was stranded 10 miles from home, there is someone I could easily find to join me* (tangible) and *there is someone I can turn to for advice about handling problems with my family* (appraisal). After reverse scoring the negatively worded items, the 12 items were summed to create three subscales (belonging, appraisal, and tangible), each representing an indicator of the latent social support variable. Higher scores represent higher perceived social interpersonal support. This scale has been validated with Latinx populations (Merz et al., 2014) and the internal consistency of the social support scale was α = .81 for our sample.

Ethnic identity (Latent). I evaluated ethnic identity using a 12-item subscale from the Scale of Ethnic Experiences (SEE; Malcarne et al., 2006). Items are scored on a five-point Likert-type scale and assess attitudes and behaviors surrounding ethnic group membership. Example items include: *I have a strong sense of myself as a member of my ethnic group*, *my parents gave me a strong sense of cultural values*, and *I do not feel it is*

necessary to learn about the history of my ethnic group. Six items were reverse scored, and one item was removed due to poor internal consistency. The remaining 11 items were averaged and used to create three subscales, including family ethnic socialization, exploration, and commitment/affirmation. Higher scores reflect higher ethnic identity. The internal consistency of the total score was $\alpha = .70$ for the current sample.

Family Cohesion (Manifest). I assessed family cohesion using an 8-item subscale from the Family Environment Scale (FES) (Moos, 1990). Items are dichotomous (0 = *No*, 1 = *Yes*) and include positively-worded items assessing families' ability to get along, support one another, and whether there is a feeling of togetherness among family members. Example negatively worded items include: "We often seem to be killing time at home," and "There is very little group spirit in our family." The total score is the sum of all eight items and ranges from 0 to 8. The internal consistency was $\alpha = .75$ for our sample.

Data Analysis

I used Mplus 8 (Muthén & Muthén, 2017) to test study hypotheses and complete the aims of this study. Preliminary analyses included assessing item means, standard deviations, scale reliabilities, bivariate correlations, and testing assumptions required for SEM. I used SEM to test the associations between cumulative lifetime adversities, risk and protective factors, and family cohesion. Criteria for good model fit was met when χ^2 values for model fit were non-significant ($p > .05$), the comparative fit index (CFI) exceeded .95, and the root mean square error of approximation (RMSEA) was below .06 (Kline, 2016).

To test the extent to which risk and protective factors moderated the association between cumulative lifetime adversities and family cohesion, I conducted a latent moderation analysis. Moderators change the relationships that two variables have with one another. Researchers often use moderation analyses to determine for whom or under which conditions a relationship between two variables exist. Latent moderation has several advantages over traditional approaches (e.g., least squares regression) to assessing moderation (Maslowsky et al., 2015). For one, latent moderation produces estimates that are free from measurement error. Moreover, only one additional parameter needs to be estimated to estimate a latent variable interaction. To determine whether to retain the moderation model, I (a) compared the BIC value of the moderation and main effects models (with lower BIC values representing a better fit to the data) and (b) conducted a log-likelihood ratio test to determine if the moderation model was better fitting than the main effects model (Maslowsky et al., 2015).

I calculated latent interaction terms by (a) standardizing the independent and moderating variables and (b) calculating the product of these two latent variables (Little, 2013). I then added these interaction terms to the main effects model. To determine whether moderation effects were significant, I examined unstandardized and standardized path coefficients ($p < .05$). The proportion of missing data in the study ranged from between 0-1% of the cases. Based on missing data analysis, I assumed that data was missing at random (MAR) and handled it using full information maximum likelihood (FIML). Power analyses demonstrated that I had adequate statistical power to detect small to moderate effect sizes.

Results

I conducted preliminary analyses to examine descriptive statistics, scale reliabilities, and test the assumptions required for SEM. The mean score of cumulative lifetime adversities was $M = 14.37$ ($SD = 7.41$), and the mean family cohesion score was $M = 6.83$ ($SD = 2.85$). Participants reported experiencing an average of 13.96 (out of a total of 25) lifetimes adversities. See Table 5 for descriptive statistics of the focal variables. I also calculated bivariate correlations between the focal constructs. Cumulative lifetime adversities were negatively associated with family cohesion ($r = -.35$, $p < .01$). The associations between the four moderating variables (acculturation stress, discrimination, social support, ethnic identity) and family cohesion were small to moderate and all were statistically significant. See Table 6 for all bivariate correlations.

Table 5

Means, Standard Deviations, Range, Skewness, Kurtosis, and Reliabilities of Predictors and Outcome Variable

Variable	CLA	Acculturation Stress	Perceived Discrimination	Social Support	Ethnic Identity	Family Cohesion
Missing	36	17	10	23	41	35
M	14.37	15.06	24.52	25.62	3.61	6.83
SD	7.41	13.78	8.16	6.64	.47	2.85
Range	0 - 46	0 - 85	17 - 85	0 - 36	0 - 5	0 - 8
Skewness	.52	1.20	1.61	-.34	.00	-1.87
Kurtosis	-.02	1.15	3.69	-.39	.13	3.23
Alpha	.83	.85	.88	.81	.70	.75

Table 6

Self-Reports of Cumulative Lifetime Adversities, Risk and Protective Factors and Family

Cohesion: Bivariate Correlations

Variables	1	2	3	4	5	6
Cumulative Lifetime Adversities	–					
Family Functioning	-.35**	–				
Ethnic Identity	-.04*	.13**	–			
Social Support	-.30**	.33**	.24**	–		
Perceived Discrimination	.38**	-.23**	-.01	-.19**	–	
Acculturation Stress	.43**	-.23**	-.06**	-.27**	.44**	–

Note. **$p < .01$

Main Effects for Total Sample

I tested the main effects of CLA, acculturation stress, perceived discrimination, social support, and ethnic identity on family cohesion using SEM. I controlled for the effects of age at the time of the survey, age at the time of immigration to the U.S., gender, and income level based on past research linking these variables with mental health problems for Latinx immigrants (e.g., Alegria & Woo, 2009; Myers et al., 2015). Age at time of survey, age at time of immigration, and income were significantly associated with family cohesion. However, the effect sizes of these associations were small, the model fit decreased, and parameter estimates did not change with the control variables included in the model. Therefore, the control variables were removed from the final model.

The model fit the data adequately based on the model fit criteria, CFI = .93,

RMSEA = .05, SRMR = .05, robust χ^2 = 994.16, p < .05. The factor loadings ranged from

.45 - .87, suggesting the indicators were adequate representations of the construct (see

Table 7). I found that CLA was significantly associated with family cohesion (b = -.38, p

< .001). All four moderator variables were also significantly associated with family

cohesion, including social support (b = .23, p < .001), acculturation stress (b = .13, p <

.001), discrimination (b = -.07, p < .01), and ethnic identity (b = .08, p < .001). However,

the association between acculturation stress and family cohesion was in the opposite

direction than expected. The main effects accounted for 26% of the variance in family

cohesion.

Table 7

Factor Loadings of Five Latent Variables

Variables	Unstandardized Coefficients	Standardized Coefficients	*p-value*
Factor Loadings			
CLA: Childhood Trauma	1.19***	.53	
CLA Current Stress	3.72***	.68	< .001
CLA: Chronic Stress	.95***	.59	< .001
AS: Parental/Familial	2.79***	.45	
AS: Occupational/Economic	5.27***	.87	< .001
AS: Immigration	3.81***	.73	< .001
PD: Stigmatization	1.82***	.73	
PD: Threat/Aggression	.90***	.51	< .001
PD: Exclusion/Work/School	4.70***	.88	< .001
SS: Belonging	1.90***	.73	
SS: Emotional/Appraisal	2.12***	.80	< .001
SS: Tangible	1.95***	.75	< .001
EI: Parent/Family	.42***	.67	< .001
EI: Exploration	.42***	.70	< .001
EI:Commitment/Affirmation	.42***	.67	< .001

Note. ***p < .001, **p < .01, *p < .05

Moderation Model

I tested the degree to which social support, ethnic identity, acculturation stress, and discrimination moderated the association between CLA and family cohesion, controlling for gender, age at time of survey, age at time of immigration to the US, and income level (see Table 8). Specifically, I assessed the degree to which social support and ethnic identity decreased the association between CLA and family cohesion and the degree to which acculturation stress and discrimination increased the association between CLA and family cohesion. The moderation was a better fit to the data than the main effects model based on (a) a decrease in the BIC value, from BIC = 245,424.73 to BIC = 152,630.93 and (b) a significant log-likelihood ratio test ($D = .95$, $p < .05$). Three out of the four moderators were significant: social support ($B = .56$, $p < .001$), acculturation stress ($B = .28$, $p < .01$), and discrimination ($B = -.17$, $p < .05$). This means that the strength of the association between CLA and family cohesion depended on the level of social support, acculturation stress, and discrimination an individual experienced. Refer to Figures 3 - 5 for graphs of the interactions. Ethnic identity was not a significant moderator of the association between CLA and family cohesion ($B = -.08$, $p < .10$). The moderation model explained 43% of the variance in family cohesion. Several alternative models were tested and did not improve model fit. Therefore, the original model was retained.
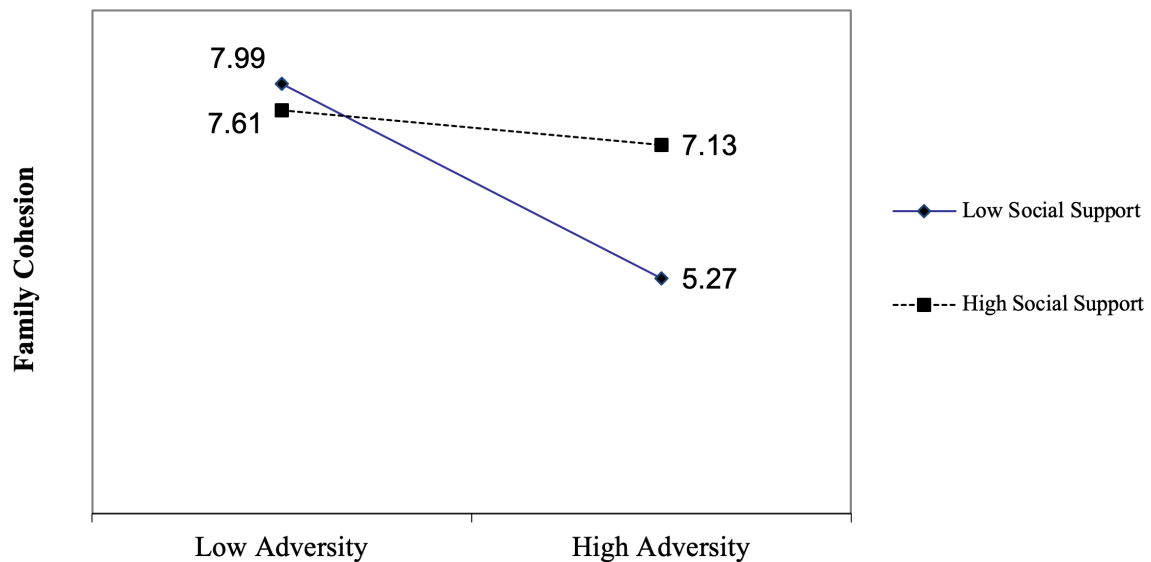
Table 8

Path Coefficients for Main Effects and Moderation Analysis

Variables	Unstandardized Coefficients	Standardized Coefficients	*p-value*
Main Effects Path Coefficients (*N* = 3,675)			
CLA → Family Cohesion	-.64***	-.38	< .001
Acculturation Stress → Family Cohesion	.22***	.13	< .001
Discrimination → Family Cohesion	-.11**	-.07	< .01
Social Support → Family Cohesion	.38***	.23	< .001
Ethnic Identity → Family Cohesion	.13***	.08	< .001
Controls			
Age → Family Cohesion	.01*	.05	< .05
Gender → Family Cohesion	-.07	-.02	.20
Income → Family Cohesion	-.04**	-.05	< .01
Age at Immigration → Family Cohesion	.01**	.06	< .01
Moderation Path Coefficients (*N* = 3,636)			
CLA*Acculturation Stress	.28**	.17	< . 01
CLA*Perceived Discrimination	-.17*	-.10	< .05
CLA*Social Support	.56***	.34	< .001
CLA*Ethnic Identity	-.10	-.06	.34

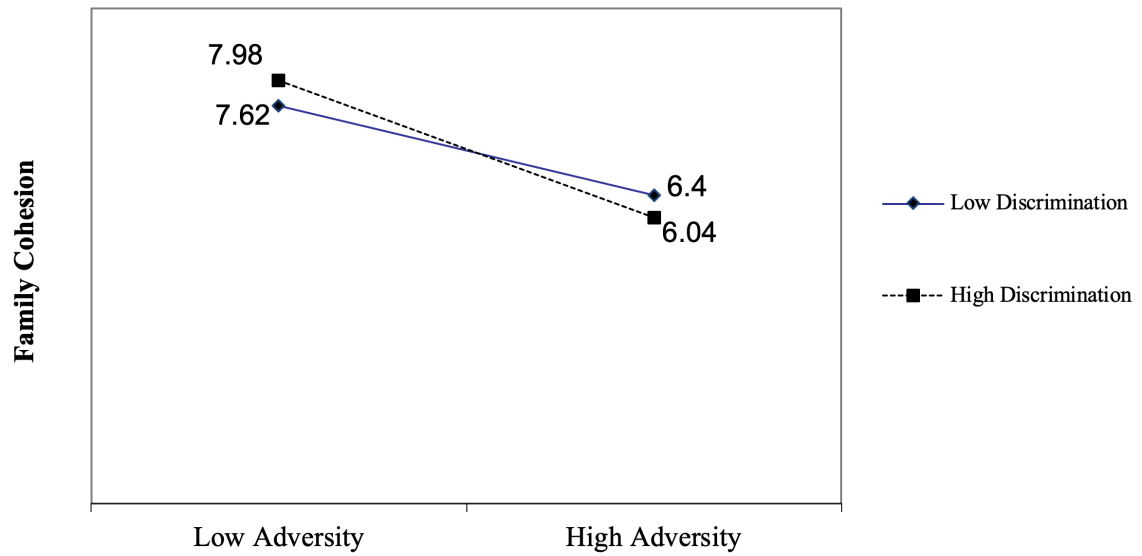*Note.* ***p < .001, **p < .01, *p < .05

Figure 3

Moderation Effect of Social Support (N = 3,594)

Note. The figure provides support for the buffering effect of high social support on the association between cumulative lifetime adversities and family cohesion.
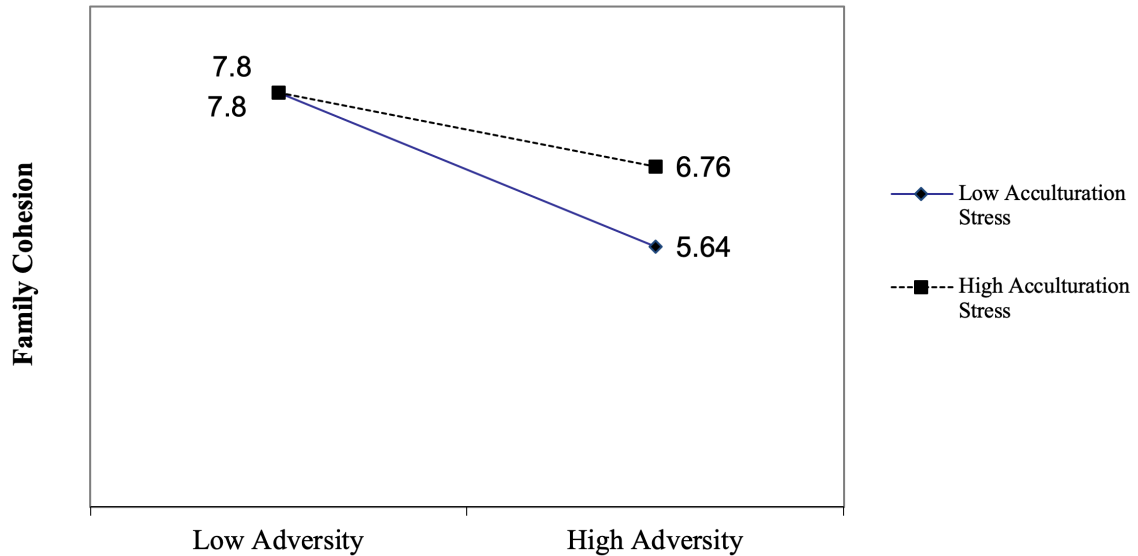
Figure 4

Moderation Effect of Perceived Discrimination (N = 3,594)

Note. The figure provides support for an exacerbating effect of discrimination on the association between cumulative lifetime adversities and family cohesion.

Figure 5

Moderation Effect of Acculturation Stress (N = 3,594)

Note. The figure provides support for a buffering effect of high acculturation stress on the association between cumulative lifetime adversities and family cohesion.

Discussion

This study examined the degree to which several risk and protective factors moderated the relationship between cumulative lifetime adversities and family cohesion among a national sample of U.S. Latinx immigrants. Participants experienced an average of 13.96 cumulative lifetime adversities, which included childhood trauma, current stress, and chronic stress. Interestingly, most individuals reported experiencing very high levels of family cohesion (scoring at least 6.8, with 8 being the highest). Bivariate correlations showed that all focal variables had small to moderate associations with one another and all were in the expected direction. Findings from this study provide evidence for the

importance of assessing moderators of lifetime adversities to promote healthy family functioning.

Main Effects Model

I tested a main effects model to examine associations between cumulative lifetime adversities, risk and protective factors (support, ethnic identity, acculturation stress, and discrimination) and family cohesion. All variables were modeled as latent constructs with the exception of family cohesion - no factor solution was found for this variable. The model fit the data well and all associations were significant. As predicted, social support and ethnic identity were positively linked with family cohesion; and cumulative lifetime adversities and discrimination were negatively linked with family cohesion. This corresponds with theory and past research. The family stress model states that experiencing multiple stressors increases the risk that families will experience dysfunction (Patterson, 1989). Families' ability to manage stress depends on the resources they have at their disposal, such as social support or possessing a strong ethnic identity. Past research has also found these variables can be important in determining Latinx families' response to stress (Prati & Pietrantoni, 2010; Stein et al., 2016). Cumulative lifetime adversities had the strongest association with family cohesion. This is understandable considering CLA was a composite of three different types of stress, including childhood trauma, current stress, and chronic stress, all shown to have detrimental effects on mental health (Gallo et al., 2014; Myers et al., 2015).

Contrary to expectations, higher acculturation stress was linked with higher levels of family cohesion. However, post-hoc analysis revealed that the direction of the

association between acculturation stress and family cohesion changed when cumulative lifetime adversities was removed from the model. This suggests there may be an interaction effect between acculturation stress and cumulative lifetime adversities (as will be explained below). The family stress model assumes that experiencing stressors (e.g., acculturation stress, cumulative lifetime adversities) will put strain on family functioning. Experiencing multiple stressors at the same time can cause a stress pile-up, or crisis, depleting families' resources and exacerbating the negative effects on families. Similarly, most research suggests that acculturation stress negatively impacts individuals and families (Bacallao & Smokowski, 2007; Dillon et al., 2013).

There are several potential explanations for these unexpected findings. First, most past literature examining the link between acculturation stress and family functioning among Latinxs has focused on adolescents' acculturation stress (e.g., Lorenzo-Blanco & Unger, 2015) or how parent-child acculturation discrepancies influence family outcomes (e.g., Schwartz et al., 2015). Adolescents are at a different stage of their development and may have different ways of managing their acculturation stress. Little is known about the association between adult acculturation stress and adult family cohesion. It is possible that the Latinx adults in the present study sought out the support of their families in response to high levels of lifetime adversities and acculturation stress. Furthermore, individuals reporting high acculturation stress may live in areas with less Latinx immigrants, and therefore, spend more time with their families. Additional research is needed before these results can be generalized.

Moderation Effects Model

Results from the moderation analysis indicated that three out of the four moderators were significant. Two of these moderating effects (social support and discrimination) were in the hypothesized direction. Specifically, social support appeared to have a buffering effect on the association between CLA and family cohesion. Discrimination appeared to have an exacerbating effect on the association between CLA and family cohesion. This corresponds with the family stress model's assumption that stressors can have a particularly harmful effect, increasing the burden on families. The family stress model also states that resources such as social support can mitigate the effects of stress on families. Likewise, past research has found that experiencing numerous stressors can be deleterious to individual and family health (Gallo et al., 2014; Green et al., 2010; Myers et al., 2015; Torres, Driscoll, & Voell, 2012). For example, Myers and colleagues (2015) found that cumulative measure of stress that included traumatic events, chronic life stress, and discrimination had a strong negative association with mental health status among Latinx and African American participants. Additionally, multiple studies suggest that social support is protective against the effects of stress on mental health outcomes (Amberg, Hultman, Michael, & Lundin, 2012; Cohen & Wills, 1985; Ward et al., 2018). For example, one study found that social support moderated the link between trauma exposure and depression among immigrant men in Kazakhstan (Ward et al., 2018).

Acculturation stress moderated the association between CLA and family cohesion, however, in the opposite direction than was expected. Experiencing high levels

of acculturation stress seemed to have a protective effect on the association between cumulative lifetime adversities and family cohesion. Said differently, Latinx immigrants with low acculturation stress and high CLA had the greatest likelihood, on average, of having poor family cohesion. This goes against the family stress model and past literature suggesting that experiencing several types of adversity is more damaging than experiencing one type alone (Gallo et al., 2014; Myers et al. 2015). One possible explanation for these findings is that families who experience acculturation stress and lifetime adversities may increasingly seek out support from family members, thus strengthening their sense of family cohesion. Several studies have found that moderate levels of stress can be protective (Seery et al., 2012; 2013). Additional research is required to better understand the influence of various types of stress on Latinx families.

Clinical Implications

Results from this study can be used to inform preventive interventions supporting the mental health of Latinx immigrant populations. Mental health therapists working with Latinx immigrants could benefit from assessing for the presence of various stressors, including acculturation stress, discrimination, and lifetime adversities. Individuals experiencing lifetime adversities and discrimination may be at greater risk for mental health problems and require more intensive intervention. Clients may not always volunteer information about discrimination or acculturation stress to their therapist. Therapists must be willing to ask questions and invite clients to share the types of migration-related stressors they are experiencing. Therapists may also benefit from assessing Latinx clients' social support networks and encourage clients to build their

support systems. This could be important in mitigating the effects of stress and adversity on Latinx families. Group interventions may be a useful tool to provide treatment and facilitate new relationships (e.g., Gonzales et al., 2012).

Preventive family mental health interventions could also be implemented at the community level, such as in churches or schools, to increase social networks and improve family functioning for Latinx immigrants. Studies conducted using existing infrastructure hold promise for improving Latinx health (Cooper et al., 2019). Franz and colleagues (2015) demonstrated the effectiveness of a widespread community-level prevention program to improve parenting skills and child behavior in a small German city. Their prevention program reached about 30% of the population by building programs into existing resources, such as schools, primary care settings, and community organizations. A similar approach could be used to support U.S. immigrant populations who have experienced trauma and adversity.

Limitations

This study had several limitations. First, data used in this study was cross-sectional and therefore, causation cannot be inferred. Future studies are needed with multiple time points to be able to infer the direction of the association. Second, not all Latinx immigrant groups were included in this study. We had to combine many countries into larger groups, such as South and Central America, hence, results from this study cannot be generalized to all Latinx immigrant groups living in the U.S. Subgroup analysis should be conducted to determine the extent to which the results are consistent across subethnic groups (e.g., Cooper et al., submitted). Third, this study used an individual,

self-report measure of family cohesion. Future studies would benefit from using multi-informant, multi-method assessments (e.g., clinician administered, observational) in order to better capture the intricacies of family dynamics. Finally, there may have been some overlap in the constructs included in the model making it difficult to determine the precise influence of any one construct alone. However, these risk and protective factors often co-occur, and I believe are important to include in the same model in order to improve our understanding of the interaction between these variables.

Despite the limitations, this study was the first to examine how several risk and protective factors moderated the relationship between cumulative lifetime adversities and family cohesion using a national sample of U.S. Latinx immigrants. Study findings highlight the importance of social support and discrimination in moderating the effect of cumulative lifetime adversities on family functioning. This study represents an important step in advancing the understanding of the overlapping effects of several risk and protective factors commonly experienced by Latinx immigrants.

Integrated Discussion and Implications of Analytic Papers

The overall objective of my dissertation was to improve assessment and prevention efforts for Latinx immigrant populations experiencing multiple types of adversity. The first paper tested the validity and factorial invariance of a comprehensive measure of lifetime adversities for Latinx immigrant groups, including Puerto Ricans, South Americans, Cubans, Dominicans, Mexicans, and Central Americans. I demonstrated configural, weak, strong, and strict invariance of a three-factor solution for cumulative lifetime adversities, including childhood trauma, current stress, and chronic stress indicators. The findings supported convergent and discriminant validity. Specifically, higher levels of cumulative lifetime adversity were associated with lower self-esteem and life engagement. Moreover, higher levels of cumulative lifetime adversity were associated with higher acculturation stress and depression. Researchers and clinicians can have confidence that this measure is accurate in assessing cumulative lifetime adversities for six Latinx immigrant subgroups. Future research is needed to validate this measure of cumulative lifetime adversities with other Latinxs who have lived in the U.S. for longer than one generation and in rural areas. Further investigation is also required to determine the degree to which scale items function similarly across each country in Central America and South America (countries in these regions were grouped together due to limitations in sample size).

The second paper examined the degree to which several risk and protective factors moderated the association between cumulative lifetime adversities and family cohesion for U.S. Latinx immigrants. Results supported a buffering effect for social

support, or that social support decreased the association between cumulative lifetime adversities and family cohesion. Conversely, I found that discrimination exacerbated the association between cumulative lifetime adversities and family cohesion. Prevention efforts may benefit from incorporating social support and discrimination components in interventions for Latinx immigrants exposed to stress. Social support interventions could improve families' resilience to the effects of adversities and migration-related stressors. Several prevention programs for Latinx families are offered in group formats to increase the sense of community and build social support among group members, such as Bridges/Puentes, GenerationPMTO, and Triple P (Gonzales et al., 2012; Parra-Cardona et al., 2017; Mejia, Calam, & Sanders, 2015). These interventions have demonstrated positive changes in individual and family mental health.

My findings also suggest that individuals exposed to both lifetime adversities and discrimination are at an increased risk for family dysfunction and likely have a need for preventive interventions that interrupt the negative effects of these stressors. Family stress theory states that experiencing multiple types of adversity places strain on the resources families have for managing stress and increases their vulnerability to future stressors (Patterson, 1989). Future studies should examine risk and resilience of Latinx immigrant families using longitudinal studies. Researchers could benefit from using person-centered analyses (e.g., latent profile analysis) to further specify subgroups that are at the greatest risk for family and psychological dysfunction. Researchers can use person-centered analyses to enhance personalized prevention efforts in which programs are tailored to address the individual needs of their clients (August & Gewirtz, 2019).

Advancing Personalized Prevention and Precision Medicine

Initiatives related to personalized prevention and precision medicine have increased dramatically over recent years. President Obama passed the Precision Medicine Initiative (PMI) in 2015 aimed at revolutionizing the practice of medicine through the personalization of prevention and treatment efforts (NIH, 2016). A recent special issue in the journal of *Prevention Science* focused on the need for personalized approaches to prevention science (August & Gewirtz, 2019). Precision medicine, also known as precision healthcare or personalized care, assumes that interventions are most effective when individual characteristics are taken into account, such as genetics, biology, personal experiences, and environmental factors (He et al., 2015). The personalized prevention approach applies the concept of precision medicine to the field of preventive science (August & Gewirtz, 2019).

My dissertation presents two statistical methods that can be incorporated into personalized prevention efforts for Latinx immigrants exposed to lifetime adversities. In the first paper, I tested the measurement invariance of cumulative lifetime adversities for six Latinx subgroups. Measurement invariance is needed to be able to understand the meaning of different mental health constructs within a particular population. For Latinx immigrants, and other populations with high within-group variability, measurement invariance testing is required for determining the extent to which measures are functioning equivalently across subgroups. My results provide evidence that a measure of cumulative lifetime adversities functioned similarly across six Latinx subgroups (e.g., Cuban, Puerto Rican). In a previous study, I found that the measure of acculturation

stress was not equivalent across Latinx subgroups, suggesting that the meaning of acculturation stress differed depending on subgroup membership (Cooper, 2018). Other studies have also found evidence that experiences of acculturation stress are unique for different subgroups (Guarnaccia et al., 2007). Understanding differences in measurement functioning for risk and protective factors is critical for assessing the needs of diverse populations. Researchers should consider the ways in which culture influences measurements' accuracy and avoid selecting measures before determining if they are effective within their target populations. Traditional psychometric research has compared measurement functioning across different populations (e.g., Carlson et al., 2011; Gray et al., 2004). Fewer studies have assessed measurement equivalence for various subgroups in a population. The approach I used to assess construct validity in paper 1 can serve as a tool to help guide researchers working with populations with high within-group diversity.

In addition, latent moderation analysis may serve as an important tool for researchers interested in personalized prevention approaches. I found that several risk and protective factors moderated the relationship between cumulative lifetime adversities and family cohesion among Latinx immigrants. I also found that risk and resilience processes varied depending on which risk and protective factors were included in the model. One avenue for future study is to incorporate latent moderation analysis into the evaluation of preventive interventions to test the extent to which intervention effects differ based on individuals' exposure to certain risk and protective factors. Perrino and colleagues (2014) examined the influence of baseline between-group differences in risk and protective factors on the treatment effects of a mental health intervention for Latinx families, using

an approach called baseline target moderation. They found that baseline differences moderated the effects of the intervention on family outcomes. This type of analysis can help researchers and clinicians tailor treatment recommendations to meet the individual needs of their clients. The family check-up intervention has applied this strategy to help refer clients to treatments that are most suitable for their risk profiles (Stormshak & Dishion, 2009).

Understanding the Immigrant Paradox

My dissertation research provides insight into the conflicting findings within the literature on Latinx immigrants' mental health. Alegria and colleagues (2008) used the term *immigrant paradox* to represent the inconsistent findings that suggest that immigrant status is both a risk and protective factor for psychological dysfunction. I explored two potential explanations for the immigrant paradox in my dissertation. One explanation is that measures used in previous studies did not function equivalently across all Latinx groups included their samples. Testing measurement invariance is particularly important when conducting research with heterogeneous populations, such as Latinx immigrants. Conflicting findings could be partly attributed to differences in measurement functioning across Latinx populations. Few studies examining risk and resilience among Latinxs have tested measurement invariance. This remains a major limitation of past research with U.S. Latinx populations. Further research is needed to determine the accuracy of psychological measures across ethnic subgroups and immigrant statuses.

The immigrant paradox could also be due to differences in individuals' exposure to various risk and protective factors. I found that first-generation Latinx immigrants'

responses to stress differed depending on the presence of specific risk and protective factors. For example, my findings suggest that having high social support can serve as a buffer for the effects of lifetime adversities. This can be problematic for recent migrants, who have likely lost important social resources as a result of migration. Moreover, studies have shown that first generation immigrants experience greater acculturation stress, higher family cohesion, and higher ethnic identity than second generation immigrants (Leong et al., 2013). These types of differences in risk and protective factors could lead to distinct mental health trajectories for these groups, accounting for some of the disparate findings related to Latinx mental health. Additional research is needed to understand how immigration status relates to various risk and protective factors.

Conclusion

My dissertation study was a part of a larger program of study focused on promoting the individual and family well-being of marginalized populations affected by trauma and adversity. Moving forward, I will continue to pursue improving our understanding of mental health disparities by using advanced statistical methods and creating innovative strategies to advance preventive EBIs tailored to the specific needs of individuals at various levels of risk. Specifically, I will conduct subgroup analyses using secondary datasets to identify risk profiles of Latinx immigrants exposed to various lifetime adversities and examine the extent to which preventive interventions are effective for individuals with different risk profiles. In addition, I hope to work collaboratively with communities to create innovate strategies for improving the

implementation and dissemination of preventive evidence-based mental health

interventions for trauma-affected populations, with a focus on immigrant populations.

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Appendix A: Survey Items

Ethnic Identity: Scale of Ethnic Experiences Ethnic Identity Subscale

e1.   Holidays related to my ethnicity are not very important to me.
e4.   Ethnicity was not important to my parents.
e7.   My ethnic background plays a very small role in how I live my life.
e8.   I do not feel it is necessary to learn about the history of my ethnic group.
e12. Ethnic pride is not very important to a child's upbringing.
14.   I have a strong sense of myself as a member of my ethnic group.
16.   I believe that my sense of ethnicity was strongly influenced by my parents.
20.   Being a member of my ethnic group is an important part of who I am.
23.   My parents gave me a strong sense of cultural values.
25.   I believe that it is important to take part in holidays that celebrate my ethnic group.
e27. When I was growing up, ethnicity played a very little part in our family life.
30.   I have taken time to learn about the history of my ethnic group.

Family Cohesion: Family Environment Scale (FES)

1.   Family members really help and support one another.
2.   We often seem to be killing time at home.
3.   We put a lot of energy into what we do at home.
4.   There is a feeling of togetherness in our family.
5.   Family members really back each other up
6.   There is very little group spirit in our family.
7.   We really get along well with each other.
8.   There is plenty of time and attention for everyone in our family.

Social Support: ISEL

ISEL 1[b] If I wanted to go on a trip for a day (for example to the beach, the country or mountains), I would have a hard time finding someone to go with me

ISEL 2[a] I feel that there is no one I can share my most private worries and fears with.

ISEL 3[c] If I were sick, I could easily find someone to help me with my daily chores.

ISEL 4[a] There is someone I can turn to for advice about handling problems with my family.

ISEL 5[b] If I decide one afternoon that I would like to go to a movie that evening, I could easily find someone to go with me.

ISEL 6[a] When I need suggestions on how to deal with a personal problem, I know someone I can turn to.

ISEL 7[b] I don't often get invited to do things with others.

ISEL 8[c] If I had to go out of town for a few weeks, it would be difficult to find someone who would look after my house or apartment (the plants, pets, garden, etc.).

ISEL 9[b] If I wanted to have lunch with someone, I could easily find someone to join me.

ISEL 10[c] If I was stranded 10 miles from home, there is someone I could call who could come and get me.

ISEL 11[a] If a family crisis arose, it would be difficult to find someone who could give me good advice about how to handle it.

ISEL 12[c] If I needed some help in moving to a new house or apartment, I would have a hard time finding someone to help me.

Acculturation Stress: Hispanic Stress Inventory (HSI)

1. Because I do not know enough English, it has been difficult for me to interact with others.
2. My spouse and I have disagreed on how to bring up our children.
3. Because of my poor English people have treated me badly.
4. My children have not respected my authority the way they should.
5. Because I am Latino I have been expected to work harder.
6. My income has not been sufficient to support my family or myself.
7. I have felt that my children's ideas about sexuality are too liberal.
8. There has been physical violence among members of my family.
9. Because I am Latino I have had difficulty finding the type of work I want.
10. My children have talked about leaving home.
11. My children have received bad school reports (or bad grades).
12. I have had to watch the quality of my work so others do not think I am lazy.
13. Because I am Latino it has been hard to get promotions or salary raises.
14. I had serious arguments with family members.
15. I have been forced to accept low paying jobs.
16. There have been conflicts among members of my family.
17. I have felt pressured to learn English.

Perceived Discrimination:

1. Have you been treated unfairly by teachers, principals, or other staff at school?
2. Have others thought you couldn't do things or handle a job?
3. Have others **threatened** to hurt you (ex: said they would hit you)?
4. Have others **actually** hurt you or tried to hurt you (ex: kicked or hit you)?
5. Have policemen or security officers been unfair to you?
6. Have others **threatened** to damage your property?
7. Have others **actually** damaged your property?
8. Have others made you feel like an outsider who doesn't fit in because of your dress, speech, or other characteristics related to your ethnicity?
9. Have you been treated unfairly by co-workers or classmates?
10. Have others hinted that you are dishonest or can't be trusted?
11. Have people been nice to you to your face, but said bad things about you behind your back?
12. Have people who speak a different language made you feel like an outsider?
13. Have others ignored you or not paid attention to you?
14. Has your boss or supervisor been unfair to you?
15. Have others hinted that you must not be clean?
16. Have people not trusted you?
17. Has it been hinted that you must be lazy?

Appendix B: Steps to Data Analysis

Paper 1: Invariance Testing

Preliminary Analysis: Descriptives & EFA
1. Label all items, reverse code or recode to have consistent scoring and have higher scores reflect more of that trait
2. Check item means, SDs, skewness and kurtosis, histograms
   - Consider removing items that are non-normal
3. Check item correlations, looking for any unpredicted relationships
4. Combine items into scales and check their internal consistencies
   - If alpha is lower than .8, remove any items that are lowering alpha or highly uncorrelated with the other items
5. EFA: check to see if the data suggests a 4-factor solution

Invariance Testing
1. Fit CFA for total sample
   a. Approach:
      - Use MLR to address nonnormality
      - Use Robust Weighted Least Squares (WLSMV) to treat variables as categorical (specificy using CATEGORICAL ARE command in mplus)
      - Constrain the factor means to 0 and factor variances and item residuals to 1.
   b. Make modifications (add largest MIs, one at a time, until the model meets the prespecified model fit criteria)
   a. ONLY ADD MIs when the model is a poor fit or if groups have significantly different fits based on MY model fit criteria
   b. What is coverage, iterations and theta parameterization?
1. Measurement invariance (Brown & Masa, 2015)
   a. Determine Baseline models for each group individually
      - Use model fit assessment criteria
      - Make sure the fit is good for all groups
      - Use WLSMV estimator
      - Consider adding MIs if model fit is poor
   b. Configural invariance
      - Freely estimated model
      - Fix residual variances to 1
      - Fix factor means to 0
      - Fix factor variances to 1
   c. Metric Invariance/Weak Invariance(constrain FLs) - Model 1
      - If significant difference between M1 and M0, add largest FL MIs, one at a time, until there is not a significant difference, & continue with partially invariant model

- Free factor variances
d. Scalar Invariance/Strong Invariance(constrain FLs + thresholds) - Model 2
    - If significant difference between M1 and M0, add largest intercept MI, one at a time, until there is not a significant difference, & continue with partially invariant model
    - Free factor variances and factor means freed
e. Strict (constrain FLs + thresholds + residuals) - Model 3
    - Fit a new model (3a) with the item residuals freely estimated. Then used this to compare to a model in which item residuals were constrained to be equal.
    - If significant difference between M3a and M3, add largest variance MIs, one at a time, until there is not a significant difference, & continue with partially invariant model

Appendix C: Dissertation Proposal

<u>**SPECIFIC AIMS**</u>

Latinx immigrant families are commonly exposed to significant stress before, during, and after migration (Leong et al., 2013). A recent study found that approximately 30% of Latinxs experienced traumatic events during migration (Perreira & Ornelas, 2013). Another study found that 77% of Latinxs were exposed to at least one traumatic event during childhood, a significantly higher rate than that of the general population (Llabre et al., 2017). There is ample evidence that trauma exposure can increase risk of developing mental health problems and increase vulnerability to other stressors (e.g., Reuben et al., 2016). For example, higher rates of trauma exposure are associated with higher levels acculturation stress for immigrants (Ehlers et al., 2016). Acculturation stress involves the challenges that accompany transitioning into a new culture, such as language barriers, stress of deportation, or the loss of social relationships. Stress due to acculturation and exposure to traumatic events "may accumulate in insidious ways" (DiGangi et al., 2016; p. 7), affecting individual and family relationships (Singh et al., 2011). Future studies need to assess exposure to stress and trauma holistically, accounting for the cumulative effects of lifetime adversities.

Although experiencing lifetime adversities, such as traumatic events (as defined by the DSM 5's criteria A associated with development of PTSD) and migration present challenges for most immigrant families, differences in risk and resilience processes can shape how families respond to these stressors (Phipps & Degges-White, 2014). Lifetime adversities will be defined as events or experience that may cause psychological distress, such as exposure to violence, incarceration of family member, illness or loss, economic stress, discrimination. Understanding family risk and protective factors is necessary for promoting immigrants' health and resilience to lifetime adversities. However, the exact nature of the compound effects of multiple forms of stress (e.g., trauma exposure, chronic stress, discrimination, acculturation stress) on mental health and how these stressors interact with risk and protective factors has produced conflicting results. As the largest and fastest growing immigrant group, additional research is needed on the effects of trauma and migration on Latinx immigrant populations (Krogstad, 2014).

There is an <u>urgent need</u> to identify sociocultural risk and protective factors in order to support the health and adaptation of effective mental health and family interventions for Latinx immigrant populations exposed to lifetime adversities. Additionally, determining within-group differences in risk and resilience can lead to advancements in prevention science by identifying potential areas for program adaptation based on levels of risk and protective factors. Failing to address these needs could stymie the development of targeted, effective treatments for Latinx immigrant families and potentially lead to greater health disparities.

The <u>long-term goal</u> of this study is to inform the development of culturally responsive and effective prevention programs to support Latinx immigrant mental health and family resilience. The <u>overall objective</u> of this study is to advance scientific understanding of how lifetime adversities impact family functioning among Latinx subgroups by examining how risk factors, such as acculturation stress, and protective

factors, such as social support, impair or enhance aspects of family functioning. This objective represents the first step in achieving my long-term goal of developing culturally appropriate preventive interventions for Latinx immigrants exposed to lifetime adversities and traumatic events.

I will draw from family resilience (Masten & Monn, 2015) and circumplex model concepts (Olson, 2000) to inform my study design. Both these models emphasize importance of families' ability to endure and adapt to life adversities. Resilience involves a dynamic interplay of risk and protective processes and their influence on individual and family health (Masten & Monn, 2015). Olson's model highlights the importance of communication and sense of togetherness in family functioning. These models will inform my conceptualization family functioning and the study hypotheses.

The *central hypothesis* is that the effects of childhood trauma exposure on family functioning will differ based on several risk and protective factors, including acculturation stress, discrimination, social support, ethnic identity, and country of origin. This hypothesis was formed based on past research suggesting that risk and protective factors may vary across and within cultural groups (e.g., Marshall et al., 2009; Rivera et al., 2008). Additionally, few studies have tested within-group diversity among Latinx subgroups using advanced statistical analysis (e.g., structural equation modeling; Gallo et al., 2014). The *rationale* for this proposal is that the identification of risk and resilience processes in relation to lifetime adversities will enhance efforts to develop mental health interventions tailored to the unique needs of Latinx immigrant groups experiencing traumatic and migration related stressors. To test my central hypothesis and complete the study objective, I will pursue the following *specific aims*:

Aim 1: Assess differences in the measurement functioning of lifetime adversities (childhood trauma, current stress, chronic stress) between Latinx subgroups. This step will involve (a) fitting a baseline measurement model of lifetime adversities, and (b) conducting invariance testing of the measurement model (e.g., the differences in the ways that the construct is organized and the items function) across Latinx subgroups. I hypothesize that parameter estimates, such as factor loadings and item intercepts, and goodness of fit indices within the measurement model will vary between Latinx subgroups.

Aim 2: Determine the effects of lifetime adversities on Latinx immigrants' family functioning. The hypothesis associated with this aim is that higher levels of lifetime adversities, including childhood trauma, current stress, and chronic stress, will be associated with lower scores in adult family functioning.

Aim 3: Identify sociocultural risk and protective factors associated with Latinx family resilience. I hypothesize that the association between lifetime adversities and family functioning will be moderated by several risk and protective factors, including acculturation stress, discrimination, social support, and ethnic identity. Specifically, acculturation stress and discrimination will exacerbate the effects of compound stress on family functioning and social support and ethnic identity will buffer the effects of complex tress on family functioning.

Through completion of these aims, the *expected outcomes* are to identify the effects of lifetime adversities on family functioning and identify several risk and

protective factors influencing this association. Further, I anticipate this study will enhance the field by improving understanding of the extent to which within-group diversity influences measurement and risk and resilience to traumatic stress. This association will be explained in the next Significance subsection of Research Strategy.

RESEARCH STRATEGY
SIGNIFICANCE
Overall Scientific Premise

Recent literature suggests a complex relationship between sociocultural factors, the risk of exposure to stress and trauma and the development of PTSD for Latinxs. As the largest and fastest growing immigrant group, there is an urgent need for research with this population (Krogstad, 2014). Most research findings support that Latinxs are more prone to developing PTSD after experiencing a traumatic event (e.g., Alcantara et al., 2013; Kaczkurkin et al., 2016; Marshall et al., 2009). Some recent studies have indicated that Latinxs experienced higher rates of trauma exposure (77.2%) than the general population (59%) and that trauma exposure was associated with a variety of health-related problems, including depressive symptoms, alcohol use, and heart disease (Llabre et al., 2017; Centers for Disease Control and Prevention, 2015). However, another nationally representative study found that trauma disparities may not exists between Latinx and non-Latinx groups (Alegría et al., 2013).

There are numerous possible explanations for these conflicting findings. For the purposes of this study, two promising explanations will be explored. For one, there may be differences in the conceptualization and measurement of different lifetime adversities across Latinx groups. Additionally, most studies make the assumption that their measures function the same across Latinx groups. This is highly problematic because Latinx immigrants come from over 20 different countries, each with a unique cultural context, which could impact the way these individuals understand or experience compound stress. Second, the conflicting findings could be a result of differences in risk and resilience processes among Latinx groups. For example, experiencing different levels of acculturation stress (DiGangi et al., 2016), discrimination (Phipps & Degges-White, 2014), and having different cultural values (Asfour et al., 2017) may all influence how Latinxs respond to lifetime adversities.

Testing measurement functioning across groups can help us improve the precision of our measures and increase the validity of research findings. Research testing sociocultural factors influencing the effects of lifetime adversities and trauma on Latinxs subgroups is critical for advancing diagnosis, treatment and prevention efforts with this population (Alcantara & Lewis-Fernandez, 2015).

Assessing Lifetime Adversities Across Latinx Subgroups

It is well-known that lifetime adversities can negatively affect the health of Latinx

populations. The types of lifetime adversities commonly assessed among Latinxs include: neighborhood stress (White et al., 2015), acculturation stress (Dillon et al., 2013), discrimination (Molina et al., 2013), and traumatic stress (Perreira & Orenales, 2013). Most extant research has examined these types of stressors separately (e.g., Lorenzo-Blanco et al., 2015). This methodological approach fails to account for the shared, cumulative impact of experiencing various forms of adversity on mental health. Future studies could benefit from including a broader conceptualization of lifetime adversities to better capture the range of adverse experiences to which Latinx immigrants are often exposed.

The proposed study will examine test the precision of a comprehensive conceptual and methodological framework for assessing lifetime adversities. I will test a 3-dimensional model of lifetime adversities that includes: childhood trauma exposure, current stress, and chronic stress. This model builds off the conceptual and methodological framework used by Myers and colleagues (2015). Examining several indicators of lifetime adversities that access different dimensions of the construct within the same methodological approach may improve our understanding of lifetime adversities and our ability to accurately evaluate the effects of lifetime adversities on mental health (Gallo et al., 2014).

Use of advanced statistical methodology to test within-group variability. Most past literature has used traditional methods (e.g., multiple regression, ANOVA) in examining the effects of lifetime adversities on diverse families and testing within-group differences in trauma responses (e.g., Guarnacia et al., 2007). Although these methods provide useful information regarding the differential reactions to lifetime adversities, advanced methodology (i.e., SEM) provides a unique opportunity to test in-depth patterns of resilience within groups. It also allows the potential for testing differential item functioning to determine whether all groups interpret survey instruments in similar ways. The proposed study will test for within-group differences in measurement as well as in risk and resilience processes among Latinxs. I expect that the completion of this aim will result in a contribution towards enhanced efforts to tailor interventions to target risk and protective factors within specific ethnic subgroups.

Effects of Lifetime Adversities and Trauma on Latinx Family Functioning

Although disparities in rates of PTSD prevalence for Latinxs may be unclear, there are multiple studies suggesting that conditional risk for PTSD is higher for Latinxs. This means that after controlling for trauma exposure, the likelihood of having PTSD is higher for Latinxs than for other ethnic groups (Alcantara & Lewis-Fernandez, 2015). Traumatic stress and PTSD can have harmful effects on families by weakening parenting skills (e.g., self-regulation, responsiveness) and harming parent-child relationships (Juul et al., 2016; Muzik et al., 2013; Schechter et al., 2014). Brockman and colleagues (2015) found that parental PTSD symptoms (i.e., experiential avoidance) were associated with less social engagement with their children based on observed parent-child interactions. Additionally, there is growing evidence that PTSD symptoms are intergenerational, or

transferred from parents to children (e.g., Letzer-Pouw et al., 2013; DiGangi et al., 2016). Letzer-Pouw and colleagues (2013) found that PTSD symptoms might be transmitted from one generation to another via increases in perceived parental burden.

Despite the amassing research on the effects of traumatic stress on parenting and intergenerational transmission of PTSD symptoms, fewer studies have examined the link between trauma exposure and overall family functioning. Family functioning is a multi-dimensional construct that can include communication, family roles, cohesion, conflict, affect regulation, problem-solving, and independence (Negy & Snyder, 2006; Olson, 2000; Roncone et al., 2008).

One of the few studies examining the relationship between trauma exposure and Latinx family functioning reported that higher rates of exposure to traumatic events were associated with lower levels of family cohesion, based on a sample of 122 Mexican immigrants (Singh et al., 2011). The complexity of families necessitates the use of multiple measurement types for assessing family processes, and only focusing on parenting and the parent-child dyad limits our understanding of the systemic consequences of traumatic stress. Additional research is needed to advance understanding of the influence of trauma exposure on family relationships. Increasing understanding of family functioning in Latinxs might be particularly relevant based on the immense emphasis that many Latinxs place on family togetherness (e.g., familism) and based on having a higher conditional risk of developing PTSD. The current study aims to identify the impact of lifetime adversities on Latinx family functioning. Upon completion of this aim, I expect the proposed work to contribute to informing the development of family-level interventions to interrupt the effects of lifetime adversities on Latinx immigrant families.

Identifying Risk and Protective Factors for Latinxs Exposed to Lifetime Adversity and Traumautic Events

It is well-known that mental health trajectories are shaped by risk and protective factors. For example, exposure to violence, poverty, and family conflict can increase the risk of mental illness, whereas, having a stable, supportive living environment can serve as protection against psychological dysfunction. Past literature on Latinx immigrant resilience has highlighted several common risk and protective factors, such as acculturation, social support, ethnic identity, discrimination, and cultural values (e.g., Singh et al., 2015; Kimbro et al., 2012; Lorenzo-Blanco et al., 2016). Ernestus and colleagues (2015) reported that for certain groups, risk factors tended to cluster together, increasing the likelihood of mental health problems.

Most of the resilience literature with Latinxs has focused on risk and protective processes associated with mental health disorders (e.g., Leong et al., 2013). Fewer studies have examined resilience processes of Latinx families exposed to traumatic events and migration stressors. This study aims to identify salient risk and protective factors that impact the relationship between trauma exposure and family functioning. Once this aim is completed, the expected contribution is that information from my findings will be used

to assess and target risk and protective factors associated with mental health disparities. For example, these findings could inform adaptive interventions that vary the dosage of the intervention prescribed based on potential moderating variables (e.g., acculturation stress, ethnic identity) that influence responsiveness to treatment (Collins et al., 2004).

Significance of Expected Research Contribution

The purpose of the proposed study is to test resilience processes among Latinx subgroups. *The contribution of the proposed research is expected to be a vertical advancement in the understanding of key risk and resilience factors for Latinxs exposed to childhood trauma. I also expect to determine the ways in which within-group differences affect the resilience processes of Latinxs and evaluate the potential of structural equation modeling in assessing these differences. This contribution will be significant because it will enhance the ability of practitioners and researchers to create targeted programs that mitigate the effects of traumatic stress and are tailored to the specific needs of various Latinx subgroups.*

INNOVATION

The status quo as it relates to the effects of traumatic stress on Latinx immigrant populations is to treat Latinxs as a single, uniform group, focusing mainly on individual outcomes (Gallo et al., 2014). Although this research is important for establishing a link between lifetime adversities and negative outcomes, it leaves out the possibility of within-group variation. A major limitation to past research is the use of traditional methodologies in analyzing the consequences of traumatic stress. Past research has often included clinical samples when assessing traumatic stress and PTSD, rather than the general population (Kaczkurkin et al., 2016). *The proposed research is innovative because it tests the dynamic interplay of multiple sociocultural risk and protective factors on the relationship between lifetime adversities and family functioning, using structural equation modeling. This analytic procedure is well suited for testing within-group differences in measurement functioning and assessing resilience processes with a national sample.* Recent findings suggest that differences in risk and resilience processes across Latinx groups could be one of the reasons for inconsistent findings on the effects and expression of lifetime adversities (e.g., trauma exposure) in Latinxs (Alcantara & Lewis-Fernandez, 2015). This new and substantively different approach to examining trauma exposure within Latinx subgroups is expected to overcome current limitations of traditional methodological approaches, hence, opening new horizons in the treatment of traumatic stress among Latinx subgroups.

Systemic Theoretical Frameworks

I will draw from the Double ABCX Model (McCubbin & Patterson, 1983), family resilience frameworks (Masten & Monn, 2015) and the circumplex model (Olson, 2000) to inform my study design. Family stress theory involves examining the process by which families and individuals are able to adjust and adapt to life stressors. Family adaptation is the central concept within this theory. My study will examine how individuals adapt to

different lifetime adversities by testing the association between these stressors and family functioning. I will also test the extent to which acculturation stress and discrimination exacerbate the effects of lifetime adversities and ethnic identity and social support mitigate the effects of lifetime adversities. Experiencing life adversities, acculturation stress, and discrimination could be conceptualized as experiencing a stress pile-up, according to family stress theory. Family resources is another concept from family stress theory that relates to the present study. Family resources allow families to better manage stress, including individual, family and community resources. Social support and ethnic identity could be conceptualized as resources within the family stress framework. I refer to these resources and pile up stressors as being risk and protective factors. My conceptual framework as well as how it aligns with concepts from family stress theory is outlined in Figure 1.

Family resilience frameworks emphasize the importance of families' ability to endure and adapt to life adversities, such as exposure to adversities and traumatic events. Identifying risk and protectives factors associated with positive adaptations to adversities and trauma (Aim 3) is central to understanding family resilience and is a core element of family resilience frameworks (Masten & Monn, 2015). This theory adds to family stress theory by emphasizing the importance of risk and protective factors.

Family functioning will be assessed using the circumplex model's conceptualization of family functioning, which underscores the importance of family cohesion, communication, and flexibility. This model was selected because it's definition of family cohesion is more applicable to the present study's design than the definition presented by family stress theory. Family stress theory conceptualizes family cohesion as a family's ability to recognize and accept the amount of control they have over a particular event or situation (McCubbin & Patterson, 1983). Although helpful, the measures in this study do not assess this definition of cohesion. I will use scales that align with core dimensions of Olson's model, including family cohesion, familism, and conflict (Olson, 2000). Negy and Snyder (2006) suggest that cohesion, conflict, and expressiveness are the most important dimensions of family functioning with Latinx families.

APPROACH
Aim 1: Assess differences in the measurement functioning of lifetime adversities (childhood trauma, current stress, chronic stress) between Latinx subgroups.

Introduction. To comprehensively understand the effects of exposure to life adversities and trauma, we must have accurate comprehensive measures that are valid across Latinx groups. The objective of this aim is to (a) test a comprehensive measurement model of lifetime adversities and (b) determine the extent to which this measurement model is equally accurate across various Latinx subgroups (Mexicans, Cubans, Puerto Ricans, Dominicans, Central Americans, and South Americans). I intend to achieve this objective by evaluating the factorial invariance of lifetime adversities. Assessing factorial invariance answers the question: Am I measuring the same construct in each subgroup? I will assess factorial invariance by conducting multi-group confirmatory factor analyses to determine whether the measures operate similarly across

groups (Dimitrov, 2010). I will use a 4-step process, guided by Brown and Masa (2015), to assess factorial invariance when dealing with ordinal data. The rationale undergirding this aim is that determining differences in measurement functioning among Latinx subgroups is needed to advance research practices with Latinx families. Obtaining this information will enhance the precision of research measures with groups with high within-group variability. Upon completion of Aim 1, I expect to identify ways in which Latinx subgroups differ in their interpretation of psychological measures of lifetime adversity and trauma exposure.

Sample. Data used for this study are from the HCHS – SOL Sociocultural Ancillary Study, conducted from 2009-2011 (Gallo et al., 2014). This is the largest and most recent publicly accessible survey of Latinx mental health in existence. This study used a household probability sampling procedure to identify potential participants in four of the largest Latinx metropolitan areas including the Bronx, Chicago, Miami, and San Diego. Participants ($N = 4,393$) included individuals aged 18-74 from various Latin American countries, such as Mexico, Cuba, Puerto Rico, and the Dominican Republic. For this study, only participants who born outside the US ($N = 3,642$) were included. Most participants were above the age of 45 and had a yearly household income of less than $30,000.

Research design. I will use a structural equation modeling (SEM) framework to complete all aims of this study. SEM has several advantages to traditional forms of data analysis (e.g., general linear modeling approaches), such as being able to partial out measurement error, model latent variables, test multiple dependent variables, and measure how well the model fits the data (Kline, 2016). My research design will use the total sample of Latinx immigrants in the HCHS/SOL data (n = 3,642) and several control variables (i.e., gender, age, SES). Models will be built up in complexity, following the recommended practices of SEM (Kline, 2016). Steps to analysis will include: (a) preliminary data analysis using SPSS 23 and Mplus 8, (b) model identification, (c) model estimation and evaluation, (d) consideration of equivalent or near equivalent models, (e) and model respecification if needed, (f) measurement invariance testing. Similar steps will be followed in the subsequent aims of this study.

Completion of Aim 1 involves conducting a multi-group confirmatory factor analysis using Mplus 8. Multiple samples CFA is concerned with whether a set of indicators measures the same constructs with equal precision over different samples, also known as factorial invariance testing (Dimitrov, 2010). For example, certain Latinx subgroups could have unique interpretations of acculturation stress items.

Preliminary analysis. Preliminary analysis will include descriptive analysis and assumption checking. I will examine item and variable distributions and correlations matrices to assess how variables are related. As the basic principles of regression are a core part of SEM, assumptions in regression and SEM are similar: *linearity, normality, homogeneity of variance and independence*. If any of these assumptions are violated, efforts will be made to rectify these violations in order to avoid bias in parameter estimates. **Linearity** assumes that the data is best represented by a linear pattern. This assumption will be assessed by graphing the relationship of the predicted-Y values against the residuals. Linear data is represented by a roughly equal spread of points above

and below the line (average residual = 0). **Normality** assumes that the residuals form a normal distribution around zero. This assumption will be examined by looking at a histogram (and skewness and kurtosis) of individual items and variables. **Homogeneity of variance** assumes that there is an equal variance among the residuals across Y. This assumption was also evaluated by looking at a plot of predicted-Y values against the residuals. Based on this plot, there did not seem to be any issues with homogeneity of variance. **Independence** relates to the residuals being independent from one another. This depends on how the data was collected and is the most important assumption not to violate. In order to check for independence, I look at the distribution of model residuals (e.g., if residuals appear to be scattered randomly around the plot, the assumption will be considered fulfilled).

Another potential issue that can bias results and cause problems with assumptions is **outliers**. Outliers can decrease effect sizes and the likelihood of finding a significant relationship. This will be assessed by looking at residual scatterplots. **Multicollinearity** will be assessed by looking at the bivariate correlations between predictors - correlations > .8, tolerance values < .10, and VIF > 10 will be considered collinear. Finally, **positive definiteness** is required for most SEM estimation methods, which relates to rules that the data matrix needs to fulfill in order for analysis to run. This will be assessed by copying the full data matrix into a matrix calculator tool (i.e., www.bluebit.gr/matrix-calculator). Missing data will be handled using full information maximum likelihood (FIML).

Measures. *Lifetime adversities* will be assessed as a latent variable using 28 items self-reported from the following scales: (a) the adverse childhood experiences (Felitti et al., 1998; 10 items) scale; (b) the perceived stress scale-10 (10 items; Cohen, Kamarack, & Mermelstein, 1983); and (c) the chronic stress scale (8 items; Gallo et al., 2014). I will test a three-factor model, with each of these scales representing a different dimension of the construct and with the scales' items representing indicators of that factor. The rationale for this model comes from the findings of past studies examining the factor structure of lifetime adversities (e.g., Ford et al., 2014; Myers et al., 2015).

Model Specification. This includes specification, or identifying the variables and the relationships between variables, of the measurement and structural path models. The measurement model will be determined by parceling items based on information from past theory and research - selecting items that are most representative of the construct. I will aim for 3-5 indicators per construct, as recommended by (Kline, 2016). In measures that have multiple subscales, each subscale will represent a factor of that construct. The structural model will be determined based on family resilience theory and past research examining risk and protective factors influencing trauma and family functioning with Latinxs. Risk and protective factors will be added to the model in line with model building recommendations (Kline, 2016). For example, if a model with two risk and protective factors is an equally good fit to the data as a model with four risk and protective factors, the simpler model will be retained. Refer to Figure 1 below.

Model identification. Identification of the measurement model will be conducted based on theory and past research on the factor structure of each construct. Two requirements must be met to estimate latent models: (a) latent variables must be set to a scale of measurement, and (b) the degrees of freedom for the model must be greater than

one ($Df_m > 0$). I will use the fixed factor method to set the scale of measurement for my variables (Little, 2017). This involves making the computer constrain the factor means to equal 0 and the factor intercepts to equal 1. Identification of the structural model also involves determining whether the model can be estimated based on the number of observed data points and the number of parameters that need to be freely estimated (Kline, 2016). The goal is to have a just identified measurement model and an over identified structural model, meaning that at least the same amount information is known from the data than what needs to be estimated. The model in Aim 1 includes two focal variables and four control variables.

Model Estimation & Evaluation. The measurement model will be estimated using robust weighted least squares (WLS). This estimator was chosen because it is the most accurate method for estimating model parameters when dealing with ordinal data (Bowen & Masa, 2015). In addition to the steps of invariance testing (will be explained in the section below), I will also examine differences in unstandardized parameter estimates (e.g., loadings, intercepts, means, variances) between groups to determine whether relationships between variables in the model differ (e.g., are weaker or stronger) based on ethnic subgroup (Little, 2017).

Invariance testing. This determines whether the construct has the same meaning across groups. It involves comparing parameter estimates and model fit between the different Latinx subgroups, after setting various equality constraints. Equality constraints force the computer to compute the same estimates across groups, consistent with the null hypothesis that no group differences exist (Kline, 2016). For example, if model fit is different across groups, after setting equality constraints, this would indicate measurement non-invariance, or that the model's fit to the data depends on ethnic group membership. The following steps will be utilized, based on Bowen and Masa's (2015) approach to measurement invariance with ordinal data. I will assess for: *configural invariance* (all parameters are freely estimated), *weak invariance* (factor loadings are held constant*), strong invariance* (factor loadings and thresholds are held constant) and *strict invariance* (factor loadings, thresholds, and residuals are held constant). My criteria for significant model fit change consists of fulfilling two out of the following three criteria: RMSEA change of $\geq$ -.03, CFI change $\geq$ -.02, and a significant chi square difference test for metric invariance and RMSEA change of $\geq$ -.01, CFI change $\geq$ -.01, and a significant chi square difference test. This criteria was based off of recommendations from Rutkowski & Svetina (2014). If any of the steps to invariance testing are not met, modification indices will be considered and the remaining steps would be completed with a partially invariant model (Dimitrov, 2010; Byrne, 2012).

Configural invariance indicates whether the same number of latent variables with the same pattern of factor loadings, thresholds, and measurement errors underlie a construct. In other words, it determines whether the construct is organized the same way in different cultures. It is tested by first fitting the baseline model to each group separately, then fitting the model to all groups simultaneously. If configural invariance is not met, modifications indices will be considered. If configural invariance is met (the same measurement model fits each group equally well), then *weak invariance* is tested. Testing for weak invariance involves constraining the factor loadings to equal across

groups and examining the difference in model fit between the constrained and freely estimated models. Assessing for weak invariance determines whether indicators are linked to the construct in a similar way. If weak invariance is met, *strong invariance* is tested. Testing for strong invariance determines whether the items are operating similarly across groups. If met, *strict invariance* is assessed. Strict invariance is tested by constraining item residuals to be equal across groups. This determines whether the variance of an item not shared with a factor and the error variance are similar across groups. If met, it means that items were measured with the same level of precision across groups. This step is often omitted from invariance testing because failing strict invariance does not affect interpretation of latent mean differences (Putnick & Bornstein, 2016).

>*Expected outcomes.* Completion of these analyses will accomplish the objective of Aim 1 by identifying the extent to which Latinx subgroup membership affects the measurement of lifetime adversities. This finding will advance scientific knowledge of how within-group differences shape risk and resilience experiences of Latinx immigrant subgroups. Without this information, assessment and intervention efforts with Latinx immigrants will be hampered, as group membership may affect the accuracy of the measurement of focal constructs. This knowledge will contribute to effective assessment practices with heterogeneous populations with high levels of within-group diversity.

>*Potential problems & alternative strategies.* Even though past theory and research suggest that within-group differences exist in risk and resilience processes among cultural groups, it is possible that our hypothesis is not supported by these results. For example, the baseline measurement model may not fit the data, or ethnic subgroup may not moderate the measurement model. Regardless of model fit or the presence of moderation results, alternative models will be tested. This is a recommended step of the SEM process because it acknowledges and examines the possibility that another model may be a more accurate fit to the data. For example, I will test chronic stress, current stress, and ACEs as indicators of life adversities to compare a more parsimonious model.

Aim 2: Determine the Effects of Lifetime Adversities on Latinx Immigrants' Family Functioning.

>*Introduction*. Understanding the consequences of lifetime adversities on Latinx immigrant family functioning is critical for generating strategies to interrupt these effects and promote healthy Latinx families. The objective for this aim is to determine the extent to which lifetime adversities impact individual reports of family functioning. To attain this objective, I will test the working hypothesis that higher levels of exposure to lifetime adversities will be associated with lower scores in family functioning. The rationale for this aim is that assessing the influence of lifetime adversities on family functioning will provide essential knowledge on lifetime stress and trauma and Latinx immigrants, without which prevention efforts to curb the effects of these stressors on family functioning will be incomplete. Obtaining this information will advance family-based prevention initiatives with immigrant families impacted by stress. Upon completion of Aim 2, I expect to identify the extent to which Latinx immigrant family functioning is affected by early trauma exposure.

>*Research design.* The analysis for this aim builds upon the previous aims'

analyses of the measurement model for lifetime adversities and involves examining the association between lifetime adversities and family functioning. This association will be tested using SEM.

   <u>Measures</u>. The focal variables evaluated in this aim are lifetime adversities and family functioning (refer to Appendix X for full scales). *Lifetime adversities* will be assessed as a latent variable using 28 items self-reported from the adverse childhood experiences (Felitti et al., 1998; 10 items) scale, the perceived stress scale-10 (10 items; Cohen, Kamarack, & Mermelstein, 1983), and the chronic stress scale (8 items; Gallo et al., 2014), as described in Aim 1. *Family functioning* will be assessed using the 18-item self-report Family Environment Scale (FES) cohesion and conflict subscales and the Sabogal Familism Scale (Sabogal et al., 1987). I selected these scales because they overlap with several dimensions described by the circumplex model (Olson, 2000). These subscales are also consistent with past research stating that items related to relationship dimensions of family functioning (e.g., cohesion, conflict) had the best psychometric properties out of the 10 subscales when tested with Latinx families (Negy & Snyder, 2006). *Familismo* is important to include as an element of family functioning because it has been identified as one of the "core cultural values guiding Latino families" (Stein et al., 2014; p. 224) and includes beliefs about extended family members, which are often considered to be a part of the major family unit. I hypothesize that a three-indicator (e.g., cohesion, conflict, familismo) model will be a good fit to the data. The *control variables* will be gender, age, and SES. These variables have often been linked with trauma exposure and migration-related stress and therefore, will be held constant in my analyses (e.g., Olff, 2007).

   <u>Model estimation and evaluation</u>. The measurement and structural models will be estimated using FIML. Criteria for good model fit will be met when chi-square values for model fit are non-significant (p > .05), the comparative fit index (CFI) exceeds .95, and the root mean square error of approximation (RMSEA) is below .06 (Kline, 2016). Associations between variables will be determined using unstandardized and standardized coefficients. If model fit is poor, an alternate model will be specified.

   Expected outcomes. This analysis will complete my aim's objective of identifying the effects of childhood trauma on Latinx family functioning above and beyond the effects of age, gender, and SES. Up to this point, the literature on the impact of traumatic stress on families has been limited to parenting, parent-child interactions has mainly focused on clinical samples. This aim will expand current knowledge on the influence of lifetime adversities and trauma exposure on the general Latinx population. This knowledge can be used to better understand and diagnose the effects of lifetime adversities at the family level.

   Potential problems & alternative strategies. As theory and past research are not always enough to make accurate predictions in the data, problems may arise with my hypothesized model. Typically, with SEM, issues can arise in several areas: problems with specification and identification or problems with models fitting to the data. Identification issues involve models that have more parameters that can be estimated from the data (e.g., under-identified or just-identified). If this occurs, I will turn to alternative models for conceptualizing the relationship between study variables

(consistent with family resilience theories) and respecify the model with fewer free parameters. I will also respecify the models that have poor fit to the data (based on good model fit criteria described above), which is common in SEM (Kline, 2016). Even if model fit is good, I will test other structural models to avoid confirmation bias, as recommended by Kline (2016).

Another potential problem would be if assumptions for SEM were violated or if there was problematic missing data. To rectify violated assumptions, I would transform the data to be a better representation of the data distribution (e.g., quadratic, logarithmic). If an assumption is not met and cannot be addressed, I will urge caution in interpreting the strength of my findings in the discussion and limitations section. However, based on prior publications using this data, problems with unmet assumptions and missingness in the focal variables (i.e., lifetime adversities and family functioning) are not expected to arise (e.g., Llabre et al., 2017).

Aim 3: Identify Sociocultural Risk and Protective Factors Associated with Latinx Family Resilience.

Introduction. Isolating the sociocultural factors that protect against or exacerbate the effects of lifetime adversities and traumatic stress for Latinx immigrants is necessary for prevention and intervention efforts with immigrant families exposed to stress. The objective of this aim is to determine the extent to which different cultural experiences and characteristics shape the influence of lifetime adversities on family functioning. To attain this objective, I will test the working hypothesis that the association between lifetime adversities and family functioning will be moderated by several risk and protective factors, using structural equation modeling. Specifically, I predict that discrimination and acculturation stress will exacerbate the effects of lifetime adversities on family functioning, whereas, ethnic identity and social support will mitigate the effects of lifetime adversities on family functioning. The rationale for this aim is that identifying moderators between lifetime adversities and family functioning will provide fundamental knowledge on Latinx family resilience. Most interventions give the same treatment package to all participants, neglecting the differences in individual needs (Collins et al., 2004). Obtaining this information will pave the way for the development of effective trauma-focused interventions based on the level of risk to which a given population is exposed. Upon completion of Aim 3, I expect to demonstrate how key risk and resilience processes influence the consequences of lifetime adversities on Latinx family functioning.

Research design. Expanding on the structural model from Aim 2, I plan to assess the effects of lifetime adversities on family functioning, as moderated by several risk and protective factors, using SEM. This analysis will consist of the same steps as were outlined in Aim 2, however, with the following moderators added to the model: acculturation stress, perceived discrimination, social support, and ethnic identity. Moderators change the relationships that two variables have with one another. Each moderator will be a product of the moderator multiplied by lifetime adversities, after each of these variables are residualized and centered (Little, 2017). The following scales will be used to assess the moderating variables:

- Acculturation stress: will be assessed using an abbreviated 17-item version of the Hispanic Stress Inventory (HSI; Cavazos et al., 2006). Likert-type items focus on various experiences associated with transitioning into living in new culture, such as learning a new language. I will test a 4-indicator model, using the subscales as indicators: occupational, immigration, parental, and familial. This factor structure is supported by Gallo and colleagues' (2014) recommendations.
- Perceived ethnic discrimination: The 17-item Brief Perceived Ethnic Discrimination Questionnaire-Community Version (PEDQ) will be used. Items focus on lifetime experiences of racism in various areas of life, including workplace and other social contexts. A four-indicator model will be tested based on the following subsections: exclusion/rejection, stigmatization/evaluation, work/school discrimination, and threat/aggression (Gallo et al. 2014).
- Social support: will be evaluated using a 12-item version of the Interpersonal Support Evaluation List (ISEL; Gallo et al., 2007). Items include questions related to emotional support, tangible support, and sense of belonging, using a Likert-type scale. I will test a three-indicator model of social support, with each subsection representing a factor.
- Ethnic identity: will be assessed using a 32-item Scale of Ethnic Experiences (SEE; Malcarne et al., 2006). Items are on a five-point Likert-type scale asking about thoughts and feelings surrounding ethnic group membership. Few recommendations for factor structure of this construct exist in past literature. Therefore, factor structure will be explored and tested based on theoretical understanding of the construct.

Expected outcomes. The outcome of completing these analyses, and thereby achieving Aim 2, will be a greater understanding of how sociocultural factors influence the relationship that lifetime adversities have on family functioning. Findings will identify the extent to which acculturative stress and perceived discrimination exacerbate the consequences of childhood trauma and the whether social support and ethnic identity mitigate the consequences of lifetime adversities. This information could be used to identify treatment components aimed at enhancing social support and ethnic identity and screen for experiences that may increase the harmful effects of lifetime adversities for Latinx immigrants.

Potential problems & alternative strategies. As in the previous section, the most common problems in SEM analysis are with problems with model specification, identification and model fit. Respecification will occur if the hypothesized models do not fit the data. Regardless of model fit, the following are examples of alternative models that will be tested:

- Discrimination will be tested as a mediator between acculturation stress and family functioning (Kimbro et al., 2012)
- Social support will be tested as a mediator between acculturation stress family functioning (Kimbro et al., 2012)
- Ethnic identity and social support will be tested as mediators between lifetime adversities and family functioning

If there are large amounts of missing data for a particular variable, I will look to examine other variables in the data set that are comparable. For example, if a risk or protective variable has problematic levels of missing data (above 30%), I will look for other variables that might protect against or amplify the effects of trauma on family functioning.

It is also possible that results do not support (or even go against) the study's hypothesis. For example, a moderating effect may not be significant. Although unexpected, this would still provide useful information because it would suggest that these sociocultural factors might not impact the relationship between trauma exposure and family functioning. However, non-significant results would not rule out that these factors could be important for resilience against developing other mental health problems.

Timeline and Benchmarks for Success

	1	2	3	4	5	6	7	8
Write/Submit IRB	■							
Complete Dissertation Proposal	■							
Data Cleaning/ Assumption Checks		■						
Aim 1: CFA Model Specification, Identification, & Estimation		■	■					
Aim 1: Invariance Testing			■	■				
Aim 1: Test Alternate Models				■				
Aim 2: CFA Model Estimation – Family Functioning					■			
Aim 2: Fit SEM Regression Model					■			
Aim 2: Model Evaluation & Testing Alternative Models						■		
Aim 3: Fit Moderators to SEM Regression Model						■		
Aim 3: Evaluate Moderation Model						■		
Robustness Check/testing Alternative Models						■		
Manuscript #1: Results of Aim 1				■	■			
Manuscript #2: Results of Aims 2 & 3						■	■	
Dissertation Defense								■

1 = starts at Feb. and goes in 2-month increments

Future Directions

Implementing this project will support my <u>*long-term goal*</u> of developing culturally responsive programs to support Latinx immigrant family resilience. Identifying protective factors against the effects of traumatic stress and migration-related stressors, and how these factors may differ across cultural subgroups represents an important step towards achieving this long-term goal. After completing the aims of this study, I intend to submit at least two manuscripts for publication in the *Journal Traumatic Stress* (Impact Factor = 2.72). The first manuscript will present the results of Aim 1. The second manuscript will be a summary of the results of Aims 2 & 3. Having access to the HCHS/SOL data will open up the possibility to pursue other research questions on Latinx mental health.

Additionally, I will gain experience conducting advanced quantitative data analysis (i.e., SEM) with a national dataset.