LATINOS' EXPERIENCES IN THE US:

ACCULTURATION, DISCRIMINATION, STRESS, SOCIAL COHESION AND

PSYCHIATRIC DISORDER

by

Kimberly B. Roth

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Department of Mental Health
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ABSTRACT

Background: Latinos are the largest foreign-born group and one of the fastest growing minority groups in the United States. As such, they will increasingly contribute to the burden of mental and behavioral disorders. Acculturation and other related experiences are associated with the development of mental disorder in US-residing Latinos, however most studies treat Latinos as a homogeneous group. This obscures meaningful between-group differences and hinders the elucidation of potential mechanisms contributing to the association between acculturation and mental health outcomes. Further, despite its importance, acculturation has been measured insufficiently and inconsistently. This is especially problematic due to the complex nature of these constructs. To understand the mechanism by which acculturation impacts mental health, novel methods are needed. Latent variable methods are one such approach that has been recommended as a way to capture nuance of complex constructs such as acculturation.

Methods: Data come from the National Latino and Asian American Study, a nationally-representative, cross-sectional survey of 2,554 Latinos in the United States.

Results: The six scales of acculturation (English and Spanish language preference and proficiency, ethnic identity) and related experiences (discrimination, acculturative stress, neighborhood context, family context) had good construct validity. No scales achieved full measurement invariance, but some scales were more variant across subgroups than others. Four latent classes of Latinos' acculturative experiences emerged: Positive Experiences (n=1,743, 69%), Cohesive-Conflict (n=424, 17%), Marginalized Conflict (n=237, 9%), and Marginalized (n=137, 5%). These classes were highly associated with all three categories of DSM-IV disorder: depressive, anxiety, and substance use disorders after

adjusting for sociodemographic characteristics, subethnicity and generational status. The Positive Experiences class had the lowest lifetime prevalence of all three disorders (14.8%, 13.6% and 7.1%, respectively). The class associated with the highest disorder prevalence (34.0%, 26.6%, and 22.5%, respectively) was those Latinos with a Marginalized Conflict experience. After accounting for acculturative experiences, direct associations between subethnicity and generational status and disorder varied. There were no significant direct effects between subethnicity and substance use disorder prevalence, but a strong dose-response relationship of generational status. Conversely, subethnicity was directly related to depressive and anxiety disorder prevalence, but generational status was not.

Conclusions: Acculturation and other experiences related to immigrant and minority status in the US are complex constructs and should be treated as such. Latent variable methods help account for measurement variance by subgroup and the unobserved nature of the constructs. Latinos have varied acculturative experiences in the US, which are highly personal and not fully accounted for by observed characteristics such as country of origin.

DISSERTATION COMMITTEE MEMBERS

William W. Eaton, PhD, (Primary academic advisor), Department of Mental Health
Kathleen R. Page, MD, (Chair), Johns Hopkins School of Medicine
Rashelle J. Musci, PhD, (Dissertation advisor) Department of Mental Health
John W. Jackson, ScD, Department of Epidemiology

DISSERTATION COMMITTEE MEMBER ALTERNATES

Ramin Mojtabai, PhD, Department of Mental Health
Janice V. Bowie, PhD, Department of Health, Behavior and Society

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CHAPTER 1. INTRODUCTION

1.1 Statement of the Problem

Latinos are the largest foreign-born group and third-fastest growing minority in the United States (US; Colby & Ortman, 2014) and will increasingly contribute to the burden of mental and behavioral disorders. Acculturative processes have been implicated in underlying mental health disparities among Latinos, yet mechanisms have not been identified. Better measures of acculturation and other potential disparities pathways, such as discrimination and family conflict, are needed to explore their associations with mental health. These relationships need to be investigated in light of heterogeneity by ancestry and generational status (including age at time of migration). This proposal uses nationally-representative data to characterize US Latinos' acculturative experiences and examine the association of these experiences with common mental and behavioral disorders, taking into consideration ethnic and generational subgroups.

Research on mental health among Latinos is constrained by three major limitations: 1) lack of ethnic subgroup comparisons, 2) not accounting for generational status, and 3) inadequate measures of acculturation. To understand and reduce health disparities for the US Latino population a more nuanced approach must be taken to disentangle the mix of risk and protective factors contributing to mental and behavioral disorder among Latinos.

Experts have noted the inadequacy of across-group analyses that treat Latinos as a homogenous group and obscure within-group disparities (Alegría et al., 2007a). The sparse research that takes into account ethnic subgroups has found significant differences in prevalence of psychiatric disorder (Alcántara, Chen, & Alegría, 2014; Alegría et al., 2007a), suicidality (Fortuna, Perez, Canino, Sribney, & Alegría, 2007), and general distress

(Torres, Driscoll, & Voell, 2012). Differences also occur by generational status and time spent in the US (Almeida, Johnson, Matsumoto, & Godette, 2012; Borges et al., 2011; Borges, Orozco, Rafful, Miller, & Breslau, 2012; Cook, Alegría, Lin, & Guo, 2009). Acculturation, defined as "the multidimensional process of the adoption of US cultural norms, values, and lifestyles" (Alegría, 2009, p.996; Lara, Gamboa, Kahramanian, Morales, & Bautista, 2005) has been linked to multiple mental and behavioral disorders (Alcántara et al., 2014; Blanco et al., 2013; Ortega, Rosenheck, Alegría, & Desai, 2000; Rivera et al., 2008; Valencia-Garcia, Simoni, Takeuchi, & Alegría, 2012), varying by ethnic subgroup and generational status (Guarnaccia et al., 2007). Experiences such as discrimination and family conflict also correlate with acculturation and mental and behavioral disorder (Cook et al., 2009; Mulvaney-Day, Alegría, & Sribney, 2007; Rivera et al., 2008; Torres et al., 2012), exhibiting similar variations by subgroup (Perez, Fortuna, & Alegria, 2008). Studies investigating the complex relationships between acculturation, psychiatric morbidity, and relevant experiences such as discrimination, family conflict, and acculturative stress need to take into account differences by ethnic and generational subgroup.

Despite its importance, acculturation has been measured insufficiently and inconsistently. A recent systematic review (Thomson & Hoffman-Goetz, 2009) called for a more thoughtful approach to conceptualizing and measuring this process, including the refinement of existing measures. The nationally-representative National Latino and Asian American Study (NLAAS) provides rich data on acculturation as well as psychiatric disorder. Acculturation measures were carefully selected and adapted, but their latent structures have yet to be fully explored. To understand the mechanism by which

acculturation impacts mental health, novel methods are needed. Latent variable methods are one such approach that has been recommended as a way to capture nuance of complex constructs such as acculturation.

1.2 Specific Aims

The aims of this dissertation described in subsequent chapters exploit rich cross-sectional data on acculturation, acculturative experiences, and mental and behavioral disorder onset in data from the National Latino and Asian American Study (NLAAS). Latino subethnic groups were specifically oversampled to ensure power to test subgroup differences among the three largest Latino ethnic subpopulations residing in the US: Puerto Ricans, Cubans, and Mexicans.

Study Aim 1: To describe and compare the level acculturation and prevalence of related experiences (language use and preference, ethnic identity, discrimination, acculturative stress, neighborhood context, and family context) by Latino subgroup.

This aim will build the foundation for additional aims by using descriptive measures of the six scales and individual scale items to describe ethnic and generational subgroups by level of acculturation and prevalence of related experiences. Exploratory factor analysis in a structural equation modeling framework will help determine the most appropriate way to use these scales for the subsequent aims and to evaluate measurement invariance across ethnic and generational subgroups.

Hypothesis 1: Level of acculturation and prevalence of related experiences will differ significantly across ethnic and generational subgroup.

Study Aim 2: To identify and describe the latent class structure of Latinos' acculturative experiences in the US using the six refined measures.

Latinos will be grouped into latent classes by their level of acculturation and related experiences under the hypothesis that these constructs do not operate independently but instead cluster and interact in a meaningful way. Latino ethnic and generational subgroup will be incorporated as predictors of class membership.

Hypothesis 2: Latinos' acculturative experiences will cluster into 3 or 4 latent classes. Generational status and ethnic subgroup will significantly predict class membership.

Study Aim 3: To estimate the strength of the relationship between class membership and DSM-IV diagnoses of three mental and behavioral disorders: any depressive, any anxiety, and any substance use disorder.

Lifetime DSM-IV diagnoses of three disorder categories (depressive, anxiety, and substance use disorder) will be used as distal outcomes of the latent acculturative experiences classes. Direct effect of covariates, subethnicity and generational status to all three distal outcomes will also be included.

Hypothesis 3: Acculturative classes experiencing higher levels of discrimination and family stress will be more likely to develop disorder. Subethnicity and generational status will remain significantly associated with disorder even after accounting for acculturative experiences.

This study advances mental health disparities research among minority populations by examining associations between acculturation and psychiatric disorders among US

Latinos. The aforementioned limitations and gaps in the current state of the scientific research are addressed by: (1) taking a latent measurement approach to the complex constructs of acculturation and related experiences known to be associated with mental and behavioral disorder in Latinos; (2) accounting for variance in the measurement of these constructs by Latino ethnic and generational subgroups; (3) identifying homogenous Latino subgroups in regards to their acculturative experiences to address potential combined effects among these experiences; and (4) investigating the complex relationships between these acculturative experiences subgroups and three common groups of mental and behavioral disorders, controlling for sociodemographic characteristics, subethnicity, and generational status.

1.3 Dissertation Outline

This dissertation is organized into seven chapters. This introductory chapter (Chapter 1) has provided an overview of the state of the public health problem, discussed relevant limitations and gaps in the scientific literature, and outline the present study's aims which address these gaps.

Chapter 2 will provide an overview and background of Latinos in the United States to lend context to this study. This will include a brief history of immigration for the major Latino subethnic groups currently residing in the United States: Mexicans, Puerto Ricans, Cubans, El Salvadorians, and Dominicans. In addition, a summary of the demographic characteristics and relevant cultural considerations will be covered.

Chapter Three will summarize the scientific literature on mental and behavioral disorder in the United States, and predictors of interest (language use and preference, ethnic identity, discrimination, acculturative stress, neighborhood context, and family

context). Finally, this chapter will provide a background on acculturation research and orient the reader toward the the theoretical basis for the three aims in this study.

Chapters Four, Five, and Six will address each study aim outlined above. In Chapter Four, we will explore the latent characteristics of each scale of interest (language use and preference, ethnic identity, discrimination, acculturative stress, neighborhood context, and family context) and assess measurement invariance by Latino subethnicity and generational status (Aim 1). Chapter Five explores the latent class structure of the acculturative experiences among our Latino sample, after accounting for measurement invariance. We will also quantify the relationship between covariates of interest and class membership. Of particular interest is whether Latino subethnicity and generational status predict latent class. Once class membership has been established, Chapter Six will explore the relationship between class and distal outcomes (any depressive, any anxiety, and any substance use disorder), adjusting for covariates. Each of these chapters will be self-contained studies, meaning that each chapter will stand alone with its own abstract, introduction, methods, results and discussion sections.

The final chapter (Chapter 7) will be an overall discussion of the findings of each study aim in light of the current state of the scientific literature. We will address implications for future research, clinical practice and interventions, and the public health impact of the findings. This chapter will conclude with a summary of dissertation limitations, strengths and public health significance, and tangible next steps to expand this work.

Hispanic/Latino are terms that are often used interchangeably although there is a subtle distinction between the two. Hispanic has historically been used to refer to individuals who are from Spanish-speaking countries (e.g., Mexico or Spain). However, Latino refers to anyone from a country (or with ancestry) from a country from Latin America. This excludes Spain but includes non-Spanish-speaking countries such as Brazil.

Nativity or origin refers to where a person was born. In the context of this study, this refers specifically to whether or not s/he was born in the United States. Therefore, individuals can be divided into two groups: <u>US-born</u> (born in the United States mainland) and <u>foreign-born</u> (born outside of the United States mainland). In the context of Puerto Ricans, those born on the island of Puerto Rico are considered foreign-born.

Immigrant is an individual born outside of the United States who has subsequently migrated. Immigrants can be in the country for a variety of reasons, including: legal permanent residents, naturalized citizens, authorized temporary residents (e.g., students or those with visas), refugees, asylees, or individuals residing in the country without authorization. The term immigrant and foreign-born are used interchangeably.

Undocumented Immigrants are any foreign-born individuals who migrated to the US without proper legal authorization or documentation. This term is preferred over the phrase "illegal immigrant" but is often used interchangeably with "unauthorized immigrant".

Race is a characteristic to describe a certain population of individuals. A specific racial population (e.g., African Americans) is a population of people with a presumed shared

genetic origin. Measures of race are weak measures when trying to predict behavior (e.g., skin color).

Ethnic Group is a group of people with a presumed shared cultural background. This can be measured by characteristics such as religion, language, or country of origin. These are imperfect measures that weakly predict behavior. The Latino/Hispanic ethnic group is the focus of this dissertation.

<u>Subethnicity</u> refers to the specific ethnic subgroup with which a Latino identifies, independent of where an individual was born (US or elsewhere). In this context, subethnicity, country of origin, and ancestry are used interchangeably. This is distinct from racial background, which can also vary among Latinos of a specific subethnic group (e.g., Puerto Ricans can identify as being black, white, or both).

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    American women. *Journal of Consulting & Clinical Psychology, 80*(2), 177-185.

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CHAPTER 2. AN OVERVIEW OF LATINOS IN THE UNITED STATES

2.1 Introduction

Latinos are currently the largest ethnic or racial minority population and the third-fastest growing immigrant population in the United States (US; Colby & Ortman, 2014). The US Hispanic population grew by over 450 percent in the 45-year interval between 1970 and 2015, from 9.6 million to 55.4 million individuals (Gutierrez, 2016). Hispanics are projected to comprise nearly one-third of the total US population by the year 2060 at over 120 million residents (Colby & Ortman, 2014). This percentage increase will only be surpassed by Asians, who are estimated to increase by 128% between 2014 and 2060 (Colby & Ortman, 2014). Approximately one third of Latinos residing in the US are foreign-born, although this percentage has decreased from its peak of 40 percent in 2000 (A. Flores, 2017).

Latinos are not equally distributed geographically within the US. As of 2015, California and Texas house the majority of Latinos (27% and 19%, respectively), followed by Florida (9%) and New York (7%; U.S. Census Bureau, 2016). Conversely, as a function of the percentage of the state population, New Mexico residents are almost 50 percent Hispanic, followed closely by California and Texas (both 39%); Arizona (31%) and Florida (24%) are not far behind.

The median age of US-residing Latinos is 28 years. Twenty seven percent of those age 25 and older have graduated high school and only 15 percent have at least a bachelor's degree (A. Flores, 2017). The overwhelming majority are English-proficient (69%), they have a median household income of $44,800, 22 percent are living in poverty and one fifth do not have health insurance (A. Flores, 2017). These figures, however, do not give an

accurate picture of US-residing Latinos, as there is a wide degree of variation by country of origin. For example, although only 10 percent of Peruvians are currently living in poverty, over one quarter of Hondurans are (A. Flores, 2017). In addition, their unique histories and relationship with the US, including how migrants were received by the government and its citizens, are widely variable and greatly influence Latinos' heterogeneous experiences in the States. For these reasons, the remainder of this chapter is devoted to the five largest Latino subethnic groups in the US at this time.

2.2 Mexicans

Mexicans have long been viewed as representative of all US-residing Latinos, in part due to the fact that they are the largest Latino ethnic subgroup in the US with an estimated 35.8 million residents (A. Flores, 2017; Guarnaccia, Martinez, & Acosta, 2002). While there is a large proportion of Mexicans in New Jersey and Los Angeles, the earliest Mexican Americans were the direct result of US annexation of southwestern territories during colonial expansion into Spain's area of influence (Gonzalez, 2011; Guarnaccia et al., 2002). Despite being seen as representative, Mexicans actually differ substantially from other Latino subgroups. They tend to be younger, with a median age of 26, be born in the US (68% of US-residing Mexicans), and are less likely to have a college degree (11%). The majority (69%) are English-proficient, 77% are US citizens, almost one quarter live in poverty and one fifth are without health insurance (A. Flores, 2017).

There is significant diversity among Mexican-origin Latinos in the United States. This often depends on legal status, ethnic origin, generation and length of residence in the US, as well as primary motivation for immigrating (Guarnaccia et al., 2002). There is also a large amount of variation among Mexicans in regards to socioeconomic indicators such

as education, income and occupational status (Guarnaccia et al., 2002). While traditionally viewed as agricultural workers, a large majority of Mexicans are involved in the industrial and services sectors of American life. They also tend to have a strong cultural identity, most likely rooted in the close proximity to their culture of origin and, at times, flexible migration patterns back and forth across the US-Mexico border (Gonzalez, 2011; Guarnaccia et al., 2002).

Mexico's status as the United States' immediate neighbor has influenced additional important immigration-related factors. Post-World War II governmental policies in addition to trade relationships such as the North American Free Trade Agreement (NAFTA) have engendered an economic environment within Mexico that favors urban working-class populations and disadvantages rural ones (Guarnaccia et al., 2002). This, coupled with the proximity of Mexico to the US, has given extremely poor, rural Mexicans cause to risk dangerous journeys across the border. Border crossings used to be relatively assured despite increased border control presence, due to the large number of possible crossing points and sheer numbers of individuals attempting the journey; however, this has drastically changed in recent years (Massey, Alarion, Durand, & Gonzalez, 1987). Even so, the trip is difficult with many stressors: high cost, unprincipled *coyotes* (migrant smugglers) and Mexican border police, and fear of (or actual) apprehension by US patrols (Cervantes, Salgado de Snyder, V. Nelly, & Padilla, 1989; Conover, 1987). Other dangers while crossing the border involve drug traffickers and related crime.

More recently, anti-immigrant rhetoric in the national political and cultural US discourse has specifically targeted Mexicans, both explicitly and implicitly. Mexicans may bear the brunt of this as they have long been the majority of unauthorized immigrants in

the country. However this is changing, as in 2016 they accounted for only half of undocumented immigrants and their numbers have declined since 2009 from 6.4 million to 5.6 million in 2015 (Krogstad, Cohn, & Passel, 2017). Instead, other nations (primarily in Asia and Central America) have started to contribute increasing numbers of unauthorized entrants to the US. Regardless, the growing anti-immigrant stigma is potentially damaging, although there is little research on the current changing trends. However, a 2016 study recently found that unfavorable changes in immigration policy (i.e., policies that are more anti-immigration in nature) were linked to increased distress and perceived discrimination in Latinos in the US (Almeida, Biello, Pedraza, Wintner, & Viruell-Fuentes, 2016). Other recent work has also shown that these policies negatively affect the mental health of undocumented immigrants, but that his varies by location (e.g., by state of residence) (Hainmueller et al., 2017; Hatzenbuehler et al., 2017; Venkataramani, Shah, O'Brien, Kawachi, & Tsai, 2017).

2.3 Puerto Ricans

Puerto Ricans are the second largest Latino group in the United States, with a population over 5.3 million living on the mainland (A. Flores, 2017). Their sociodemographic characteristics resemble that of the US Latino population as a whole. Almost one third of Puerto Ricans aged 25 or older graduated high school, 19 percent have a college degree, one quarter live in poverty, but only nine percent are uninsured (A. Flores, 2017). Almost all (83%) are English-proficient (A. Flores, 2017), most likely due to their status as citizens and the US government's strong influence on the island for the past century.

The geographic distribution of Puerto Ricans in the States continues to change. A recent report (Gutierrez, 2016) projected that by 2020 Puerto Ricans will surpass Cubans to become the largest Latino population group in Florida. Conversely, the population on the island itself has been undergoing a striking decline since its peak in 2004, having lost about 400,000 residents through 2016 (Krogstad, Starr, & Sandstrom, 2017). There are currently over 3.3 million Puerto Ricans living on the island, representing a 10.4% decrease since 2010 (U.S. Census Bureau, 2017). The island's population is projected to continue declining to approximately 3 million by 2050 (Krogstad et al., 2017).

The history between the United States and Puerto Rico has been complicated. In 1898, during the Spanish-American War, the US invaded the island of Puerto Rico and claimed it as our own, taking it from Spain's large empire. Initially, Puerto Ricans received the conquerors with anticipation, as the US promised improvements over Spain's colonial reign. It wasn't long, however, before it became clear that intentions towards the island's welfare were similar to, if not worse than, that of the Spanish empire (Gonzalez, 2011). In response to the US' increased demands on Puerto Ricans, a growing nationalist movement emerged. The military response to this desire for Puerto Rican independence was characterized by swift violence. Nowhere is this more evident than the Ponce or Palm Sunday Massacre, in which insular police opened fire on a peaceful nationalist march in the town square, leaving 21 dead and 150 wounded (Gonzalez, 2011).

In 1917, Congress passed the Jones Act, which granted US citizenship to all Puerto Ricans. A direct consequence of this act was to spur migration from the island to mainland United States. A main contributor to this migration was the Supreme Court case Balzac v. Porto Rico (1922), which established that island-dwelling Puerto Ricans were not entitled

to the same level of rights as citizens on the mainland. This, along with explicitly allowing Puerto Ricans to migrate freely within US jurisdiction, made it more appealing to take up residence in the mainland because then Puerto Ricans would lawfully have the same rights as any other citizen of the US.

The real influx of Puerto Ricans to the States began after World War II. Many scholars speculate that the changing economic landscape encouraging migration to "greener pastures" on the mainland, while others anecdotally attribute the flight to the rising tensions between Nationalists and the US government (Gonzalez, 2011). The majority of Puerto Ricans settled in the *barrios* (or neighborhoods) of New York City and the surrounding areas. Despite citizenship, they have the lowest socioeconomic status of the prominent Latino subgroups in the US (Guarnaccia et al., 2002).

Citizenship and extensive US involvement in island politics, social life, and economy for over a century have created a unique experience for Puerto Ricans. Their patterns tend to be characterized by circular migration, in which residents can flow easily back and forth in between the island and mainland. In addition, the US has tried to control the industrialization and economic development of the island and has even attempted on several occasions to make English the primary language in Puerto Rican schools (Gonzalez, 2011; Guarnaccia et al., 2002). This has led to a general loss of cultural identity (J. Flores, 1993; Guarnaccia et al., 2002).

2.4 Cubans

Cubans are the fourth largest Latino subgroup in the US with their population numbering over 2.1 million individuals (A. Flores, 2017). Their story is distinct from that of Puerto Ricans despite both islands being coveted territories of the US. Cubans fled to

the US to escape instability and violence driven by politics, with the majority of migrants settling in Florida (Gutierrez, 2016; López, 2015a). Miami is their largest place of settlement, where they exert a significant amount of political and cultural influence (Portes & Stepick, 1993). The strong ethnic enclaves that have sprung up in Miami help to ease the transition for new Cuban immigrants, resulting in lower stress levels directly related to migration (Guarnaccia et al., 2002). However, although Florida is often perceived as analogous with Cuban populations, the rate of population increase of Cubans in Florida (60% from 2000-2014) has been eclipsed by that of Mexicans (78%) and Puerto Ricans (94%; Gutierrez, 2016).

The large influx of Cubans occurred during and just after Cuban Revolution in 1960. As political refugees, the first major wave of Cuban migrants tended to have a relatively high socioeconomic status, with more education and higher occupational status. They had access to significant aid from the US government, which helped them establish themselves in their new lives. This aid included access to business loans and transference of their professional degrees to enable them to continue in their occupations (Grenier & Stepick, 1992; Pedraza-Bailey, 1985; Portes & Bach, 1985). Therefore, it is unsurprising that Cubans tend to have the highest levels of socioeconomic status of all Latino subethnicities in the States. They are also more likely to retain the use of Spanish as their primary language (Guarnaccia et al., 2002). This, along with their notable social and economic capital, has led to the maintenance of a strong ethnic and cultural identity as a minority group in the US (Guarnaccia et al., 2002; Portes & Stepick, 1993).

2.5 Other Latinos

According to the Pew Research Center (2017), the Latino population in the US is continuing to diversify even as growth has slowed in recent years. In addition to Mexicans, Puerto Ricans and Cubans, four other Latino ethnicities (Salvadorans, Dominicans, Guatemalans, and Colombians) have a population in the US of over one million individuals, all of which have continued to grow in size over the past 10 years. In this section, the demographics and history of Salvadorans and Dominicans will be discussed in more detail, as they are among the top five most populous Latino subgroups in the US.

2.5.1 Salvadorans

Salvadorans are the third largest Latino group in the United States and hail from the "Northern Triangle" (which also includes Guatemala and Honduras). As of 2017, they numbered over 2 million individuals and approximately 60 percent are foreign born (Cohn, Passel, & Gonzalez-Barrera, 2017; A. Flores, 2017). This proportion has been sharply increasing since 2007, with the number of Salvadoran immigrants to the US rising by 19 percent, starkly contrasted against the Mexican immigrant population which decreased by six percent in that same time period (Cohn et al., 2017). Overall, Salvadorans have a median age of 30, one quarter have a high school degree, 10 percent have a college degree, one fifth are living in poverty, and 26 percent are uninsured. Sixty percent are US citizens and approximately one half consider themselves proficient in English (A. Flores, 2017). In general, this group's levels of education and English proficiency are lower than the US immigrant population as a whole (Cohn et al., 2017; López, 2015b). They have settled mostly in the South (Texas) and West (California), with their largest population being in the Los Angeles area (López, 2015b; Migration Policy Institute, 2015).

Central American migrants to the US, of which Salvadorans are a part, have been less likely than other Latino immigrants to cite economic circumstances as the main motivation for seeking residence in the States (Hugo Lopez, Gonzalez-Barrera, & Motel, 2011). The same is true for family reasons. Historically, there were relatively few Central Americans in the US until the 1990s, when immigration from the area surged. Specifically, immigrant Salvadorans increased eightfold between 1980 and 1990; today the US-residing population is approximately 20 percent of that in their home country (Gonzalez, 2011). During those years, intense civil conflict and war coupled with the resulting social chaos were the primary drivers of the masses fleeing the country. At the time, the US government denied refugee status from the Salvadorans, forcing them to enter illegally (Gonzalez, 2011). This neglect is unfortunate given the history that the US had in influencing and arming the political conflict in the region.

More recent immigrants from El Salvador (since 2001) have earned Temporary Protected Status (TPS) from the US government, allowing them to live and work in the US for a limited amount of time. TPS is granted due to catastrophic conditions in their home country, such as war, hurricanes, or earthquakes, and usually applies to unauthorized or undocumented immigrants. Salvadorans are the largest group (approximately 195,000 migrants) among the 10 nations who have earned that status as of a recent Pew Research Center report (Cohn & Passel, 2017). The US granted TPS to individuals fleeing El Salvador after a series of highly-damaging earthquakes that left the country in devastation. Since that time, that status has been extended repeatedly as recovery has been slowed by a variety of other natural disasters and drought coupled with increasing rates of violence and unemployment (Cohn & Passel, 2017). TPS is scheduled to expire in September 2019.

2.5.2 Dominicans

Dominicans are the fifth largest Latino subgroup in the US. Coming from the Caribbean, they have primarily settled in New York City and the surrounding areas (Guarnaccia et al., 2002). Approximately 75% of Dominican immigrants reside in New York, New Jersey, and Florida (Nwosu & Batalova, 2015) and over half are foreign born (A. Flores, 2017). While they are a Latino subgroup that is often understudied, Dominican migration was actually one of the largest the US has seen in the past 50 years (Duany, 1990). Between the years of 1961 and 2010, the Dominican immigrant population in the US grew from 12,000 to 879,000, an increase of over 7,000 percent; conversely, less than 10 percent of the current Dominican immigrant population have arrived since 2010 (Nwosu & Batalova, 2015).

The reasons for Dominican migration have been varied but in many respects their experience has been similar to that of Cubans (Garrison & Weiss, 1987; Grasmuck & Pessar, 1991). Like Cubans, some sought political refuge, with large-scale migration from the Dominican Republic starting due to political upheaval. In 1961 the right-wing dictator Rafael Trujillo ("El Jefe") was assassinated, quickly followed by US intervention and subsequent occupation in 1965 (Guarnaccia et al., 2002). This led to facilitation of migration by the US government, in part to protect political dissidents as well as to cement their occupation of and governmental influence on the island (Grasmuck & Pessar, 1991). Although Trujillo's reign of terror had finally ended, the political upheaval continued for decades, through the overthrowing of their first democratically-elected president Juan Bosch and the struggle for power that followed (Gonzalez, 2011). However, unlike Cubans but similar to Salvadorans, the US government refused to officially recognize Dominicans

as political refugees, thus limiting their access to financial and other types of aid (Guarnaccia et al., 2002). In addition, the United States were highly involved in influencing the outcome of the political battles, particularly in the case of the 1965 Dominican Revolution, during which the White House intervened on behalf of the current Dominican government to stomp out the rebellion (Gonzalez, 2011).

More recently, other Dominicans were motivated to migrate to the US by economic reasons. This mainly occurred starting in the 1980s, after the political turmoil ended at home. A main contributing factor was the high level of unemployment and poverty on the island (Guarnaccia et al., 2002). Middle-class Dominicans experienced significant frustration as it pertains to economic opportunity in their home country, causing them to seek better financial stability in the US (Guarnaccia et al., 2002). More recent waves of immigrants have tended to be poorer, with many Dominicans being motivated by the goal of family reunification in addition to economic incentives (Nwosu & Batalova, 2015).

Immigrants from the Dominican Republic are some of the most disadvantaged in the United States. Compared to the overall foreign-born population (including those from Europe and Asia), they are more likely to live in poverty, have less English proficiency, and have less than a college degree; however, they are more likely to be insured with public health coverage and have obtained US citizenship (Nwosu & Batalova, 2015). Approximately one third of immigrant adults from the Dominican Republic work in the service industry, significantly more than the general US immigrant population (Nwosu & Batalova, 2015).

2.6 Conclusions

There is significant diversity among Latinos when considering ethnicity and country of origin. This can be attributed to a variety of factors: reasons for migration, socioeconomic status both in country of origin and in the US, employment sector and opportunities, flexibility of migration patterns, geographic distribution and structure of ethnic enclaves, ethnic identity and language use, and legal and political status in the United States. These variables influence both the experience of foreign- and US-born Latinos in the US as well as access to mental health services. Because of this diversity, it is essential to take into account differences by subethnicity when looking at mental health outcomes of Latinos residing in the US. In the next chapter, we will consider both the mental health of US Latinos as a whole as well as the little evidence for between-group variation that exists in the scientific literature to date.

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CHAPTER 3. LITERATURE REVIEW

3.1 Introduction

It is well established that depression, anxiety and substance use contribute significantly to US and global disability (Lopez & Murray, 1998; Murray & Lopez, 1996; World Health Organization (WHO), 2008). Depression, anxiety and substance use disorders are also highly comorbid with other disorders and predictive of deleterious outcomes such as reduced educational and occupational attainment, suicide, and chronic physical illnesses (Eaton et al., 2012; Henriksson et al., 1993; Kessler, Chiu, Demler, Merikangas, & Walters, 2005; Kessler & Wang, 2008; Ortega, Feldman, Canino, Steinman, & Alegria, 2006). However, prevalence and sequelae of these disorders vary substantially across racial and ethnic groups (Breslau et al., 2006; Harris, Edlund, & Larson, 2005; Martins et al., 2012), producing interest in mental health disparities.

> A health disparity has been defined by Healthy People 2020 as:
>
> a particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage. Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion. (U.S. Department of Health and Human Services, Office of Minority Health, 2018)

Reducing mental and behavioral health disparities in disadvantaged populations is imperative in order to reduce the global burden of disease and achieve health equity, or "the highest level of health for all" (U.S. Department of Health and Human Services, Office of Minority Health, 2018). Because this requires working to address avoidable inequalities,

one way to do so is by investigating the potential pathways through which these disparate rates of disorder manifest in racial/ethnic minority populations.

3.2. Mental and Behavioral Disorder in Latinos

3.2.1 Hispanic/Immigrant Health Paradox and Latino Heterogeneity

Latinos living in the US have disproportionately higher rates of a variety of deleterious health outcomes, including obesity, diabetes, chronic liver disease, and certain types of cancer when compared to non-Hispanic whites (Dominguez et al., 2015). However, a large number of outcomes, including mortality, heart disease, and mental disorders have been consistently shown to have lower prevalence in Latinos than non-Hispanic whites (Abraido-Lanza, Dohrenwend, Ng-Mak, & Turner, 1999; Dominguez et al., 2015; Escobar, Nervi, & Gara, 2000; Grant et al., 2004a; Martins et al., 2012; Palloni & Morenoff, 2001). These lower rates of disorder are somewhat surprising in Latino populations in the US, given that they are much more likely to live in poverty, experience stress, and have less access to health insurance, conditions often associated with worse health (Adler et al., 1994; Williams, Mohammed, Leavell, & Collins, 2010). This counterintuitive epidemiologic phenomenon, termed the "Hispanic health paradox", has been much researched and often debated (Alcántara, Estevez, & Alegría, 2017; Lariscy, Hummer, & Hayward, 2015; Palloni & Morenoff, 2001).

At first glance, the Hispanic health paradox appears to hold when considering mental health in Latinos. Despite their increased poverty and lower educational and occupational attainment (U.S. Census Bureau, 2015), as a whole US Latinos have lower prevalence of mental and behavioral disorders as compared to non-Hispanic whites. Figure 3.1 displays the estimated prevalence of affective, anxiety and substance use disorders in

the six largest epidemiologic studies of US-residing Latinos on mental disorder: the Los Angeles Epidemiologic Catchment Area (LA-ECA) study (Karno, 1987). National Comorbidity Survey (NCS; Kessler et al., 1994), Mexican American Prevalence and Services Survey (MAPSS; Vega et al., 1998a), National Comorbidity Survey Replication (NCS-R; Kessler, Berglund et al., 2004), National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; Grant, Moore, Shepard, & Kaplan, 2003; Grant et al., 2004b), and the National Latino and Asian American Study (NLAAS; Alegría, Takeuchi et al., 2004). Although estimates vary by study, Latinos consistently have similar or lower rates of the three major classes of disorder as compared to non-Hispanic whites (shown in the transparent bars for the LA-ECA, NESARC and NCS-R).

Figure 3.1. Lifetime prevalence of DSM mental and behavioral disorders in Latinos across five population-based epidemiologic studies in the United States, as compared to non-Hispanic whites.
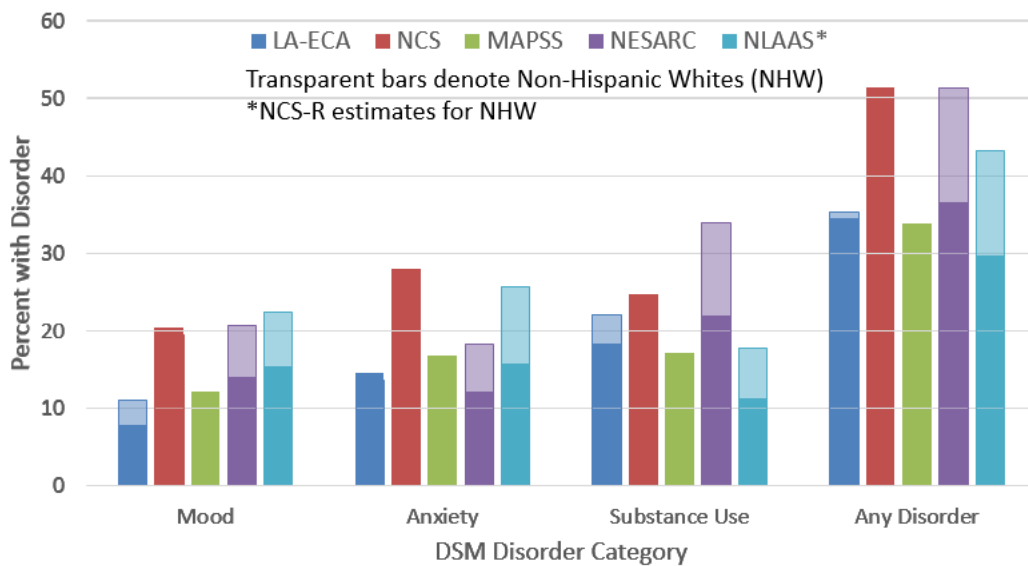
One main criticism of the Hispanic health paradox is its gross oversimplification of a complex phenomenon by treating Latinos as a homogenous group. The above comparison between Latinos as a homogeneous group and non-Hispanic whites obscures important

differences in prevalence of disorder between Latino subgroups. Figure 3.2 presents lifetime prevalence estimates of DSM-IV mental and behavioral disorder groups in the NLAAS, separated by ancestry (i.e., ethnic subgroup) and compared to non-Hispanic whites in the NCS-R (Alegría et al., 2008). Although all Latino groups have lower rates of disorder as compared to non-Hispanic whites, Puerto Ricans consistently have higher prevalence than the other ethnic subgroups. Cubans, Mexicans and Other Latinos have similar rates of disorder, although Cubans exhibit slightly higher rates of depressive disorders and lower rates of substances use disorders. These estimates presented by Alegría and colleagues (2008) are representative of the well-replicated finding that prevalence of disorders and distress vary significantly by Latino subethnicity has been well-replicated (Alcántara et al., 2014; Alegría et al., 2007a; Alegría et al., 2008; Camacho et al., 2015; Fortuna et al., 2007; Guarnaccia et al., 2007; Perreira et al., 2015; Wassertheil-Smolle et al., 2014).

Figure 3.2. Lifetime prevalence of DSM-IV mental and behavioral disorders in Latino ethnic subgroups and non-Hispanic whites in the National Latino and Asian American Study.
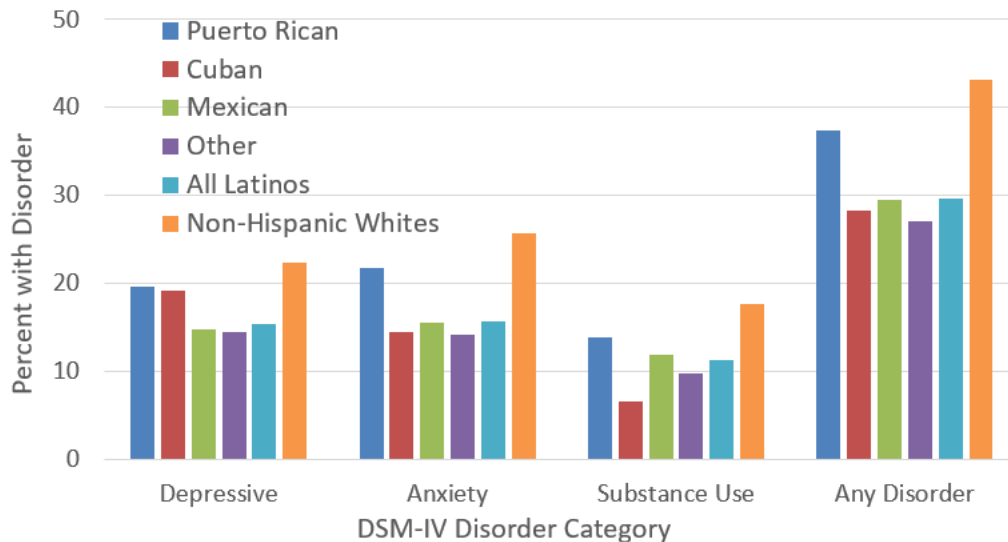
Another important subgrouping of Latinos is nativity. This requires stratifying estimates of mental disorder by, at the very least, country of birth. Upon doing so, the "immigrant health paradox" becomes evident. Tangential to the Hispanic health paradox, the immigrant health paradox is a similar (and overlapping) phenomenon in which foreign-born individuals exhibit lower rates of disorders as compared to their US-born counterparts. In Latinos, these two paradoxes are difficult to disentangle as a large proportion of Latinos living in the US are foreign-born (A. Flores, 2017). In fact, often times they are used interchangeably, despite their subtle differences. However, throughout the remainder of this dissertation, the focus will be specifically on the immigrant health paradox, as discussed below.

The immigrant health paradox documented in the US is not limited to Latinos. It has also been documented in Asians, Afro-Caribbeans and migrants of Anglo-Saxon background (Alcántara et al., 2017; Alegría et al., 2008; Carlisle, 2012; González, Tarraf, Whitfield, & Vega, 2010; Grant et al., 2004a). In a variety of contexts in the US, individuals born outside of the US exhibit more favorable outcomes as compared to their US-born counterparts. For this reason, when considering the mental health of US-residing Latinos, it is imperative to consider differences by nativity (i.e., foreign-born versus US-born).

As a whole, Latino immigrants to the US tend to have lower prevalence of mental and behavioral disorders than those born in the US (Alegría et al., 2008; Alegría, Canino, Stinson, & Grant, 2006). Lifetime prevalence of depressive, anxiety and substance use disorders in Latinos and non-Hispanic whites in the NLAAS and NCS-R, respectively (Alegría et al., 2008), are presented in Figure 3.3, stratified by nativity (US-born vs foreign-born). Regardless of ethnicity, foreign-born individuals have lower rates of disorder than

their US-born counterparts. This difference suggests that post-migration experiences may be an important factor in the development of disorder among Latino immigrants in the US, leading to the exploration of the role of acculturation and other factors closely related to minority or immigrant status in the development of common mental and behavioral disorders.

Figure 3.3. Lifetime prevalence of DSM-IV mental and behavioral disorders in Latino and non-Hispanic whites, by nativity, in the National Latino and Asian American Study.
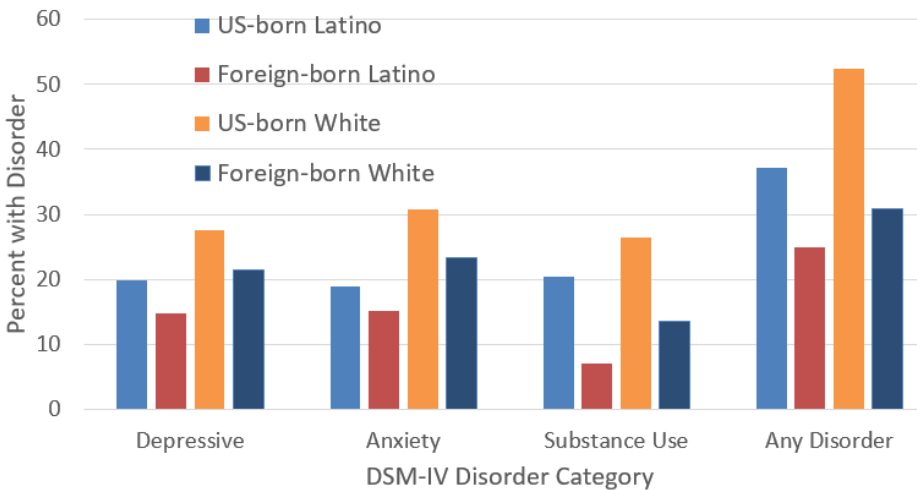
Most immigration research on Latinos considers differences only by country of birth. However, the few studies that have looked at more fine-grained immigration measures have found that prevalence of mental and behavioral disorders differ among foreign-born individuals by variables such as time lived in the US and age at migration (Alegría, Sribney, Woo, Torres, & Guarnaccia, 2007; Alegría et al., 2008; Almeida et al., 2012; Borges, Medina-Mora, Breslau, & Aguilar-Gaxiola, 2007; Breslau et al., 2007; Breslau, Borges, Hagar, Tancredi, & Gilman, 2009; Cook et al., 2009; Escobar et al., 2000; Perreira et al., 2015). For example, Figure 3.4 displays the lifetime prevalence of any DSM-IV depressive, anxiety or substance use disorder by three common immigration

characteristics. The first, years lived in the US, displays a clear gradient, with the lowest prevalence of disorder (17.3%) among Latinos who have lived in the States five years or less. This increases in a dose-response manner to 29 percent of foreign-born Latinos having lived in the US at least 21 years. However, this is still less than those born in the US (36.8%). The second characteristic, age at immigration, is also related to prevalence of disorder.

Among foreign-born Latinos, the lowest prevalence (approximately 21%) is among those who arrived in the US between the ages of 13 and 34, whereas about 28 percent of Latinos arriving young or older had ever met criteria for a mental or behavioral disorder. However, this is still lower than US-born Latinos. Finally, there is a gradient of disorder prevalence by generational status. First-generation Latinos have the lowest prevalence (23.8%), but even among those born in the US there are significant differences. Thirty percent of second-generation Latinos (that is, having at least one parent born outside of the US) as opposed to over 40 percent of those from the third or higher generation (both parents born in the States). Taken together, it is clear the simple distinction of US- versus foreign-born is not sufficient to understand differences in disorder among US-residing Latinos.

Figure 3.4. Lifetime prevalence of DSM-IV mental and behavioral disorders in Latinos, by immigration characteristic, in the National Latino and Asian American Study.
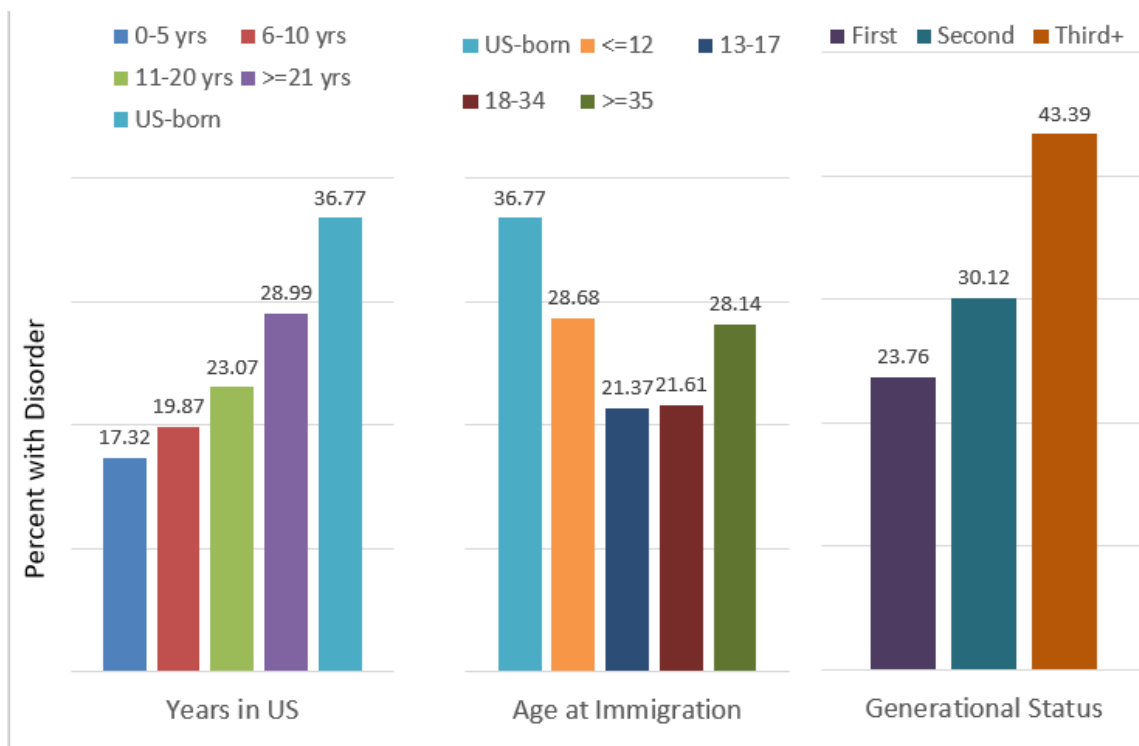
As seen in Figures 3.2, 3.3 and 3.4, heterogeneity by Latino ethnic and generational subgroups is an important distinction regardless of disorder. However, prevalence estimates and the strength and patterns of the differences by subgroup often vary. For this reason, we will briefly consider each of the mental and behavioral disorder categories in turn with an emphasis on estimates from the NLAAS, as it currently provides the best population-based estimates of disorder by Latino subgroups in the United States.

3.2.2. Depressive Disorders

Many studies have found that Latinos are at decreased risk of meeting criteria for a depressive disorder as compared to non-Hispanic whites (Alegría et al., 2006; Martins et al., 2012; Mendelson, Rehkopf, & Kubzansky, 2008). This is consistent with the Hispanic health paradox. However, there is considerable heterogeneity in the prevalence of depressive disorders in US-residing Latinos by ancestry and generational status. As seen in Figure 3.2, the estimated lifetime prevalence of any DSM-IV depressive disorder

(dysthymia and major depressive episode) in all Latinos (NLAAS) is approximately 15%. However, this estimate ranges from 14.7% in Mexicans to 19.6% in Puerto Ricans. These patterns across ethnicity are seen consistently in the literature: Mexicans tend to have the lowest prevalence of depression and Puerto Ricans the highest, often approaching that of non-Hispanic whites.

Immigrants tend to exhibit lower prevalence of lifetime and past 12-month depression as well as depressive symptoms than US natives (Alegría et al., 2008; González et al., 2010). When looking beyond nativity, time spent in the US and age at migration are also strongly related to depressive disorders. More specifically, the longer someone spends in the US or the younger someone arrives, the more likely s/he is to have a depressive disorder (Alegría et al., 2007; Alegría et al., 2008; Cook et al., 2009; Perreira et al., 2015). The sparse research that has looked at categories integrating both country of origin and nativity have found varying patterns (Alegría et al., 2007; Alegría et al., 2008). For instance, one study by González et al. (2010) showed that island-born Puerto Ricans in the US have higher lifetime and 12-month depression prevalence than Cubans and Puerto Ricans born in the US. Thus, the significant range in prevalence estimates of depressive disorders among Latinos based on their characteristics contributes to a lot of variation, and at times conflicting evidence, in the scientific literature.

3.2.3. Anxiety Disorders

Anxiety disorders exhibit similar prevalence and patterns across Latino subgroups as depressive disorders. While the overall prevalence of any anxiety disorder (panic, generalized anxiety, post-traumatic stress, agoraphobia and social phobia) in the NLAAS is similar to that of depressive disorders (15.7%), it ranges from 14.4% to 21.7%, with

Puerto Ricans again being more likely to meet criteria (Figure 3.2). In the NLAAS, the main difference is the lower prevalence among Cubans (14.4%), which is similar to that of Mexicans (15.5%). Variation by nativity and other immigration characteristics also exists, with being born in the US, longer residence, and earlier age at time of immigration also being positively associated with having an anxiety disorder (Alegría et al., 2008; Breslau et al., 2009; Cook et al., 2009; Perreira et al., 2015). Similar to depressive disorders, relationships often vary by ethnic subgroup.

3.2.4. Substance Use Disorders

Substance use disorders (SUD) are made up of alcohol abuse and dependence as well as illicit drug abuse and dependence according to the DSM-IV (American Psychiatric Association, 1994). However, a larger proportion of research in US Latino populations is specifically dedicated to alcohol. Latinos are less likely to drink than other racial/ethnic groups, but those who do are much more likely to suffer from alcohol-related harms and problems such as alcohol use disorders (AUD; Chartier & Caetano, 2010; Mulia, Ye, Greenfield, & Zemore, 2009; Zemore, 2007). Other substances such as marijuana and illicit drugs have shown similar patterns but have been studied more in adolescent populations (Alegría et al., 2008; Almeida et al., 2012; Borges et al., 2016).

The subgroup differences in prevalence of substance use disorders in US Latinos are similar but more striking. Figure 3.2 shows that the overall lifetime prevalence of DSM-IV substance use disorders in Latinos is 11.2%. Like anxiety and depressive disorders, Puerto Ricans have the highest prevalence (13.8%) as compared to all other Latino subethnic groups. However, Cubans have a much lower prevalence (6.6%) than all other subgroups. Substance use problems and disorders have repeatedly been shown to be

associated with immigration characteristics. In particular, there is a large body of research that has connected alcohol use and problems and substance use problems (including AUD and SUD, respectively) with acculturation in the US in a variety of migrant populations including Latinos (Alegría et al., 2008; Alegría et al., 2007b; Almeida et al., 2012; Chartier & Caetano, 2010; Cherpitel et al., 2015; Karriker-Jaffe & Zemore, 2009; Pinedo, Zemore, Cherpitel, & Caetano, 2017; Zemore, 2007).

In summary, there is significant variation in the prevalence of mental and behavioral disorders among Latinos ethnic subgroups and by immigration characteristics. While there are broad patterns across disorder (for example, Puerto Ricans are consistently among those with the highest prevalence of disorder), the distinction between the other subgroups sometimes differs depending on disorder category. Further, the variation in prevalence by nativity and immigration characteristics suggests that there is something important about amount and timing of exposure, along with family structure (i.e., generation), leading researchers to be interested in acculturation as it relates to mental health. The next sections will expound upon acculturation theory, measurement, and its relation to mental and behavioral disorder.

3.3. Acculturation and Enculturation

Acculturation is a complex phenomenon that has traditionally been viewed as a unidimensional construct. This implies that there is one general underlying domain on which all individuals can be placed based on their "level of acculturation". Under this model, people can be either fully accultured, fully unaccultured, or somewhere in between. Traditionally this view has been analogous with the concept of assimilation, or the idea that an immigrant should leave behind the ways of their home culture and adopt the ways

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of the new culture. The unidimensional equation of acculturation with assimilation is reflected in the *Oxford English Dictionary* definition (Simpson & Weiner, 1989, p.91): acculturation is "the adoption and assimilation of an alien culture." While this is now considered over-simplistic at best, the majority of early acculturation research was influenced by this view.

One of the earliest and most-cited definitions of acculturation states that it encompasses "those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact, with subsequent changes in the original culture patterns of either or both groups" (Redfield, Linton, & Herskovits, 1936, p.149). This definition is more nuanced than a traditional assimilation view but is more suited for the sociological study of changes at the group rather than individual level. Further, it does not allow for an outcome of "enduring biculturalism" in which a group can simultaneously be fluent in two distinct cultures (Rudmin, Wang, & de Castro, 2017).

This recognition that biculturalism is a possible outcome of the collision of two distinct cultures led to the advancement of a bi-dimensional theory of acculturation. In this theory, there are two underlying dimensions or domains instead of one: the old or original culture (from one's home country) and the new (that of the host country). When combined with the concept of psychological acculturation (Graves, 1967), which addresses changes in beliefs, values, identity and behavior at the individual rather than sociological level (Berry, 2017), a more refined definition of acculturation can be used: "the multidimensional process that occurs as a result of intercultural contact between one's heritage culture and the receiving culture that may cause changes in regard to cultural norms, values, languages, attitudes, behaviors, cognitions, and identities" (Schwartz,

Unger, Zamboanga, & Szapocznik, 2010; A. Romero & Piña-Watson, 2017, p.119). This definition expands our understanding of the acculturation process as something that is not only specific to immigrants, but also relevant to later generations of ethnic/racial groups in the United States.

The classic example of this view is Berry's (2003) model of acculturation, in which he separates individuals into four broad acculturative categories: assimilated, integrated, marginalized and separated individuals. These groups relate to four general strategies by which immigrants can adapt to life in a new culture, depending on the level they choose to engage with their host country as well as how much they hold onto the culture and values of their country of origin.

Berry's bidimensional model incorporates the concept of enculturation into traditional acculturation theory. Enculturation, or "the process of preserving the norms of the native group, whereby individuals retain identification with their ethnic cultures of origin" (Guarnaccia et al., 2007, p. 513), is a separate domain apart from acculturation (or assimilation). Because of this, acculturation and enculturation can be measured separately (Kim & Omizo, 2006), allowing for individuals to be classified in a more complex manner, such as Berry's four acculturative groups.

3.3.1. Measurement of Acculturation

Currently there is no agreed-upon way in which acculturation should be operationalized (Alegría, 2009). Even though experts concur that a unidimensional model is insufficient to account for the complex processes at play when immigrants acculturate to a host culture, literature reviews continue to reveal that the prevailing conceptualization in acculturation research uses measures in line with the one-dimensional view (Alegría, 2009;

Doucerain, Segalowitz, & Ryder, 2017). At best, a scale is used; at worst a simple proxy. To make matters worse, a large proportion of literature does not define acculturation at all or only provides a vague definition (Hunt, Schneider, & Comer, 2004; Thomson & Hoffman-Goetz, 2009). A brief discussion follows on the common ways in which acculturation is operationalized in the research literature.

The easiest method to measure acculturation is through a simple proxy. The most common proxies are nativity (US-born versus foreign-born), language preference, and length of residence in the US. While this method is slowly becoming less common, two recent reviews of acculturation research found that one third of studies used a simple proxy (Koneru, Weisman de Mamani, Flynn, & Betancourt, 2007; Thomson & Hoffman-Goetz, 2009). Because these proxies are easily obtained with one question that is usually straightforward (e.g., "How many years have you lived in the United States), it is clear why a large proportion of researchers choose this route. However, the drawbacks are severe. As proxies, they do not measure psychological acculturation and may instead be capturing "other phenomena that may or may not be associated with acculturation" (Thomson & Hoffman-Goetz, 2009, p. 989). And while proxies may be a helpful first step in looking broadly at associations, they do not allow elucidation of the mechanisms underlying these associations. Thus, they are unhelpful in understanding disparities and therefore informing prevention or intervention measures (Alegría, 2009; Lawton & Gerdes, 2014). Some experts (Alegría, 2009; Schwartz & Unger, 2017) have even gone so far to say that use of proxies may be contributing to the inconsistent results in the scientific literature.

Unidimensional scales are slightly better in that they use multiple questions to get at the underlying domain of assimilation to the host culture. They are still considered

unidimensional because they only measure the extent to which the individual has adopted the culture of the new host country. Examples of unidimensional scales in Latino populations are the Acculturation Rating Scale for Mexican Americans (ARSMA; Cuellar, Harris, & Jasso, 1980) and the Short Acculturation Scale for Hispanics (SASH; Marin, Sabogal, Marin, Otero-Sabogal, & Perez-Stable, 1987). However, they, too are constrained by similar limitations as proxy measures. And while they may do a better job measuring adaptation to the host culture, they do not offer insight into retention of the characteristics and values from one's culture of origin that may provide protection or resilience in the face of adversity (Thomson & Hoffman-Goetz, 2009). Doucerain and colleagues (2017) argue that respondents are forced to choose between two cultures that are relevant to their orientation and functioning in life, thereby limiting the ability for these measures to fully capture the various strategies in which new immigrants navigate adapting to life in a new environment. Despite these drawbacks, Thompson and Hoffman-Goetz (2009) still found that 58 percent of studies used a unidimensional measure.

Bidimensional instruments overcome this limitation by measuring each culture (home and host) separately. Generally, these instruments include two scales assessing various behaviors, values and belief, which then provide separate scores for each culture. One example for use in Latino populations is the Bidimensional Acculturation Scale (BAS; Marin & Gamba, 1996). Finally, multidimensional instruments attempt to separately measure multiple domains relevant to the acculturation process. This can include individual scales regarding elements such as values, attitudes, and preferences for food, music, or social interactions. These instruments are rarely seen in the literature (Thomson & Hoffman-Goetz, 2009), but examples the Acculturation Rating Scale for Mexican

Americans II (ARSMA II; Cuellar, Arnold, & Maldonado, 1995) and the Hazuda Scale (Hazuda, Stern, & Haffner, 1988). Bidimensional models have been shown to predict adjustment outcomes with superiority as compared to unidimensional model (Ryder, Alden, & Paulhus, 2000). These models are also conceptually more consistent with a growing body of research on biculturalism in which individuals report competency and deep rootedness in multiple cultures, making bidimensional models the preferred approach in acculturation research (Schwartz, Birman, Benet-Martínez, & Unger, 2017).

It is clear that the conceptualization and measurement of acculturation is complex. However, Doucerain, Segalowitz and Ryder (2017) argue that the availability of recently-developed bi- or tri-dimensional scales makes the need for proxy measures and even unidimensional scales obsolete when moving forward in research. However, it is unclear whether using these more in-depth scales is sufficient without using latent variable methods. Because acculturation is a complex construct, it stands to reason that summary scores or other standard methods for operationalizing scales may oversimplify and obscure important differences both overall and across subgroups.

3.4. Acculturative Experiences

How acculturation is relevant in producing health disparities remains unknown. Broadly, acculturation may function as a mediator (something that occurs in the causal pathway between an exposure and an outcome) or a moderator (something that affects the strength and/or direction of the exposure-outcome relationship. Further, because the definition and measurement of acculturation so widely varies across studies, it is unclear what specific elements of the acculturative process are most relevant to health, or if those components are the same across different mental health outcomes. Finally, while

acculturation has been consistently linked with mental and behavioral disorder, other experiences tangential to the acculturation process (that is, things often experienced by minorities and immigrants navigating living in a new culture such as discrimination or disrupted social relationships) may be equally if not more important than the acculturative process itself in the development of disorder. Four main domains are of particular salience: neighborhood context, family environment, discrimination, and acculturative stress.

3.4.1. Neighborhood Context and Family Environment

Neighborhood and family environment are two contexts in which Latinos may be impacted by their new host culture. These environments may either be protective or risky, depending on their characteristics. Social support, as experienced either through family or friends, has been shown to buffer the effects of stress among minorities or immigrants (Almeida, Subramanian, Kawachi, & Molnar, 2011; Park, Unützer, & Grembowski, 2014; Rivera et al., 2008; Vega, Kolody, & Valle, 1987). However, the influence of neighborhood environments on health can be mixed. On one hand, increased neighborhood social cohesion may have a positive impact on health outcomes (Bjornstrom & Kuhl, 2014; Mair et al., 2010; Mulvaney-Day et al., 2007; Ross, 2000). On the other, immigrant enclaves have higher levels of poverty (Hong, Zhang, & Walton, 2014), which often means more neighborhood physical disorder, crime, and thus poorer health outcomes (Alegría, Molina, & Chen, 2014; Aneshensel & Sucoff, 1996; Aneshensel et al., 2007; Ross & Mirowsky, 2001).

Families can have similarly conflicting effects on health. They can be a place of great support, particularly among Latinos where *familisimo*, or a strong family orientation with an emphasis on loyalty and involvement, is a core cultural value (Sabogal, Marín,

Otero-Sabogal, Marín, & Perez-Stable, 1987). This strong foundation in family relationships has been proposed as a mechanism for resilience in the face of adversity that immigrants and minorities experience when acclimating to US society (Lopez-Tamayo, Seda, & Jason, 2016; Stein, Gonzalez, Cupito, Kiang, & Supple, 2015; Valdivieso-Mora, Peet, Garnier-Villarreal, Salazar-Villanea, & Johnson, 2016).

Conversely, families can also be places of conflict. Familial cultural conflict (FCC) has been theorized as a driver of negative mental and behavioral health outcomes among immigrants largely through the acculturation gap hypothesis (Portes & Rumbaut, 2001). The hypothesis posits that differences in levels of acculturation between family members, often parents and children, results in relationship stress (Arnett, 1999; Baptiste, 1993; Portes & Rumbaut, 2001). This stress can be through differences in values, priorities, beliefs, traditions and/or behaviors. Family cultural conflict (often stemming from intergenerational cultural dissonance or the "acculturation gap") has been implicated in a variety of negative outcomes including depression, anxiety, and substance use problems, particularly among adolescents in immigrant families (Cervantes, Padilla, Napper, & Goldbach, 2013; Cox Jr., Zapata Roblyer, Merten, Shreffler, & Schwerdtfeger, 2013; Gil, Wagner, & Vega, 2000; Lau et al., 2005; Lui, 2015; Martinez Jr., 2006; Toro, 2011). The importance of the acculturation gap and FCC underscores the need to consider generational status when looking at contributors to poor mental health instead of only nativity; the acculturation gap between first and second-generation Latinos versus second and third generation Latinos may have a meaningfully different effect on health based on the above theory and body of research. There are other contributors to family stress in the context of

Latinos beyond cultural conflict, such as separation during migration and subsequent reunification.

3.4.2. Discrimination

Discrimination, conceptualized as unfair treatment of individuals or groups based on characteristics such as gender or race, are pervasive problems for minorities living in the United States. It can be pervasive, inhabiting a variety of domains: school, work, peers, or even day-to-day living. Racial or ethnic minorities are likely to experience various forms of discrimination in a majority culture regardless of nativity and are much more likely to experience discrimination at greater levels than non-Hispanic whites (Eccles, Wong, & Peck, 2006; Kessler, Mickelson, & Williams, 1999). However, immigrants may be more likely to experience certain types of discrimination, especially in regards to limited language proficiency, policy measures, or even cultural stereotypes (Almeida et al., 2016; Cervantes et al., 2013; Dietz, 2010; A. J. Romero & Roberts, 2003). Further, some research has shown that Latinos living in the US are especially likely to be recipients of discrimination (American Psychological Association, 2012; Coll et al., 1996; Driscoll & Torres, 2013) and that discrimination is associated with higher levels of acculturation (Arellano-Morales et al., 2015). I'm focused on self-reported perceived/internalized discrimination, but there are other places of discrimination that are more structural. Also based on race.

Discrimination can take many forms ranging from specific, acute instances such as traumatic encounters with border police to more chronic, pervasive microaggressions (A. J. Romero & Roberts, 2003; Thompson, 2008). The latter instances, which include things such as verbal ridicule or receiving poorer service, may seem relatively insignificant, can

have cumulative, negative consequences over time such as depressive symptoms (Sellers & Shelton, 2003). In fact, a recent study by Cervantes and colleagues (2013) found that the stress attributable to discrimination was the singular domain to have a consistent effect across multiple Latino generations.

Discrimination can also be perceived (attributed as such by the recipient) or observed (in the form of more concrete experiences). Regardless, both types have been linked to stress and poor health (Allison, 1998; Kessler et al., 1999). In fact, Kessler and colleagues (1999) argue that "perceived discrimination is one of the most important secondary stresses associated with major stressor events such as job loss and exposure to violence" (pp. 209-10). Discrimination based on race or ethnicity can also be considered a structural stressor that has consequences independent of actual events (Adams, 1990). This, in turn, has been linked to a variety of poor health outcomes (Chithambo, Huey, & Cespedes-Knadle, 2014; Cobb, Xie, Meca, Schwartz, & Xie, 2017; Kessler et al., 1999; Pascoe & Smart Richman, 2009).

The effect of discrimination on mental health has been well documented. Increased levels of discrimination have been linked to both internalizing and externalizing problems, including suicide, depression, generalized anxiety disorder, substance use, and general psychological distress (Araújo & Borell, 2006; Brown et al., 2000; Gee, Ryan, Laflamme, & Holt, 2006; Kessler et al., 1999; Torres, Yznaga, & Moore, 2011; Tran, Lee, & Burgess, 2010). These effects can occur across the lifespan, beginning in elementary school children (Coll et al., 1996; Eccles et al., 2006; Spears Brown & Bigler, 2005). Because of this, timing of exposure to such discrimination may be crucial, highlighting again the importance of nativity and, in particular, age of immigration when looking at its

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relationship with mental disorder. Finally, the experience of discrimination has been shown to differ according to Latino subethnicity (Araújo & Borell, 2006; Arellano-Morales et al., 2015; Gee et al., 2006), again reinforcing the need to disaggregate by subgroup.

3.4.3. Acculturative Stress

One of the most obvious experiences related to the process of integrating into a new culture is acculturative stress. Broadly, "stress" can be defined as "the external or internal demands that are appraised by an individual as taxing or exceeding their existing resources" (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986; A. Romero & Piña-Watson, 2017, p.120; Selye, 1978). Thus, "acculturative stress" can be thought of as "the cognitive appraisal of stress due to adapting to the majority/dominant culture, which often includes intergroup discrimination and language conflicts" (Berry, 2003; A. Romero & Piña-Watson, 2017, p.120). It may arise from a variety of elements during the process of acculturation, as immigrants become increasingly exposed to the new and usually dominant culture (Berry, 2003; Torres, 2010; Torres et al., 2012), and therefore usually involves stress specific to the immigration experience. Therefore, prevailing theory posits that the migration process itself may not inherently raise the risk of mental disorder, but rather it is the individual response of each migrant to that process that influences mental health outcomes (Aldwin, 2007; Lazarus, 1997).

The association between acculturative stress and poor mental health has been well-established (Arbona et al., 2010; Audibert, Suarez-Morales, & Losada, 2014; Cano, Castillo, Castro, de Dios, & Roncancio, 2014; Caplan, 2007; Crockett et al., 2007; Hovey & Magaña, 2000; Mejía & McCarthy, 2010). While traditionally this type of stress has been thought of as being specific to immigrants confronted with adapting to a new culture,

more recent research has shown that even second- or third-generation minorities can experience acculturative stress (A. Romero & Piña-Watson, 2017).

Acculturative stress can manifest in a variety of domains and differentially by Latino subgroup. One potential area could be legal stress, as a large proportion of Mexicans in the US are undocumented immigrants (Krogstad et al., 2017). Cubans, on the other hand, generally do not have similar experiences in regard to fear of deportation and interaction with the US legal system. Therefore, fears regarding the legal system and deportation (Arbona et al., 2010; Cobb et al., 2017; Pérez & Fortuna, 2005) may differentially contribute to disorder or, in the case of first-generation immigrants, being separated from support systems in one's home country (Arbona et al., 2010).

3.5. Summary

This chapter reviewed the scientific literature on Latinos, acculturation, and mental health in the United States. When it comes to mental and behavioral disorders, US-residing Latinos tend to have better outcomes compared to non-Hispanic whites. However, significant variations are seen when associations are disaggregated by subethnic and immigrant-related (e.g., nativity, time spent in the US, age at immigration, and generational status) characteristics. The latter points toward the importance of acculturation and other related experiences of minorities and immigrants. Because the acculturation literature is so varied, it is essential to use a bidimensional definition of acculturation and measure it accordingly. Consistent with Berry's (2003) approach, this study assesses acculturation on two domains: the culture of origin (as measured by ethnic identity) and US host culture (as measured by language preference and proficiency). It also takes into account ethnic and

generational subgroups, as they exhibit significant variation in relation to both mental and behavioral disorder and other experiences relating to acculturation.

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CHAPTER 4. FACTOR STRUCTURE AND MEASUREMENT INVARIANCE OF SIX SCALES IN THE NATIONAL LATINO AND ASIAN AMERICAN STUDY

4.1 Abstract

As the US-residing Latino population grows, so will the burden of mental and behavioral disorder. Although foreign-born Latinos tend to exhibit lower rates of morbidity, this effect disappears both with increased time in the US and with future US-born generations. Rates of disorder also vary significantly by Latino subgroup, whether it be country of origin or generational status. Time of migration to the US is also important, as the less-studied "1.5 Generation" (immigrants arriving as children) often resemble their US-born counterparts. Due to these complicated patterns, it is imperative to illuminate the contextual mechanisms that drive this increasing prevalence of disorder, both for prevention and treatment purposes. As acculturation, context and lived experiences among minorities are complex and unobservable constructs, it is more appropriate to employ latent variable methods to characterize these potential risk and protective factors in order to make valid inferences in relation to the development of disorder. This study factor analyzes six scales relating to acculturation and related experiences from the National Latino and Asian American Study, using measurement invariance testing to explore differences in latent constructs by Latino subgroup. Findings show that Latinos are heterogeneous, but that this often depends on the construct and subgrouping of interest. The importance of taking into account age at immigration is also highlighted.

4.2 Introduction

Latinos are the largest foreign-born and third-fastest growing minority in the United States (US)(Colby & Ortman, 2014) and will increasingly contribute to the burden of

mental and behavioral disorders. Acculturative processes have been consistently implicated in underlying mental health disparities among Latinos, yet mechanisms have not been identified. Better measures of acculturation and other potential disparities pathways, such as discrimination and family conflict, are needed to explore their associations with mental health. These relationships need to be investigated in light of heterogeneity by ancestry and generational status (including age at time of migration).

Research on mental health among Latinos is constrained by three major limitations: 1) lack of ethnic subgroup comparisons, 2) not accounting for generational status, and 3) inadequate measures of acculturation. To understand and reduce health disparities for the US Latino population a more nuanced approach must be taken to disentangle the mix of risk and protective factors contributing to mental and behavioral disorder among Latinos. Experts have noted the inadequacy of across-group analyses that treat Latinos as a homogenous ethnic group (Alegría et al., 2007a) and obscure within-group disparities among Latinos. The sparse research that takes into account ethnic subgroups has found significant differences in prevalence of psychiatric disorder (Alegría et al., 2007a; Alcántara et al., 2014), suicidality (Fortuna et al., 2007), and general distress (Torres et al., 2012). Differences also occur by generational status and time spent in the US (Almeida et al., 2012; Borges et al., 2011; Borges et al., 2012; Cook et al., 2009). Acculturation, defined as "the multidimensional process of the adoption of US cultural norms, values, and lifestyles" (Alegría, 2009; Lara et al., 2005), has been linked to multiple mental and behavioral disorders (Alcántara et al., 2014; Blanco et al., 2013; Ortega et al., 2000; Rivera et al., 2008; Valencia-Garcia et al., 2012), varying by ethnic subgroup and generational status (Guarnaccia et al., 2007). Experiences such as discrimination and family conflict

also correlate with acculturation and mental and behavioral disorder (Cook et al., 2009; Mulvaney-Day et al., 2007; Rivera et al., 2008; Torres et al., 2012), exhibiting similar variations by subgroup (Perez et al., 2008). Studies investigating the complex relationships between acculturation, psychiatric morbidity, and relevant experiences such as discrimination, family conflict, and acculturative stress need to take into account differences by ethnic and generational subgroup.

Despite its importance, acculturation has been measured insufficiently and inconsistently. A recent systematic review (Thomson & Hoffman-Goetz, 2009) called for a more thoughtful approach to conceptualizing and measuring this process, including the refinement of existing measures. The more recent concept of enculturation, or "the process of preserving the norms of the native group, whereby individuals retain identification with their ethnic cultures of origin" (Guarnaccia et al., 2007, p. 513) was introduced to help expand the more traditional unidimensional approach used by acculturation researchers; because acculturation and enculturation are considered separate domains and can be measured separately (Kim & Omizo, 2006), individuals can be classified using a bi-dimensional model in a more complex manner.

The nationally-representative National Latino and Asian American Study (NLAAS) provides rich data on acculturation as well as psychiatric disorder. Acculturation measures, which include a measure of enculturation, were carefully selected and adapted, but their latent structures have yet to be fully explored. To understand the mechanism by which acculturation impacts mental health, novel methods are needed. Latent variable methods are one such approach that has been recommended as a way to capture nuance of complex constructs such as acculturation.

Along with acculturation, factors such as neighborhood context, family environment, discrimination, and other mechanisms related to physical and mental disorders are complex, unobserved constructs. While it is possible to develop scales that are highly related to these constructs, the scales are not, in and of themselves, perfect measures of the construct they purport to measure. In fact, even the individual items are imperfect measures due to phenomena such as recall bias. Treating these scales as observed variables by summing them or creating binary or categorical variables neglects the possibility of measurement error, introducing bias (usually an attenuation of an effect), decreased reliability (with larger standard errors), or both into analyses. In the context of complex mechanisms such as acculturation and the development disorder, neglecting to account for measurement error will lead to conflicting results. This is one reason why acculturation research has made little progress in teasing apart the complex mechanisms at work to promote disorder in immigrants.

Applying latent variable models is one approach to addressing these limitations. Rather than taking the individual scale items as known building blocks to an observable construct, methods such as factor analysis allow us to capitalize on having more than one indicator to get at the true underlying scores. In other words, an individual's responses on the indicators are influenced by one's true score on the unobserved construct, rather than assuming the construct is a manifestation of the observed indicators.

Two additional issues that arise with directly regressing observed indicators on an outcome of interest are multicollinearity and biased parameter estimates. Multicollinearity, or the interdependence among explanatory variables, is a potential concern for all basic regression analyses (Rockwell, 1975) and occurs when directly regressing the indicators

on the outcome, rather than going indirectly through an unobserved factor. Further, incorrectly specifying the measurement model, such as not accounting for correlated residuals among scale indicators, will bias one's structural model parameter estimates of interest, leading to attenuated or incorrect conclusions (Asparouhov & Muthén, 2009).

Exploratory Factor Analysis (EFA) addresses these limitations while also allowing the assessment of dimensionality of a measurement instrument. It seeks to find the smallest number of underlying factors to best explain the correlations among a set of observed variables (Bartholomew, Knott, & Moustaki, 2011; L. K. Muthén & Muthén, 1998-2017; Spearman, 1904). And while it is often viewed as data driven, there is a focus on interpretability. It is by nature exploratory, meaning no structure is imposed on the relationships between the observed variables and the unobserved factors. There are also no restrictions on which factors influence which items. While in the past Confirmatory Factor Analysis (CFA) has been considered a more rigorous approach to factor analysis than EFA, recent statistical developments and the advent of Exploratory Structural Equation Modeling (ESEM) have bridged the gap between EFA and CFA. ESEM, essentially the incorporation of EFA into an SEM framework, allows prior advantages of CFA, such as measurement invariance testing, to be implemented within the flexibility of an EFA framework (Asparouhov & Muthén, 2009; Marsh et al., 2009). In fact, studies comparing the two modeling approaches have demonstrated that the assumption of zero cross-loadings necessary for CFA models are often untenable and lead to poor model fit (Marsh, Nagengast, & Morin, 2013; Marsh et al., 2009). Instead, allowing even small but significant cross loadings can be important to fully capture complex constructs.

It is also important to test for the presence of measurement invariance in measurement models such as factor analyses. Because a large part of epidemiologic research involves comparison of means or prevalences, failing to account for differences in measurement across meaningful subgroups may lead to biased inferences (Meredith & Teresi, 2006; Meredith, 1993). An implicit assumption of group comparisons is construct consistency across groups or time, but if this untested assumption is invalid, observed mean differences may instead be due to construct variation. Confirming the presence of measurement invariance in a factor analysis model allows latent or observed construct scores to be validly compared. The ESEM approach is flexible enough to allow imposition of increasingly stringent constraints on the various parts of the factor analysis model to determine to what extent do indictors and their constructs have the same relationships and correlational structure across multiple groups.

This study explores the latent variable properties of six scales from nationally-representative data evaluating US Latinos' acculturative (language, ethnic identity) and immigration-related experiences (neighborhood context, family context, acculturative stress, discrimination), taking into consideration differences between ethnic and generational subgroups. The objective is to evaluate the factor structure of these scales and test for measurement invariance across subgroups to determine the most meaningful and appropriate way to use these scales in future studies.

4.3 Methods

4.3.1 Participants and Procedure

Data for this study are from the National Latino and Asian American Study (NLAAS), which is a nationally-representative, probability-based survey that was

conducted between 2001 and 2003 as part of the Collaborative Psychiatric Epidemiology Surveys (CPES; Heeringa et al., 2004; Pennell et al., 2004). The CPES was a National Institute of Mental Health (NIMH)-funded project conducted by the Survey Research Center (SRC) at the University of Michigan (UM) to collect data on the prevalence of psychiatric disorders, associated impairments, and service use patterns in the US. The CPES target population was all civilian, non-institutionalized adults (aged 18 years or older) in the contiguous United States. The NLAAS further narrowed that population to those of Latino or Asian origin and is the first nationally-representative study powered to examine acculturation and psychiatric disorder in these two minority populations by subgroup. A stratified, multi-frame probability sampling strategy, which oversampled Latinos and Asian Americans, was employed to achieve this goal. Specifically, NLAAS Investigators aimed to obtain information on language use and ethnic disparities, support systems, family environment, neighborhood factors, discrimination, and assimilation in order to estimate how closely mental and behavioral disorders are related to social and cultural factors (Pennell et al., 2004).

These analyses limited the NLAAS sample to those 2,554 participants of Latino ethnicity. Computer assisted structured interviews were conducted in person at the respondent's home, administered by interviewers trained at UM's Institute for Social Research. The final response rate for the Latino sample was 75.5% (Heeringa et al., 2004). All NLAAS study procedures were approved by the Internal Review Board Committees of Cambridge Health Alliance, the University of Washington, and the University of Michigan (Pennell et al., 2004). Additional details regarding the study sample and procedures can be found elsewhere (Alegría et al., 2004; Heeringa et al., 2004; Pennell et al., 2004). The

present study was approved by the IRB Office at the Johns Hopkins Bloomberg School of Public Health (IRB #00008615).

4.3.2 Measures

All non-diagnostic measures have been described in detail elsewhere, including reliability results (Alegría, Vila et al., 2004). All questionnaires for the Latino sample were rigorously adapted, translated into Spanish, and back translated to ensure cross-cultural equivalency in four domains: semantic, content, technical and criterion/conceptual validity (Alegría et al., 2004). Individual measures were thoughtfully selected, adapted and/or developed by the NLAAS investigators, with careful attention to language and idiomatic expressions. This current study utilizes ethnic subgroup, generational status and migration information, psychiatric diagnoses, measures of acculturation and related acculturative experiences (language, ethnic identity, discrimination, acculturative stress, neighborhood context, and family context), and sociodemographic characteristics. Respondents could complete the interview in the language of their choice, including switching back and forth between English and Spanish, depending on their comfort level for each subject matter. All six scales described below can be reviewed in full in Appendix A.

4.3.2.1 Acculturation and Enculturation

Language. Level of acculturation was assessed via two Spanish and English language domains: proficiency and preference. Three questions regarding language proficiency were asked for both English and Spanish, resulting in a total of six items. These items are first asked in Spanish and then repeated in English. The three Spanish-language items were taken from the Cultural Identity Scales for Latino Adolescents (Felix-Ortiz,

Newcomb, & Myers, 1994). The corresponding English items were created especially for the NLAAS English-language proficiency scale to mirror the Spanish-language items. Four response categories range from "Poor" to "Excellent". When language-specific proficiency items are summed, higher scores indicate a higher level of proficiency in the given language. For this study, items were dichotomized into Poor/Fair and Good/Excellent due to small cell sizes. The respondent's language preference was evaluated using three items also adapted from the Cultural Identity Scales for Latino Adolescents (Felix-Ortiz et al., 1994). Items assess level of preference for using Spanish or English in three areas: speaking with family, speaking with friends, and thinking. Response categories range from: Spanish All the Time to English All the Time. This is a unidimensional scale with higher scores indicating increased preference for English. Items on Spanish and English language proficiency (see Appendix A) are also available.

Ethnic Identity. Ethnic identity, or the degree to which individuals identify with their own ethnic group, is operationalized in the NLAAS with a four-item scale ($\alpha = 0.75$) (Guarnaccia et al., 2007). Items assessed respondents' closeness and identification with, shared time with and similarity of feelings and ideas to others in their own ethnic group. Ethnic identity has often been used as a proxy measure for enculturation (Guarnaccia et al., 2007). In this study responses were collapsed into three categories: Low ("not at all" or "not very"), Medium ("somewhat"), and High ("very").

4.3.2.2 Acculturative Experiences

These scales, hereafter referred to as "acculturative experiences" or "related experiences", include experiences correlated with acculturation and immigration status and are significant to the mental health of minority groups in the US.

Neighborhood Context. This 7-item scale is made up of two subscales: The Neighborhood Social Cohesion scale (4 items) and the Neighborhood Safety scale (3 items). The Social Cohesion scale is designed to reflect the cohesiveness and safety of respondents' neighborhoods in which they live (e.g., people in the neighborhood can be trusted, people in the neighborhood get along, neighbors would help in an emergency, and people in the neighborhood look out for each other). It was adapted from three different instruments: The Social Cohesion and Trust subscale by Sampson, Raudenbush, and Earls (Sampson, Raudenbush, & Earls, 1997); UNOCCAP (National Institute of Mental Health, 1994); and the Neighborhood subscale of the National Longitudinal Study of Adolescent Health (Bearman, Jones, & Udry, 1997). Four response categories range from "Very True" to "Not at All True". When summed, higher scores indicate less neighborhood social cohesion ($\alpha = 0.81$). The Neighborhood Safety scale contains three items which ask about the respondent's perception of neighborhood violence and safety at night. Participants were asked to rate on a four-point scale "How true is each of the following statements about your neighborhood – very true, somewhat true, not very true, or not at all true?" See Appendix A for all items. When summed, higher scores represent a higher perception of neighborhood safety. For this study, individual item responses on both subscales were combined to create a binary variable: Not true ("not very true" and "not at all true"), and True ("somewhat true" and "very true").

Family Context. This 15-item measure is made up of three subscales: Family Pride (7 items), Family Cohesion (3 items), and Family Cultural Conflict (5 items). The Family Pride scale assesses the respondent's feelings of loyalty and respect toward his or her family members (e.g., family members respect one another, we share similar values and

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beliefs as a family, we really do trust and confide in each other). The Family Cohesion scale asks about feelings of closeness (e.g., family members like to spend free time with each other, family members feel very close to each other, family togetherness is very important) with one's family members. Both the Family Pride and Cohesion subscales (D. Olson, 1989; D. H. Olson, 1986) were rated on a four-point scale of Strongly Agree, Somewhat Agree, Somewhat Disagree, and Strongly Disagree. These categories were collapsed into Agree (somewhat or strongly) and Disagree (somewhat or strongly).

The Family Conflict subscale addresses intergenerational and cultural conflict between respondents and their families. Respondents were asked five questions regarding their familial cultural conflict views and experiences (e.g., being too close to family interfered with goals; arguing with family over different customs; feeling lonely and isolated due to lack of family unity; family relations being less important to those close to you; and personal goals conflicting with family) via the Family Cultural Conflict Scale (α = 0.91), a subscale of the Hispanic Stress Inventory (Cervantes, Padilla, & Salgado de Snyder, 1991). The three response options were: Hardly Ever or Never, Sometimes, or Often. When summed, high scores indicate greater amounts of conflict. For this study, these responses were collapsed into binary indicators: No ("Hardly ever or never") and Yes ("Sometimes" and "Often").

Discrimination. Two subscales assessed discrimination. A nine-item everyday discrimination scale (α = 0.91), adapted from the Detroit Area Study, (Jackson, Williams, & Torres, 1995; Williams, Yan, Jackson, & Anderson, 1997) asked respondents about the frequency of discriminatory experiences in day-to-day life (e.g., being threatened or harassed, treated with less courtesy than others, treated with less respect than others,

receiving poorer service than others, others acting as if the respondent was not smart, others acting as if they were afraid of the respondent, others acting as if respondent is dishonest, others acting as if the respondent is not as good as they are, and being called names or insulted). When summed, lower scores indicate greater prevalence of everyday discrimination, but for the purposes of this study, the six available responses were collapsed into three categories: Never ("Never"), Rarely ("A Few Times a Year" and "Less Than Once a Year") and Often ("Almost Every Day", "At Least Once a Week", and "A Few Times a Month").

Perceived discrimination was assessed via three items adapted from Vega and colleagues (1993). Respondents can indicate how often they or their friends are disliked or treated unfairly because they are of Latino descent. When summed, lower scores represent higher frequency of discrimination. This study collapsed the four response options into three: Never, Rarely and Often (from "Sometimes" and "Often").

Acculturative Stress. Acculturative stress was assessed in the foreign-born population only using a nine-item scale ($\alpha = 0.67$), asking respondents about the presence (Yes or No) of feelings or experiences regarding transition to the US, both in how they feel about leaving friends or family back in their country of origin and about experiences here, such as finding work or fears about deportation. The items were adapted from the Acculturative Distress scale from the Mexican American Prevalence and Services Survey (Vega et al., 1998a).

4.3.3 Population Subgroups

Subethnicity. Self-reported ancestry or country of origin was collapsed into four major Latino subgroups: Puerto Ricans (n=495), Mexicans (n=868), Cubans (n=577) and All Others (n=614).

Generational Status. Four categories of generational status were created. First generation (arriving in the US at age 12 or older, n=1257), 1.5 generation (arriving when less than age 12, n=365), second generation (US-born with at least one parent foreign-born, n=522) and third generation (US-born with both parents US-born, n=397). The distinction between the first and 1.5 generations is important from a developmental perspective, as it allows for differences based on age of migration to the US, which has been linked to increased prevalence of psychiatric disorder (Alegría et al., 2007; Vega, Sribney, Aguilar-Gaxiola, & Kolody, 2004). Thirteen respondents were unable to be classified by generational status and were therefore excluded from generation-specific analyses.

4.3.3 Statistical Analysis

For each scale raw frequencies of individual items were examined in the overall sample and by ethnic and generational subgroup. For subgroup comparisons a chi-squared test was used to assess for statistical differences in item endorsements across group categories. In the cases of low frequency within a cell, item levels were collapsed as discussed in the measures section above. Statistical weighting was not incorporated as inferences were not being made from the NLAAS sample to the larger US Latino population.

All analyses were conducted in Mplus Version 8 (L. K. Muthén & Muthén, 1998-2017). Exploratory Factor Analysis Analysis (EFA) with Geomin rotation (oblique,

allowing correlated factors) and a WLSMV (Weighted Least Squares Means and Variance adjusted) estimator was used, the Mplus defaults for EFA with categorical indicators due to better performance in estimating parameters in the presence of ordinal data (DiStefano & Morgan, 2014). Full information maximum likelihood (FIML, the Mplus default) allowed records with some missing data to be retained. Different factor structures were compared (e.g., 1-factor versus 2-factor models) using several absolute fit statistics, including Chi-Square test, Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and the Standardized Root Mean Square Residual (SRMR). Guidelines for good model fit are: CFI and TLI greater than 0.95, SRMR at or below 0.08, and RMSEA below 0.06 (Hu & Bentler, 1999). Scree plots of eigenvalues were also examined. The final factor model was chosen based on the scree plots, fit statistics, and the interpretability of the factors based on item loadings.

Measurement invariance (MI) was explored across ethnic and generational subgroups using an Exploratory Structural Equation Modeling (ESEM) framework (Asparouhov & Muthén, 2009) as described by Marsh et al. (2009) using a theta parameterization. Prior to evaluating MI, the factor structure of each subgroup of interest must be explored to determine if the number of factors in each group is equivalent to the factor structure in the overall sample ("configural invariance"). Marsh and colleagues put forth a 13-step process ("taxonomy of invariance") to fully evaluate the measurement invariance of a scale with continuous indicators within an ESEM framework (Marsh et al., 2009). As all NLAAS scales have categorical indicators, statistical limitations required us to undertake a 7-step process, as highlighted in Table 4.0. Here, models are named to harmonize with Marsh Taxonomy, and several steps have a secondary "partial" invariance

Table 4.0. Overview of Model Taxonomy for Measurement Invariance Testing with Categorical Indicators

Model Number	Invariant Parameters	Description	Nested Models
Model 1	None (FMn = 0)	Configural invariance	-
Model 2	FL (FMn = 0)	Weak factorial/ measurement invariance	[1]
Model 3	FL, Uniq (FMn = 0)		[1,2]
Model 4	FL, FVCV (FMn = 0)		[1,2]
Model 5	FL, INT	Strong factorial/ measurement invariance	[1,2,5p]
Model 5p	FL, INT(p)	Strong factorial/ measurement invariance	[1,2]
Model 6	FL, Uniq, FVCV		[1,2,3,4]
Model 7	FL, Uniq, INT	Strict factorial/ measurement invariance	[1,2,3,5]
Model 8	FL, FVCV, INT		[1,2,4,5]
Model 8p	FL, FVCV, INT(p)		[1,2,4,5p]
Model 9	FL, FVCV, INT, Uniq		[1-8]
Model 10	FL, INT, FMn	Latent mean invariance	[1,2,5]
Model 10p	FL, INT(p), FMn	Latent mean invariance	[1,2,5p]
Model 11	FL, Uniq, INT, FMn	Manifest mean invariance	[1,2,3,5,7,10]
Model 12	FL, FVCV, INT, FMn		[1,2,4,5,6,8,10]
Model 12p	FL, FVCV, INT(p), FMn		[1,2,4,5p,6,8p,10p]
Model 13	FL, FVCV, INT(p), Uniq, FMn	Complete factorial invariance	[1-12]

Adapted from Marsh et al. (2009).
Note. Models in gray unable to be tested with categorical factor indicators.
FL=factor loadings; FVCV=factor variance-covariances; INT=item intercepts;
Uniq=item uniquenesses; FMn=factor means; p=partial.

step to test for invariance of item intercepts, designated by a "p" in the model number. Steps shaded in gray were excluded in our analyses as they involved testing of item uniquenesses or residuals, which is statistically impossible with categorical indicators; freeing them to test for invariance across subgroups would result in an unidentified model. Further, to identify Models 1 through 4, factor means are necessarily constrained to be zero. Once item intercepts are constrained to be either fully or partially invariant as determined by Model 5, factor means can be freed.

To test for measurement invariance, we start with Model 1 and proceed through Model 12. Once the constraint of a model parameter significantly worsens model fit as evidenced through the CFI, TLI, Weighted Root Mean Square Residual (WRMR), and χ^2 difference test, invariance testing stops at that step. The level of measurement invariance at that step dictates how across-group comparisons can be made. At this time, partial invariance of factor loadings is not allowed, nor is partial FVCV invariance (meaning either all factor variances and covariances need to be constrained to be equivalent across groups or all must be free). Models were compared using chi-squared difference testing at the p=0.05 level and substantive evaluation of parameter estimates. Model 1 pertains to configural invariance, which means that only the factor structure is the same across groups. In our case of categorical indicators, Model 12 indicates full invariance across groups.

4.4 Results

In this section, results for each scale are presented in a similar order. The first table for each scale presents and compares item frequencies across subgroups. The second table displays fit statistics from the Exploratory Factor Analysis. Results from measurement invariance testing across ethnic and generational subgroups are presented in the third table

and discussed. Finally, EFA-estimated factor loadings and subgroup-specific loadings, means and variances from the ESEM MI testing models are presented in the final table for each scale.

4.4.1 Language

Table 4.1.1 presents endorsement of individual items for both scales in the overall sample and by subgroups of interest. Chi-square test statistics and p-values are presented for test of differences in frequencies across subgroup categories, although only the "Good/Excellent" category for the Language Proficiency subscale is displayed and the "Poor/Fair" responses are not presented. All items were significantly different across all subgroups, whether looking across subethnicities or generational status. In general, Cubans reported better Spanish proficiency and tended to prefer Spanish when speaking and thinking, whereas Puerto Ricans reported higher levels of English proficiency and preference. When looking across generational groups, there was a clear gradient, with more first-generation immigrants having higher Spanish proficiency and using Spanish to communicate and think.

Table 4.1.2 displays the fit statistics from the Exploratory Factor Analysis. Based on the fit statistics, a 2-factor model was chosen. This was especially clear from the eigenvalues, scree plot (data not shown), and reduction in SRMR when adding a second factor to explain the covariance structure among all items. Factor loadings are presented in Table 4.1.4, where a clear structure of "Spanish" and "English" factors are seen. Items 1 through 3, which involve Spanish proficiency, load strongly (all >0.850) on the "Spanish" factor. English Proficiency items 4 through 6 all have loadings greater than 0.990 on the "English" factor. Language Preference subscale items load strongly (all >0.700) on

Intended to be blank.

Table 4.1.1. Response Distribution of 9-item Language Scale Items in the Latino NLAAS Sample, by Subgroup

Scale Item	Sub-scale	Response	Total (n=2550) n (%)	Cuban (n=577) n (%)	Puerto Rican (n=491) n (%)	Mexican (n=868) n (%)	All Other (n=614) n (%)	χ^2 (p-value)±	First (n=1249) n (%)	1.5 (n=363) n (%)	Second (n=522) n (%)	Third (n=397) n (%)	χ^2 (p-value)±
1. How well do you speak Spanish?	Language Proficiency	Good/ Excellent	1754 (74.9)	493 (87.1)	298 (68.3)	547 (69.5)	416 (75.1)	**66.91 (0.0000)**	1029 (82.9)	284 (80.5)	309 (66.3)	125 (46.0)	**187.79 (0.0000)**
2. How well do you read Spanish?		Good/ Excellent	1624 (69.3)	475 (83.9)	280 (64.2)	479 (60.9)	390 (70.4)	**88.83 (0.0000)**	1014 (81.7)	247 (70.0)	267 (57.3)	89 (32.7)	**292.72 (0.0000)**
3. How well do you write in Spanish?		Good/ Excellent	1449 (61.8)	442 (78.1)	242 (55.5)	411 (52.2)	354 (63.9)	**102.61 (0.0000)**	949 (76.5)	212 (60.1)	213 (45.7)	70 (25.7)	**314.94 (0.0000)**
4. How well do you speak English?		Good/ Excellent	1291 (50.7)	236 (41.0)	337 (68.8)	412 (47.6)	306 (49.8)	**89.30 (0.0000)**	194 (15.5)	287 (78.8)	461 (88.5)	345 (86.9)	**1240.12 (0.0000)**
5. How well do you read English?		Good/ Excellent	1309 (51.4)	252 (43.8)	341 (69.6)	410 (47.3)	306 (49.8)	**84.71 (0.0000)**	222 (17.7)	277 (76.1)	462 (88.7)	344 (86.6)	**1143.50 (0.0000)**
6. How well do you write in English?		Good/ Excellent	1214 (47.7)	225 (39.1)	319 (65.1)	377 (43.5)	293 (47.7)	**82.74 (0.0000)**	175 (14.0)	267 (73.4)	444 (85.2)	324 (81.6)	**1142.76 (0.0000)**
7. What language do you speak with most of your friends?	Language Preference	Spanish	1254 (53.5)	378 (66.8)	158 (36.2)	425 (54.0)	293 (52.9)	**95.28 (0.0000)**	1071 (86.2)	91 (25.8)	49 (10.5)	36 (13.2)	**1242.03 (0.0000)**
		Both	377 (16.1)	75 (13.3)	95 (21.8)	116 (14.7)	91 (16.4)		115 (9.3)	94 (26.6)	117 (25.2)	49 (18.0)	
		English	712 (30.4)	113 (20.0)	183 (42.0)	246 (31.3)	170 (30.7)		56 (4.5)	168 (47.6)	299 (64.3)	187 (68.8)	
8. What language do you speak with most of your family?		Spanish	1604 (68.4)	467 (82.5)	229 (52.5)	503 (63.8)	405 (73.1)	**132.85 (0.0000)**	1167 (94.0)	205 (58.1)	170 (36.5)	54 (19.9)	**985.14 (0.0000)**
		Both	347 (14.8)	61 (10.8)	108 (24.8)	126 (16.0)	52 (9.4)		49 (3.9)	84 (23.8)	147 (31.5)	65 (23.9)	
		English	393 (16.8)	38 (6.7)	99 (22.7)	159 (20.2)	97 (17.5)		26 (2.1)	64 (18.1)	149 (32.0)	153 (56.2)	
9. In what language do you think?		Spanish	1291 (55.3)	372 (65.7)	172 (39.6)	440 (56.2)	307 (55.5)	**70.84 (0.0000)**	1076 (86.8)	104 (29.5)	67 (14.5)	35 (12.9)	**1221.20 (0.0000)**
		Both	369 (15.8)	70 (12.4)	91 (21.0)	112 (14.3)	96 (17.4)		124 (10.0)	98 (27.8)	102 (22.1)	44 (16.2)	
		English	676 (28.9)	124 (21.9)	171 (39.4)	231 (29.5)	150 (27.1)		40 (3.2)	150 (42.6)	293 (63.4)	192 (70.8)	

Note. 4 respondents had missing responses on all items.
*3 degrees of freedom for Language Proficiency, 6 degrees of freedom for Language Preference
Bold=significant at the p<0.01 level

Table 4.1.2. Fit Statistics for Exploratory Factor Analysis of 9-item Language Scale

Model	# Free Params	Chi-Square	DF	p-value	RMSEA (95% CI)	p-value	CFI	TLI	SRMR
1-Factor	9	3231.576	27	0.000	0.216 (0.209-0.222)	0.000	0.970	0.960	0.315
2-Factor	*17*	*245.803*	*19*	*0.000*	*0.068 (0.061-0.076)*	*0.000*	*0.998*	*0.996*	*0.024*
3-Factor	24	58.8470	12	0.000	0.039 (0.029-0.049)	0.960	1.000	0.999	0.008
4-Factor*	--	--	--	--	--	--	--	--	--

Note: **Bold, italics** indicate chosen factor structure.
Params=Parameters; DF=Degrees of freedom; RMSEA=Root Mean Square Error of Approximation; CI=Confidence Interval; CFI=Comparative Fit Index; TLI=Tucker-Lewis Index; SRMR=Standardized Root Mean Square Residual
*Model did not converge.

"English", and with less strong cross loadings with an inverse relationship (range: -0.304- -0.402). Factors were significantly negatively correlated (r= -0.218). In order to proceed to the evaluation of measurement invariance (MI), an EFA was conducted in each population subgroup (i.e., subethnicity and generational status) to confirm that each subgroup had a similar factor structure. All subgroups had 2-factor results for language scale (data not shown).

Results from measurement invariance (MI) testing for the Language scale across subgroups are displayed in Table 4.1.3. When looking across both subethnic and generational groups, constraining all factor loadings (Model 2) produced significantly worse fit as seen in the Chi-square difference test compared with the free factor loadings across groups in Model 1 (p=0.0062 and p<0.0001, respectively). As partial invariance of loadings is not possible to estimate, MI testing stopped, and Model 1 as the final model across subethnicities and generations (configural invariance). Fit statistics for these models were good.

Table 4.1.4 also presents standardized factor loadings, means and variances for the chosen measurement invariances models. Although the pattern of loadings resulting from

Table 4.1.3. Summary of Goodness of Fit Statistics for All Measurement Invariance Models for the 2-factor Language Scale

Model	# Free Params	CFI	TLI	RMSEA (95% CI)	p-value	WRMR	χ2 DiffTest	df	Comparison Model	p-value	
Total group (TG) models											
ESEM	29	0.998	0.996	0.067 (0.060-0.075)	0.000	0.958	--	--	--	--	
Multiple group invariance (MGI) models											**Invariant Parameters***
By Subethnicity (4 groups)											
MGI1	**116**	**0.998**	**0.997**	**0.058 (0.049-0.066)**	**0.063**	**0.963**	**--**	**--**	**--**	**--**	**IN = none (FMn = 0)**
MGI2	74	0.999	0.999	0.035 (0.027-0.043)	1.000	1.498	68.412	42	[1]	0.0062	IN = FL (FMn = 0)
MGI4	N/A								[2]		IN = FL, FVCV (FMn = 0)
MGI5	N/A								[2]		IN = FL, INT
MGI8	N/A								[5]		IN = FL, FVCV, INT
MGI10	N/A								[5]		IN = FL, INT, FMn
MGI12	N/A								[10]		IN = FL, FVCV, INT, FMn
By Generation (4 groups)											
MGI1	**116**	**0.996**	**0.992**	**0.066 (0.058-0.074)**	**0.001**	**1.419**	**--**	**--**	**--**	**--**	**IN = none (FMn = 0)**
MGI2	74	0.996	0.996	0.051 (0.044-0.057)	0.436	2.047	100.564	42	[1]	0.0000	IN = FL (FMn = 0)
MGI4	N/A								[2]		IN = FL, FVCV (FMn = 0)
MGI5	N/A								[2]		IN = FL, INT
MGI8	N/A								[5]		IN = FL, FVCV, INT
MGI10	N/A								[5]		IN = FL, INT, FMn
MGI12	N/A								[10]		IN = FL, FVCV, INT, FMn

Note: Highlight indicates chosen model. Red text indicates invariant parameters at the $p<0.05$ level.
Params=parameters; CFI=comparative fit index; TLI=Tucker-Lewis Index; RMSEA=root mean squared error of approximation; WRMR=weighted root mean square residual; df=degrees of freedom; DiffTest=difference test.
*For multiple group invariance models, IN means the sets of parameters constrained to be invariant across the multiple groups: FL=factor loadings; FVCV=factor variance-covariances; INT=item intercepts; Uniq=item uniquenesses; FMn=factor means.

Table 4.1.4. Factor Loadings, Means and Variances for 2-Factor Models of 9-item Language Scale

| | EFA Factor Loadings Total Group | | ESEM Standardized Factor Loadings Subethnicity (Model MGI1) | | | | | | | |
| | | | Puerto Ricans | | Cubans | | Mexicans | | All Other | |
	Spanish	English	Spanish	English	Spanish	English	Spanish	English	Spanish	English
1. How well do you speak Spanish?	**0.877***	**0.070***	0.901*	0.079*	0.903*	0.138*	0.831*	0.011	0.899*	0.068
2. How well do you read Spanish?	**0.981***	**0.003***	0.983*	-0.022	0.965*	-0.061	0.963*	-0.031	0.956*	0.002
3. How well do you write in Spanish?	**0.972***	-0.031	0.960*	0.000	0.938*	-0.122*	0.977*	-0.028	0.950*	-0.103*
4. How well do you speak English?	-0.002	**0.992***	0.080*	0.993*	-0.017	0.987*	0.036	0.974*	0.001	0.973*
5. How well do you read English?	**0.029***	**0.991***	0.118*	1.003*	0.067*	1.005*	0.038	0.971*	0.078*	0.993*
6. How well do you write in English?	**0.046***	**0.992***	0.112*	0.970*	0.051	0.999*	0.066*	0.961*	0.027	0.954*
7. Language spoken with friends.	**-0.304***	**0.847***	-0.329*	0.819*	-0.250*	0.894*	-0.184*	0.913*	-0.211*	0.867*
8. Language spoken with family.	**-0.402***	**0.709***	-0.389*	0.645*	-0.257*	0.780*	-0.284*	0.811*	-0.422*	0.706*
9. In what language do you think?	**-0.344***	**0.833***	-0.377*	0.802*	-0.256*	0.876*	-0.264*	0.883*	-0.249*	0.868*
Factor Correlations	-0.218*		-0.171*		-0.248*		-0.232*		-0.259*	
Factor Means (se)	--		[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]
Factor Variances (se)	--		*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*

		Generational Status (Model MGI1)							
		First		1.5		Second		Third	
		Spanish	English	Spanish	English	Spanish	English	Spanish	English
1. How well do you speak Spanish?		0.832*	0.054	0.850*	0.116*	0.873*	0.174*	0.759*	-0.030
2. How well do you read Spanish?		0.934*	0.071*	0.996*	0.037	0.998*	0.024	0.985*	0.126*
3. How well do you write in Spanish?		1.000*	-0.021	0.956*	-0.008	0.967*	0.069	0.991*	0.021
4. How well do you speak English?		0.204*	0.909*	0.132*	0.991*	0.090*	0.957*	0.005	0.937*
5. How well do you read English?		0.301*	0.897*	0.197*	0.981*	0.166*	0.991*	0.081	1.012*
6. How well do you write in English?		0.283*	0.882*	0.217*	0.941*	0.172*	0.969*	0.109*	0.988*
7. Language spoken with friends.		-0.111*	0.893*	-0.387*	0.816*	-0.411*	0.754*	-0.456*	0.652*
8. Language spoken with family.		-0.189*	0.763*	-0.197*	0.694*	-0.552*	0.343*	-0.516*	0.542*
9. In what language do you think?		-0.134*	0.893*	-0.440*	0.807*	-0.478*	0.735*	-0.513*	0.678*
Factor Correlations	--	0.188*		-0.039		-0.046		-0.219*	
Factor Means (se)	--	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]
Factor Variances (se)	--	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*

*Significant at the p<0.05 level

EFA=Exploratory Factor Analysis; ESEM=Exploratory Structural Equation Modeling; MGI=Multiple Group Invariance; se=standard error

Note: Loadings are Geomin Rotated. Brackets indicate fixed parameters. See Table 4.1.1 for exact item wording.

the EFA is similar when compared to the ESEM MI results, subtle differences do occur when looking across subgroups, indicating why loadings could not be constrained to be equal. Among Mexicans, the strength of Spanish-speaking ability in relation to the underlying Spanish language construct is slightly attenuated as compared to other groups, whereas the weight of reading and writing in Spanish is more consistent. Interestingly, while still small, the loadings of reading and writing in English are two to three times the strength when relating to the Spanish language latent construct. There is also a slight increase in the strength of the inverse relationship of higher preference for English and the Spanish language construct in Puerto Ricans as compared to other subethnic groups. In addition, while all factors were modestly but significantly correlated, it was slightly less so among Puerto Ricans.

The differences are much more striking when looking across generational subgroups. For example, first generation adult immigrants' language preference had much less to do with the Spanish language construct (all $\lambda < -0.19$), but instead had strong loadings on the English construct (all $\lambda > 0.76$). Among Latinos born in the US, however, higher preference for thinking and communicating in English had a much larger negative association with the Spanish language factor. Moreover, the factor correlations are much more variable across subgroups, ranging from a significant positive correlation for the adult migrants ($r=0.188$) to a similar strength but opposite direction among third generation Latinos ($r=-0.219$). The Spanish and English constructs were almost unrelated among the 1.5 and second generations. Because factor loadings were unable to be constrained across subgroups, factor means and variances needed to be fixed at zero and one, respectively, for model identification.

4.4.2 Ethnic Identity

Frequencies of item responses are all significantly different (p<0.001) across subgroups (Table 4.2.1). Cubans tended to report high levels of identification with their own racial/ethnic group as compared to other subethnic groups, regardless of item. Puerto Ricans, Mexicans and other Latinos had relatively similar proportions reporting Medium and High levels of identification within a given item. First generation immigrants had the highest levels of identification with their own racial/ethnic group, as compared to other generational groups.

A 1-factor model was chosen after performing EFA, as there were too few items to support two factors (the 2-factor model did not converge). This was true for all subgroups. All fit statistics were excellent for the 1-factor model (Table 4.2.2). Factor loadings (see Table 4.2.4) ranged from 0.547 (identifying with others of similar descent) to 0.895 (marrying within one's racial/ethnic group). The latent factor ("Identity") characterizes identification with one's ethnic group, with higher scores indicating closer group identification.

Measurement invariance testing fit statistics and model comparisons are presented in Table 4.2.3. When looking across subethnic groups, factor loadings were deemed marginally invariant (Model 2, p=0.0473). However, constraining factor variances (with only one factor, there were no covariances to constrain) across groups (Model 4) produced significantly worse fit (p=0.0109). The same was true when constraining all item intercepts (Model 5, p=0.0008). Using the modification indexes supplied by Mplus and an examination of the variant parameter estimates and confidence intervals obtained in Model 2, we allowed both intercepts for item 4 (marriage) to vary across all subethnicities. This

Table 4.2.1. Response Distribution of Ethnic Identity Scale Items in the Latino NLAAS Sample, by Subgroup

Scale Item		Total (n=2554) n (%)	Cuban (n=577) n (%)	Puerto Rican (n=495) n (%)	Mexican (n=868) n (%)	All Other (n=614) n (%)	χ^2 (p-value)*	First (n=1257) n (%)	1.5 (n=365) n (%)	Second (n=522) n (%)	Third (n=397) n (%)	χ^2 (p-value)*
1. How closely do you identify with other people who are of the same racial and ethnic descent as yourself?	Medium	683 (26.8)	119 (20.7)	140 (28.4)	254 (29.4)	170 (27.8)	**49.890 (0.0000)**	240 (19.2)	113 (31.1)	174 (33.4)	150 (38.0)	**77.820 (0.0000)**
	High	1627 (63.9)	431 (74.8)	313 (63.5)	519 (60.1)	364 (59.5)		886 (70.7)	220 (60.6)	301 (57.8)	214 (54.2)	
2. How close do you feel, in your ideas and feelings about things, to other people of the same racial and ethnic descent?	Medium	962 (37.9)	178 (31.0)	206 (41.9)	335 (38.9)	243 (40.0)	**45.660 (0.0000)**	349 (28.0)	163 (44.9)	240 (46.3)	206 (52.2)	**131.180 (0.0000)**
	High	1259 (49.6)	352 (61.3)	226 (45.9)	405 (47.0)	276 (45.4)		755 (60.5)	145 (39.9)	207 (40.0)	147 (37.2)	
3. If you could choose, how much time would you like to spend with other people who are of your same racial/ethnic group?	Medium	1110 (43.6)	205 (35.7)	230 (46.5)	403 (46.6)	272 (44.6)	**55.540 (0.0000)**	426 (34.0)	176 (48.5)	279 (53.6)	224 (56.9)	**112.190 (0.0000)**
	High	1077 (42.4)	309 (53.8)	191 (38.6)	356 (41.2)	221 (36.2)		649 (51.8)	136 (37.5)	164 (31.5)	123 (31.2)	
4. How important do you think it is for people who are from your same racial/ ethnic group to marry other people who are also from this group?	Medium	536 (21.0)	97 (16.8)	100 (20.2)	208 (24.0)	131 (21.3)	**22.720 (0.0009)**	260 (20.7)	75 (20.5)	115 (22.0)	85 (21.4)	**103.140 (0.0000)**
	High	490 (19.2)	138 (23.9)	79 (16.0)	147 (17.0)	126 (20.5)		338 (27.0)	50 (13.7)	51 (9.8)	48 (12.1)	

* 6 degrees of freedom
Bold=significant at the p<0.01 level

Table 4.2.2. Fit Statistics for Exploratory Factor Analysis of 4-item Ethnic Identity Scale

Model	# Free Parameters	Chi-Square	DF	p-value	RMSEA (95% CI)	p-value	CFI	TLI	SRMR
1-Factor	*4*	*20.737*	*2*	*p<0.0001*	*0.061 (0.039-0.085)*	*0.196*	*0.996*	*0.989*	*0.026*
2-Factor*	--	--	--	--	--	--	--	--	--

Note: Bold, italics indicate chosen factor structure.
DF=Degrees of freedom; RMSEA=Root Mean Square Error of Approximation; CI=Confidence Interval; CFI=Comparative Fit Index;
TLI=Tucker-Lewis Index; SRMR=Standardized Root Mean Square Residual
*Model did not converge.

Table 4.2.3. Summary of Goodness of Fit Statistics for All Measurement Invariance Models for the 1-factor Ethnic Identity Scale

Model	# Free Params	CFI	TLI	RMSEA (95% CI)	p-value	WRMR	χ^2 DiffTest	df	Comparison Model	p-value	Invariant Parameters*
Total group (TG) models											
ESEM	12	0.996	0.989	0.061 (0.039-0.085)	0.196	0.913	--	--	--	--	
Multiple group invariance (MGI) models											**Invariant Parameters***
By Subethnicity (4 groups)											
MGI1	48	0.997	0.990	0.057 (0.032-0.084)	0.286	1.011	--	--	--	--	IN = none (FMn = 0)
MGI2	39	0.996	0.994	0.044 (0.025-0.063)	0.672	1.496	17.091	9	[1]	0.0473	IN = FL (FMn = 0)
MGI4	36	0.994	0.993	0.049 (0.032-0.066)	0.515	1.967	11.160	3	[2]	0.0109	IN = FL, FVCV (FMn = 0)
MGI5	18	0.991	0.994	0.044 (0.031-0.056)	0.780	2.187	47.488	21	[2]	0.0008	IN = FL, INT
MGI5p	**25**	**0.995**	**0.996**	**0.037 (0.022-0.051)**	**0.929**	**1.746**	**18.664**	**14**	**[2]**	**0.1782**	**IN = FL, INT(p)**
MGI8p	22	0.992	0.995	0.041 (0.028-0.055)	0.851	2.177	10.286	3	[5p]	0.0163	IN = FL, FVCV, INT(p)
MGI10p	22	0.962	0.973	0.093 (0.082-0.105)	0.000	3.967	77.029	3	[5p]	0.0000	IN = FL, INT(p), FMn
MGI12p	N/A								[10p]		IN = FL, FVCV, INT(p), FMn
By Generation (4 groups)											
MGI1	48	0.997	0.991	0.052 (0.026-0.079)	0.405	0.937	--	--	--	--	IN = none (FMn = 0)
MGI2	39	0.999	0.999	0.019 (0.000-0.043)	0.988	1.101	5.217	9	[1]	0.8150	IN = FL (FMn = 0)
MGI4	36	0.999	0.999	0.019 (0.000-0.041)	0.993	1.321	3.849	3	[2]	0.2782	IN = FL, FVCV (FMn = 0)
MGI5	18	0.969	0.980	0.079 (0.068-0.090)	0.000	3.357	177.874	21	[2]	0.0000	IN = FL, INT
MGI5p	29	0.998	0.998	0.022 (0.000-0.041)	0.996	1.384	15.288	10	[2]	0.1219	IN = FL, INT(p)
MGI8p	**26**	**0.998**	**0.998**	**0.024 (0.000-0.041)**	**0.996**	**1.636**	**5.025**	**3**	**[5p]**	**0.1700**	**IN = FL, FVCV, INT(p)**
MGI10p	26	0.988	0.991	0.055 (0.042-0.068)	0.260	2.438	28.624	3	[5p]	0.0000	IN = FL, INT(p), FMn
MGI12p	N/A								[10p]		IN = FL, FVCV, INT(p), FMn

Note: Highlight indicates chosen model. Red text indicates invariant parameters at the p<0.05 level.

Params=parameters; CFI=comparative fit index; TLI=Tucker-Lewis Index; RMSEA=root mean squared error of approximation; WRMR=weighted root mean square residual; df=degrees of freedom; DiffTest=difference test; p=partial.

*For multiple group invariance models, IN means the sets of parameters constrained to be invariant across the multiple groups: FL=factor loadings; FVCV=factor variance-covariances; INT=item intercepts; Uniq=item uniquenesses; FMn=factor means.

Table 4.2.4. Factor Loadings, Means and Variances for 1-Factor Models of 4-item Ethnic Identity Scale

	EFA Factor Loadings	ESEM							
		Standardized Factor Loadings *Subethnicity (Model MGI5p)*				**Standardized Factor Loadings** *Generation (Model MGI8p)*			
	Total Group	Puerto Ricans	Cubans	Mexicans	All Other	First	1.5	Second	Third
	Identity	**Identity**	**Identity**	**Identity**	**Identity**	**Identity**	**Identity**	**Identity**	**Identity**
1. Identify with others of same racial/ethnic descent	**0.547***	0.798*	--	--	--	0.836*	--	--	--
2. Feel close in your ideas/feelings	**0.746***	0.884*	--	--	--	0.918*	--	--	--
3. Amount of time spend w/ people of same group	**0.856***	0.585*	--	--	--	0.625*	--	--	--
4. Importance of marrying within same group	**0.895***	0.266*	--	--	--	0.258*	--	--	--
Factor Correlations	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*	*n/a*
Factor Means (se)	--	[0.0]	0.603 (0.103)*	-0.014 (0.072)	-0.079 (0.079)	0.437 (0.078)*	0.044 (0.084)	-0.005 (0.077)	[0.0]
Factor Variances (se)	--	*[1.0]*	*1.648 (0.270)**	*1.239 (0.171)**	*1.392 (0.213)**	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*

*Significant at the p<0.05 level
EFA=Exploratory Factor Analysis; ESEM=Exploratory Structural Equation Modeling; MGI=Multiple Group Invariance; se=standard error
Note: Loadings are Geomin Rotated. Brackets indicate fixed parameters. See Table 4.2.1 for exact item wording.

improved model fit to where the remaining intercepts were deemed invariant (Model 5p vs. Model 2, p=0.1782). From this model on we proceeded with partial invariance of item intercepts. Factor variances were still different across groups after partial constraint of intercepts (Model 8p, p=0.0163). Constraining factors means to be equal also worsened fit (Model 10p, p<0.0001), forcing us to choose Model 5p (invariant factor loadings, partially invariant item intercepts, and free factor means and variances) as the final model across subethnicities (strict factorial/measurement invariance). A similar pattern was seen when testing for invariance across generational subgroups, except that factor variances were deemed invariant as seen in Models 4 and 10p. As factor means (Model 10p, p<0.0001) and item 4 intercepts (Model 5, p<0.0001; Model 5p, p=0.1219) were variant across groups, Model 8p was selected as best fitting the data. Model fit statistics were good for both chosen models.

After accounting for measurement non-invariance, even though the factor loadings were deemed equivalent across subgroups, the standardized ESEM factor loadings are somewhat different than the EFA results (Table 4.2.4). The loading for item 1 has increased (λ=0.798) and is no longer the smallest. Conversely, the loading for item 4 has decreased in strength to approximately one third it's former size, indicating that the importance of marrying someone of the same racial/ethnic descent is much less related to the latent construct of ethnic identity than how it appeared from the EFA results. This loading pattern is true for both ethnic and generational groups. However, factor means and variances are not constant across subgroups. Compared to the reference group of Puerto Ricans in which the mean is fixed to zero, Cubans have a significantly higher mean, whereas Mexicans and other Latinos do not. However, all three groups have "Identity" factors with significantly

more variation as compared to Puerto Ricans, whose factor variance is fixed to one. Among the generational groups, first generation immigrants are the only group with a mean significantly different than zero. All factor variances are constrained to be equal, as they were deemed equivalent during MI testing.

4.4.3 Neighborhood Context

Table 4.3.1 item frequencies and chi-square tests show that the majority of items were significantly different across both ethnic and generational groups. The only neighborhood item that did not significantly differ by subethnicity at the p<0.05 level was "*I have neighbors who would help me if I had an emergency.*" While this item was different across generational subgroups with third generation Latinos more likely to agree (p=0.0252), the endorsement of whether neighbors get along (item 2) and the presence violent crime (item 6) were similar across generations. Feeling safe alone at night was only marginally significant across subethnicities (p=0.0454).

Fit statistics from the EFA pointed towards a 2-factor model (Table 4.3.2). The 2-factor structure also held in all subgroups (data not shown). Table 4.3.4 displays the factor loadings from the total group EFA for the chosen factor structure. Items 1 through 4 loaded primarily on the first factor ("Community", range $\lambda=0.547$ to 0.895), while items 6 and 7 loaded heavily on the second factor ("Safety", $\lambda=0.896$ and 0.712, respectively), as seen in Table 4.3.4. Item 5 loaded significantly on both factors ($\lambda=0.400$ and -0.469, respectively). These factors were significantly negatively correlated (r= -0.342).

Measurement invariance testing results are displayed in Table 4.3.3. Factor loadings and variances-covariances were deemed invariant across subethnic groups (Models 2 and 4). Constraining all item intercepts (Model 5) produced significantly worse

Table 4.3.1. Response Distribution of Neighborhood Context Scale Items in the Latino NLAAS Sample, by Subgroup

Scale Item	Sub-scale	Response	Total (n=2544) n (%)	Cuban (n=577) n (%)	Puerto Rican (n=491) n (%)	Mexican (n=868) n (%)	All Other (n=614) n (%)	χ^2 (p-value)*	First (n=1249) n (%)	1.5 (n=363) n (%)	Second (n=522) n (%)	Third (n=397) n (%)	χ^2 (p-value)*
					Subethnicity					**Generational Status**			
1. People in this neighborhood can be trusted.	Neighborhood Context	True	1687 (67.9)	428 (76.3)	308 (64.0)	557 (66.2)	394 (65.7)	**23.990 (0.0000)**	796 (65.4)	249 (70.7)	357 (69.6)	277 (71.4)	7.770 (0.0509)
2. People in this neighborhood generally get along with each other.		True	2074 (83.3)	500 (88.5)	388 (80.5)	694 (82.3)	492 (82.1)	**14.860 (0.0019)**	1011 (82.6)	292 (83.4)	424 (83.0)	338 (86.4)	3.250 (0.3540)
3. I have neighbors who would help me if I had an emergency.		True	1996 (80.6)	473 (84.0)	382 (80.1)	668 (79.5)	473 (79.2)	5.610 (0.1320)	951 (78.6)	283 (81.1)	416 (81.2)	336 (85.5)	9.330 (0.0252)
4. People in my neighborhood look out for each other.		True	1917 (77.1)	470 (83.9)	355 (73.8)	641 (75.9)	451 (75.3)	**19.620 (0.0002)**	919 (75.4)	271 (76.8)	391 (76.7)	327 (83.8)	**12.170 (0.0068)**
5. I feel safe being out alone in my neighborhood during the night.	Neighborhood Safety	True	1857 (73.5)	445 (78.1)	348 (71.3)	622 (72.6)	442 (72.5)	8.030 (0.0454)	834 (67.7)	273 (75.2)	419 (80.4)	322 (81.1)	**46.130 (0.0000)**
6. People often get mugged, robbed or attacked in my neighborhood.		True	578 (23.2)	88 (15.5)	135 (28.3)	192 (22.7)	163 (26.9)	**30.800 (0.0000)**	308 (25.2)	70 (19.7)	118 (22.9)	82 (21.0)	6.350 (0.0956)
7. People sell or use drugs in my neighborhood.		True	721 (30.7)	86 (16.1)	192 (42.2)	234 (29.6)	209 (36.7)	**91.770 (0.0000)**	275 (24.5)	107 (31.4)	182 (36.4)	153 (40.9)	**46.600 (0.0000)**

Note. 10 observations had missing responses for neighborhood context.
* 3 degrees of freedom
Bold=significant at the p<0.01 level

Table 4.3.2. Fit Statistics for Exploratory Factor Analysis of 7-item Neighborhood Context Scale

Model	# Free Params	Chi-Square	DF	p-value	RMSEA (95% CI)	CFI	TLI	SRMR
1-Factor	7	588.556	14	0.0000	0.127 (0.118-0.136)	0.901	0.852	0.12
2-Factor	*13*	*81.701*	*8*	*0.0000*	*0.060 (0.049-0.072)*	*0.987*	*0.967*	*0.034*
3-Factor	18	4.392	3	0.2221	0.014 (0.000-0.038)	1.000	0.998	0.009
4-Factor	--	--	--	--	--	--	--	--

Note: ***Bold, italics*** indicate chosen factor structure.
Params=Parameters; DF=Degrees of freedom; RMSEA=Root Mean Square Error of Approximation; CI=Confidence Interval; CFI=Comparative Fit Index; TLI=Tucker-Lewis Index; SRMR=Standardized Root Mean Square Residual

fit (p<0.0001). We then allowed the intercepts for item 7 (selling drugs) to vary across all subethnicities, and items 5 (feeling safe alone at night) and 6 (violent crime) in only Cubans. This improved model fit to where the remaining intercepts were deemed invariant (Model 5p vs. Model 2, p=0.9313). Proceeding with partial item intercept invariance, constraining factors means to be equal worsened fit (Model 10p, p<0.0001), leading us to choose Model 8p (invariant factor loadings, factor variances and covariances, partially invariant item intercepts, and free factor means) as the final model across subethnicities (strict factorial/measurement invariance).

In Table 4.3.3 we also see the results of MI testing across generational groups. Model 2 shows that factor loadings are invariant (p=0.733) but Model 4 provides evidence for variant factor variances-covariances (p=0.025). Holding all item intercepts equal across groups again worsens fit (Model 5, p<0.0001), but when items 5 through 7 (feeling loyal, proud, and expressing feelings, respectively) are allowed to vary by generational status, fit improves significantly (Model 5p vs. Model 2, p=0.703). Model 10p supports the invariance of factor means across generational groups (p=0.0959). Models 8p and 12p were not tested as the factor variances-covariances were deemed variant in Model 4. Based on

Table 4.3.3. Summary of Goodness of Fit Statistics for All Measurement Invariance Models for the 2-factor Neighborhood Context Scale

Model	# Free Params	CFI	TLI	RMSEA (95% CI)	p-value	WRMR	χ^2 DiffTest	df	Comparison Model	p-value	
Total group (TG) models											
ESEM	20	0.987	0.967	0.060 (0.049-0.072)	0.071	1.199	--	--	--	--	
Multiple group invariance (MGI) models											**Invariant Parameters***
By Subethnicity (4 groups)											
MGI1	80	0.984	0.958	0.068 (0.055-0.080)	0.010	1.489	--	--	--	--	IN = none (FMn = 0)
MGI2	50	0.991	0.988	0.036 (0.025-0.046)	0.987	1.730	23.575	30	[1]	0.7909	IN = FL (FMn = 0)
MGI4	41	0.993	0.992	0.030 (0.018-0.040)	1.000	2.052	12.706	9	[2]	0.1764	IN = FL, FVCV (FMn = 0)
MGI5	35	0.986	0.985	0.040 (0.031-0.049)	0.963	2.012	47.272	15	[2]	0.0000	IN = FL, INT
MGI5p	40	0.992	0.990	0.032 (0.022-0.042)	0.999	1.755	4.329	10	[2]	0.9313	IN = FL, INT(p)
MGI8p	**31**	**0.993**	**0.993**	**0.028 (0.016-0.038)**	**1.000**	**2.077**	**12.921**	**9**	**[5p]**	**0.1662**	**IN = FL, FVCV, INT(p)**
MGI10p	34	0.983	0.982	0.045 (0.036-0.053)	0.837	2.277	36.579	6	[5p]	0.0000	IN = FL, INT(p), FMn
MGI12p	N/A								[10p]		IN = FL, FVCV, INT(p), FMn
By Generation (4 groups)											
MGI1	80	0.990	0.973	0.055 (0.043-0.069)	0.230	1.293	--	--	--	--	IN = none (FMn = 0)
MGI2	50	0.994	0.992	0.030 (0.017-0.041)	0.999	1.572	24.841	30	[1]	0.7327	IN = FL (FMn = 0)
MGI4	41	0.993	0.992	0.031 (0.020-0.041)	0.999	2.100	18.991	9	[2]	0.0253	IN = FL, FVCV (FMn = 0)
MGI5	35	0.976	0.974	0.054 (0.046-0.063)	0.182	2.400	148.377	15	[2]	0.0000	IN = FL, INT
MGI5p	44	0.994	0.993	0.028 (0.016-0.039)	1.000	1.594	3.805	6	[2]	0.7031	IN = FL, INT(p)
MGI8p	N/A								[5p]		IN = FL, FVCV, INT(p)
MGI10p	**38**	**0.994**	**0.993**	**0.029 (0.017-0.039)**	**1.000**	**1.755**	**10.766**	**6**	**[5p]**	**0.0959**	**IN = FL, INT(p), FMn**
MGI12p	N/A								[10p]		IN = FL, FVCV, INT(p), FMn

Note: Highlight indicates chosen model. Red text indicates invariant parameters at the p<0.05 level.

Params=parameters; CFI=comparative fit index; TLI=Tucker-Lewis Index; RMSEA=root mean squared error of approximation; WRMR=weighted root mean square residual; df=degrees of freedom; DiffTest=difference test; p=partial.

*For multiple group invariance models, IN means the sets of parameters constrained to be invariant across the multiple groups: FL=factor loadings; FVCV=factor variance-covariances; INT=item intercepts; Uniq=item uniquenesses; FMn=factor means.

these results, Model 10p (latent mean invariance) is the best fitting model across generational subgroups for the 2-factor Neighborhood Context scale.

Once again, the standardized factor loadings resulting from the appropriate measurement invariance models, constrained across subgroups, show a very similar pattern to the EFA loadings. Correlation between the factors is also equivalent and equal across groups. However, factor means vary significantly by subethnicity. Puerto Ricans (the reference group) and other Latinos are not different, whereas Cubans have significantly higher levels of neighborhood community and of safety (because lower scores on the "Safety" factor indicate perception of more safety in one's neighborhood). And while Mexicans aren't meaningfully different than Puerto Ricans and other Latinos on levels of community, they report significantly safer neighborhood environments, although not nearly as safe as Cubans.

Note that while the raw loadings from the ESEM were constrained across generational groups, because the factor variance-covariance structure was allowed to vary, standardized loadings presented in Table 4.3.4 vary slightly. These loadings are also similar to the EFA results. Factor correlations vary across groups, with the community and safety constructs for third generation Latinos being much more inversely related (r= -0.521), whereas first generation adult migrants about half the strength yet still significant (r= -0.220). As compared to the third generation, the distributions of factor scores were much more variable for other groups, with the exception of neighborhood safety among the first generation. Factor means across generations were deemed not meaningfully different and therefore constrained to equality.

Table 4.3.4. Factor Loadings, Means and Variances for 2-Factor Models of 7-item Neighborhood Context Scale

	EFA Factor Loadings Total Group		ESEM Standardized Factor Loadings Subethnicity (Model MGI8p)							
			Puerto Ricans		Cubans		Mexicans		All Other	
	Community	Safety	Community	Safety	Community	Safety	Community	Safety	Community	Safety
1. People can be trusted.	**0.547***	**-0.371***	0.552*	-0.370*	--	--	--	--	--	--
2. People generally get along.	**0.746***	**-0.203***	0.745*	-0.206*	--	--	--	--	--	--
3. Neighbors help in emergency.	**0.856***	0.063	0.864*	0.064*	--	--	--	--	--	--
4. People look out for each other.	**0.895***	0.001	0.903*	0.003	--	--	--	--	--	--
5. I feel safe out alone at night.	**0.400***	**-0.469***	0.397*	-0.484*	--	--	--	--	--	--
6. People get mugged/attacked.	0.015	**0.896***	0.017	0.899*	--	--	--	--	--	--
7. People sell or use drugs.	-0.091	**0.712***	-0.085	0.706*	--	--	--	--	--	--
Factor Correlation	-0.342*		-0.329*		-0.329*		-0.329*		-0.329*	
Factor Means (se)			[0.0]	[0.0]	0.304 (0.087)*	-0.533 (0.174)*	0.023 (0.073)	-0.161 (0.081)*	0.029 (0.079)	-0.056 (0.086)
Factor Variances (se)			[1.0]	[1.0]	[1.0]	[1.0]	[1.0]	[1.0]	[1.0]	[1.0]

	Generational Status (Model MGI10p)							
	First		1.5		Second		Third	
	Community	Safety	Community	Safety	Community	Safety	Community	Safety
1. People can be trusted.	0.596*	-0.387*	0.505*	-0.443*	0.511*	-0.444*	0.455*	-0.391*
2. People generally get along.	0.781*	-0.225*	0.701*	-0.273*	0.708*	-0.274*	0.645*	-0.246*
3. Neighbors help in emergency.	0.873*	0.030	0.859*	0.040	0.846*	0.039	0.803*	0.036
4. People look out for each other.	0.896*	-0.043	0.866*	-0.056	0.863*	-0.056	0.819*	-0.052
5. I feel safe out alone at night.	0.439*	-0.491*	0.362*	-0.547*	0.364*	-0.546*	0.324*	-0.481*
6. People get mugged/attacked.	-0.022	0.858*	-0.017	0.895*	-0.017	0.889*	-0.016	0.849*
7. People sell or use drugs.	-0.125*	0.738*	-0.098*	0.786*	-0.098*	0.780*	-0.091*	0.717*
Factor Correlation	-0.220*		-0.409*		-0.306*		-0.521*	
Factor Means (se)	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]
Factor Variances (se)	1.844 (0.344)*	1.052 (0.274)	1.526 (0.35)*	1.588 (0.515)*	1.412 (0.302)*	1.447 (0.423)*	[1.0]	[1.0]

*Significant at the p<0.05 level

EFA=Exploratory Factor Analysis; ESEM=Exploratory Structural Equation Modeling; se=standard error

Note. Loadings are Geomin Rotated. Brackets indicate fixed parameters. See Table 4.3.1 for exact item wording.

Table 4.4.1. Response Distribution of Family Context Scale Items in the Latino NLAAS Sample, by Subgroup

Scale Item	Sub-scale	Response	Total (n=2550) n (%)	Cuban (n=577) n (%)	Puerto Rican (n=491) n (%)	Mexican (n=868) n (%)	All Other (n=614) n (%)	χ^2 (p-value)*	First (n=1249) n (%)	1.5 (n=363) n (%)	Second (n=522) n (%)	Third (n=397) n (%)	$\chi2$ (p-value)*
1. Family members respect one another.	Family Pride	Agree	2386 (93.6)	555 (96.2)	445 (90.6)	809 (93.2)	577 (94.0)	**13.970 (0.0029)**	1205 (96.1)	335 (92.0)	478 (91.6)	357 (89.9)	**27.090 (0.0000)**
2. We share similar values and beliefs as a family.		Agree	2364 (92.8)	556 (96.4)	426 (86.9)	810 (93.3)	572 (93.3)	**36.630 (0.0000)**	1203 (96.0)	333 (91.5)	457 (87.7)	360 (90.7)	**43.200 (0.0000)**
3. Things work well for us as a family.		Agree	2378 (93.3)	556 (96.4)	434 (88.6)	819 (94.5)	569 (92.7)	**28.550 (0.0000)**	1205 (96.2)	336 (92.6)	475 (91.0)	352 (88.7)	**35.390 (0.0000)**
4. We really do trust and confide in each other.		Agree	2353 (92.4)	558 (96.7)	425 (86.9)	804 (92.7)	566 (92.2)	**36.320 (0.0000)**	1202 (95.9)	330 (91.2)	460 (88.1)	351 (88.4)	**45.940 (0.0000)**
5. Family members feel loyal to the family.		Agree	2391 (93.9)	556 (96.4)	443 (90.2)	817 (94.3)	575 (93.8)	**17.920 (0.0005)**	1203 (96.1)	338 (92.9)	474 (91.0)	363 (91.4)	**22.900 (0.0000)**
6. We are proud of our family.		Agree	2458 (96.4)	564 (97.7)	465 (94.9)	840 (96.8)	589 (95.9)	7.000 (0.0720)	1230 (98.1)	343 (94.5)	498 (95.4)	375 (94.5)	**20.150 (0.0002)**
7. We can express our feelings with our family.		Agree	2359 (92.5)	550 (95.3)	432 (88.2)	804 (92.6)	573 (93.3)	**20.630 (0.0001)**	1205 (96.1)	327 (90.1)	467 (89.5)	350 (88.2)	**44.730 (0.0000)**
8. Family members like to spend free time with each other.	Family Cohesion	Agree	2324 (91.2)	549 (95.1)	426 (86.9)	792 (91.2)	557 (90.7)	**22.400 (0.0001)**	1186 (94.6)	326 (89.8)	460 (88.1)	340 (85.6)	**40.000 (0.0000)**
9. Family members feel very close to each other.		Agree	2377 (93.3)	553 (95.8)	438 (89.4)	815 (93.9)	571 (93.0)	**18.400 (0.0004)**	1199 (95.6)	331 (91.2)	473 (90.6)	363 (91.4)	**21.570 (0.0001)**
10. Family togetherness is very important.		Agree	2476 (97.1)	568 (98.4)	471 (95.9)	839 (96.7)	598 (97.4)	6.860 (0.0763)	1231 (98.2)	357 (98.1)	497 (95.2)	379 (95.5)	**16.800 (0.0008)**

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Item														
11. Being too close to your family interfered with your own goals.	Family Cultural Conflict	Yes	606 (23.8)	127 (22.0)	112 (22.9)	207 (23.9)	160 (26.1)	2.990 (0.3932)	261 (20.8)	111 (30.5)	137 (26.2)	95 (23.9)	**16.730 (0.0008)**
12. Because you have different customs, you have had arguments with other members of your family.		Yes	725 (28.4)	162 (28.1)	150 (30.6)	231 (26.6)	182 (29.6)	3.030 (0.3866)	263 (21.0)	126 (34.7)	198 (37.9)	137 (34.5)	**71.480 (0.0000)**
13. Because of the lack of family unity, you have felt lonely and isolated.		Yes	453 (17.8)	72 (12.5)	116 (23.6)	166 (19.1)	99 (16.1)	**24.810 (0.0000)**	207 (16.5)	67 (18.4)	102 (19.5)	73 (18.4)	2.690 (0.4415)
14. Family relations are becoming less important for people that you are close to.		Yes	575 (22.6)	91 (15.8)	130 (26.6)	214 (24.7)	140 (22.8)	**22.100 (0.0001)**	231 (18.5)	91 (25.1)	139 (26.7)	109 (27.5)	**23.990 (0.0000)**
15. Your personal goals have been in conflict with your family.		Yes	492 (19.3)	83 (14.4)	111 (22.6)	183 (21.1)	115 (18.8)	**14.270 (0.0026)**	177 (14.1)	93 (25.5)	127 (24.3)	91 (23.0)	**42.660 (0.0000)**

Note. 4 respondents had missing responses for family context.

* 3 degrees of freedom

Bold=significant at the p<0.01 level

Table 4.4.2. Fit Statistics for Exploratory Factor Analysis of 15-item Family Context Scale

Model	# Free Parameters	Chi-Square	DF	p-value	RMSEA (95% CI)	CFI	TLI	SRMR
1-Factor	15	1199.273	90	0.0000	0.070 (0.066-0.073)	0.950	0.941	0.107
2-Factor	*29*	*258.657*	*76*	*0.0000*	*0.031 (0.027-0.035)*	*0.992*	*0.989*	*0.033*
3-Factor	42	107.176	63	0.0004	0.017 (0.011-0.022)	0.998	0.997	0.022
4-Factor	54	55.654	51	0.3040	0.006 (0.000-0.014)	1.000	1.000	0.015
5-factor	65	36.906	40	0.6103	0.000 (0.000-0.000)	1.000	1.000	0.012

Note: ***Bold, italics*** indicate chosen factor structure.

DF=Degrees of freedom; RMSEA=Root Mean Square Error of Approximation; CI=Confidence Interval; CFI=Comparative Fit Index; TLI=Tucker-Lewis Index; SRMR=Standardized Root Mean Square Residual

4.4.4 Family Context

The endorsement of Family Context items (Table 4.4.1) differed by subgroup with three exceptions from the Family Conflict subscale: "*Being too close to your family interfered with your own goals*" (item 11) and "*Because you have different customs, you have had arguments with other members of your family*" (item 12) did not differ by country of origin; and "*Because of the lack of family unity, you have felt lonely and isolated*" (item 13) was not different by generation.

Table 4.4.2 displays EFA fit statistics. Based on these results, a 2-factor model was chosen, which also held in all subgroups (data not shown). The 2-factor Family Context scale had clear loadings by subscale: items 1 through 10 loaded heavily (>0.75) on the "Cohesion" factor, and items 11 through 15 on the "Conflict" factor (all >0.7; Table 4.4.4). Other loadings were low (generally <0.2), with items 3, 4, and 11 through 14 having significant cross loadings. Factors were significantly negatively correlated (r= -0.603). This pattern was consistently seen in all generational and subethnic subgroups except for the 1.5 generation (data not shown). In this group items 12, 13 and 14 were approximately equal or slightly reversed (that is, they loaded slightly more strongly on the cohesion factor rather than conflict).

Table 4.4.3 displays the fit statistics and results of measurement invariance testing for the Family Context scale. When testing across Latino subethnic groups, the chi-square difference test comparing Model 2 to 1 was borderline significant (p=0.0478), so we chose to consider the factor loadings roughly invariant across groups and continue with MI testing. Model 4 showed factor variances and covariances to be invariant (p=0.0814), but Model 5 indicated significantly worse model fit after constraining item intercepts to be the

Table 4.4.3. Summary of Goodness of Fit Statistics for All Measurement Invariance Models for the 2-factor Family Context Scale

Model	# Free Params	CFI	TLI	RMSEA (95% CI)	p-value	WRMR	χ2 DiffTest	df	Comparison Model	p-value	Invariant Parameters*
Total group (TG) models											
ESEM	44	0.992	0.989	0.031 (0.027-0.035)		1.073	--	--	--	--	
Multiple group invariance (MGI) models											**Invariant Parameters***
By Subethnicity (4 groups)											
MGI1	176	0.994	0.991	0.027 (0.021-0.032)	1.000	1.442	--	--	--	--	IN = none (FMn = 0)
MGI2	98	0.995	0.994	0.022 (0.016-0.027)	1.000	1.888	*99.942*	*78*	*[1]*	0.0478	IN = FL (FMn = 0)
MGI4	89	0.995	0.995	0.020 (0.014-0.026)	1.000	2.164	*15.365*	9	[2]	0.0814	IN = FL, FVCV (FMn = 0)
MGI5	59	0.994	0.994	0.022 (0.016-0.027)	1.000	1.971	62.512	39	[2]	0.0098	IN = FL, INT
MGI5p	62	0.995	0.994	0.021 (0.016-0.026)	1.000	1.944	43.212	36	[2]	0.1904	IN = FL, INT(p)
MGI8p	**53**	**0.995**	**0.995**	**0.020 (0.014-0.025)**	**1.000**	**2.208**	**15.157**	**9**	**[5p]**	**0.0867**	**IN = FL, FVCV, INT(p)**
MGI10p	56	0.992	0.992	0.025 (0.020-0.030)	1.000	2.169	25.414	6	[5p]	0.0003	IN = FL, INT(p), FMn
MGI12p	N/A								[10p]		IN = FL, FVCV, INT(p), FMn
By Generation (4 groups)											
MGI1	**176**	**0.995**	**0.993**	**0.024 (0.018-0.030)**	**1.000**	**1.362**	**--**	**--**	**--**	**--**	**IN = none (FMn = 0)**
MGI2	98	0.994	0.993	0.023 (0.018-0.028)	1.000	1.915	119.273	78	[1]	0.0018	IN = FL (FMn = 0)
MGI4	N/A								[2]		IN = FL, FVCV (FMn = 0)
MGI5	N/A								[2]		IN = FL, INT
MGI8	N/A								[5]		IN = FL, FVCV, INT(p)
MGI10	N/A								[5]		IN = FL, INT(p), FMn
MGI12	N/A								[10]		IN = FL, FVCV, INT(p), FMn

Note: Highlight indicates chosen model. Red text indicates invariant parameters at the p<0.05 level.

Params=parameters; CFI=comparative fit index; TLI=Tucker-Lewis Index; RMSEA=root mean squared error of approximation; WRMR=weighted root mean square residual; df=degrees of freedom; DiffTest=difference test; p=partial.

*For multiple group invariance models, IN means the sets of parameters constrained to be invariant across the multiple groups: FL=factor loadings; FVCV=factor variance-covariances; INT=item intercepts; Uniq=item uniquenesses; FMn=factor means.

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Table 4.4.4. Factor Loadings, Means and Variances for 2-Factor Models of 15-item Family Context Scale

| | EFA Factor Loadings Total Group | | ESEM Standardized Factor Loadings Subethnicity (Model MGI8p) | | | | | | | |
| | | | Puerto Ricans | | Cubans | | Mexicans | | All Other | |
	Cohesion	Conflict	Cohesion	Conflict	Cohesion	Conflict	Cohesion	Conflict	Cohesion	Conflict
1. Family members respect one another.	**0.758***	-0.079	0.746*	-0.101*	--	--	--	--	--	--
2. We share similar values and beliefs.	**0.837***	0.002	0.827*	-0.017	--	--	--	--	--	--
3. Things work well for us as a family.	**0.846***	**-0.095***	0.823*	-0.139*	--	--	--	--	--	--
4. We really do trust and confide in each other.	**0.851***	**-0.106***	0.846*	-0.119*	--	--	--	--	--	--
5. Family members feel loyal to the family.	**0.886***	-0.038	0.882*	-0.047	--	--	--	--	--	--
6. We are proud of our family.	**0.914***	-0.037	0.928*	-0.044	--	--	--	--	--	--
7. We can express our feelings with our family.	**0.907***	0.005	0.896*	-0.028	--	--	--	--	--	--
8. Like to spend free time with each other.	**0.916***	0.065	0.886*	0.012	--	--	--	--	--	--
9. Family members feel very close to each other.	**0.944***	0.047	0.906*	-0.020	--	--	--	--	--	--
10. Family togetherness is very important.	**0.885***	0.08	0.854*	-0.001	--	--	--	--	--	--
11. Being too close to family interfered with goals.	**0.207***	**0.848***	0.192*	0.846*	--	--	--	--	--	--
12. Different customs led to arguments with family.	**-0.148***	**0.643***	-0.163*	0.643*	--	--	--	--	--	--
13. Felt lonely/isolated due to lack of family unity.	**-0.169***	**0.736***	-0.192*	0.731*	--	--	--	--	--	--
14. Family relations less important for people.	**-0.191***	**0.742***	-0.233*	0.724*	--	--	--	--	--	--
15. Personal goals in conflict with your family.	0.003	**0.838***	-0.017	0.831*	--	--	--	--	--	--
Factor Correlations	*-0.603*		*-0.568*		*-0.568*		*-0.568*		*-0.568*	
Factor Means (se)	--		[0.0]	[0.0]	0.612 (0.026)*	-0.313 (0.083)*	0.317 (0.026)*	-0.052 (0.073)	0.297 (0.090)*	-0.101 (0.077)
Factor Variances (se)	--		*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*

		First		1.5		Second		Third	
		*Generational Status (Model MGI1)*						
		Cohesion	Conflict	Cohesion	Conflict	Cohesion	Conflict	Cohesion	Conflict
1. Family members respect one another.		0.785*	-0.037	0.679*	-0.246*	0.649*	-0.240*	0.518*	-0.476*
2. We share similar values and beliefs.		0.832*	-0.052	0.766*	-0.226*	0.748*	-0.120	0.662*	-0.256*
3. Things work well for us as a family.		0.830*	-0.197*	0.697*	-0.299*	0.790*	-0.206*	0.641*	-0.393*
4. We really do trust and confide in each other.		0.858*	-0.140*	0.795*	-0.298*	0.645*	-0.366*	0.729*	-0.306*
5. Family members feel loyal to the family.		0.809*	-0.211*	0.857*	-0.160	0.805*	-0.214*	0.768*	-0.180
6. We are proud of our family.		0.852*	-0.153*	0.781*	-0.287*	0.772*	-0.296*	0.880*	-0.149
7. We can express our feelings with our family.		0.820*	-0.201*	0.821*	-0.158	0.824*	-0.130	0.761*	-0.199*
8. Like to spend free time with each other.		0.756*	-0.262*	0.846*	0.062	0.854*	-0.100	0.903*	0.045
9. Family members feel very close to each other.		0.825*	-0.190*	0.939*	-0.008	0.847*	-0.143*	0.792*	-0.145
10. Family togetherness is very important.		0.852*	-0.087	0.501*	-0.258	0.791*	-0.122	0.833*	-0.037
11. Being too close to family interfered with goals.		0.254*	0.872*	0.364*	0.945*	-0.053	0.660*	0.179	0.686*
12. Different customs led to arguments with family.		-0.043	0.716*	-0.231*	0.635*	-0.139	0.623*	-0.122	0.729*
13. Felt lonely/isolated due to lack of family unity.		-0.195*	0.758*	-0.256*	0.672*	-0.012	0.900*	-0.199*	0.750*
14. Family relations less important for people.		-0.180*	0.813*	-0.348*	0.615*	-0.060	0.830*	-0.138	0.768*
15. Personal goals in conflict with your family.		-0.070	0.843*	-0.031	0.865*	0.000	0.752*	0.153	0.827*
Factor Correlations	--	*-0.415**		*-0.442**		*-0.512**		*-0.448**	
Factor Means (se)	--	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]
Factor Variances (se)	--	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*

*Significant at the p<0.05 level
EFA=Exploratory Factor Analysis; ESEM=Exploratory Structural Equation Modeling; se=standard error
Note. Loadings are Geomin Rotated. Brackets indicate fixed parameters. See Table 4.4.1 for exact item wording.

same across all subethnic groups (p=0.0098). After freeing intercepts for item 12 ("Because you have different customs, you have had arguments with other members of your family") across subethnicities, Model 5p fit significantly improved, making the chi-square comparison to Model 2 insignificant (p=0.1904). Again, we proceeded with partial intercept invariance for the remaining models. Invariance continued to hold in Model 8p (p=0.0867); however, Model 10 revealed factor means across groups to be highly variant (p=0.0003), leading us to conclude that Model 8p (strict factorial/measurement invariance) was optimal. In contrast, when testing for MI across generational subgroups, constraining factor loadings significantly worsened model fit (Model 2, p=0.0018). As partial factorial loading invariance is not possible, we were forced to conclude testing and acknowledge that comparisons across generational groups cannot be validly made.

Standardized factor loadings for the ESEM model across subethnic groups closely resembled those from the EFA (Table 4.4.4). Factor correlations were invariant across groups and also of similar magnitude, indicating that family cohesion and conflict constructs were strongly negatively correlated (r= -0.568). In comparison to the reference group of Puerto Ricans, only Cubans had significantly less conflict, yet all groups had significantly higher family cohesion, with Cubans approximately twice the increase as Mexicans and other Latinos. Conversely, the ESEM-derived standardized factor loadings, while still forming generally similar constructs of cohesion and conflict, were much more heterogeneous across generational groups without clear patterns. In particular, the 1.5 Generation had more item cross loadings as compared to other subgroups. For some items, these child immigrants looked more like their US-born counterparts with strong negative loadings of respect and shared values (items 1 and 2) or a near-zero cross loading on item

8 (spending time together). Among other items, there was more of a gradient across the generations, for example in items 1 and 2 where the family cohesion loading was the strongest among the first generation and the weakest among the third. The negative correlation between constructs was strong and consistent.

4.4.5 Discrimination

Endorsement of discrimination items either rarely or often are presented in Table 4.5.1. All item frequencies significantly differ by subgroups. In the entire sample, often experiencing instances of discrimination varied from 1.5% (being threatened or harassed) to 31.2% (seeing friends treated unfairly). In general, Cubans reported the lowest levels of everyday and perceived discrimination (range: 0.3%-18.5%, and Puerto Ricans and Mexicans often the highest (range: 2.4%-37.6% and 1.5%-36.6%, respectively). Third generation Latinos consistently reported higher frequency of discrimination (range: 3.3%-36.0%), with the other generational groups usually being significantly lower. However, this pattern was not always consistent, depending on the item.

Exploratory Factor Analysis revealed a 2-factor model with satisfactory fit (as seen in the CFI, TLI and SRMR), although the RMSEA was higher than is desirable (Table 4.5.2). However, inspection of the eigenvalues and scree plot did not provide enough justification for adding a third factor. This was true for all subgroups as well (data not shown). The factor loadings as shown in Table 4.5.4 break strongly by subscale, with the nine Everyday Discrimination items resulting in an "Observed" factor (λ range: 0.691-0.978), and the three Perceived Discrimination items loading strongly on a "Perceived" factor (all $\lambda > 0.720$). There were, however, some low cross-loadings of the Everyday items on the "Perceived" factor (λ range: 0.210-0.350), despite the significant factor correlation

Table 4.5.1. Response Distribution of Discrimination Scale Items in the Latino NLAAS Sample, by Subgroup

Scale Item	Sub-scale	Response	Total (n=2550)	Subethnicity					Generational Status				
				Cuban (n=577)	Puerto Rican (n=491)	Mexican (n=868)	All Other (n=614)	χ² (p-value)*	First (n=1254)	1.5 (n=364)	Second (n=522)	Third (n=397)	χ² (p-value)*
			n (%)	n (%)	n (%)	n (%)	n (%)	χ² (p-value)*	n (%)	n (%)	n (%)	n (%)	χ² (p-value)*
1. You are treated with less courtesy than other people.	Everyday Discrimination	Rarely	1067 (42.0)	166 (28.9)	251 (51.3)	378 (43.6)	272 (44.4)	**126.61 (0.0000)**	425 (34.1)	181 (49.7)	250 (47.9)	206 (52.0)	**142.15 (0.0000)**
		Often	385 (15.1)	56 (9.7)	95 (19.4)	151 (17.4)	83 (13.5)		148 (11.9)	51 (14.0)	95 (18.2)	89 (22.5)	
2. You are treated with less respect than other people.		Rarely	1045 (41.0)	152 (26.8)	132 (27.0)	260 (30.3)	169 (27.8)	**22.96 (0.0008)**	313 (25.3)	128 (35.6)	142 (27.3)	125 (31.6)	**25.72 (0.0003)**
		Often	265 (10.4)	105 (18.5)	133 (27.3)	188 (21.9)	109 (17.9)		294 (23.8)	65 (18.1)	91 (17.5)	83 (21.0)	
3. You receive poorer service than other people at restaurants or stores.		Rarely	1025 (40.2)	111 (19.3)	147 (30.1)	250 (29.0)	156 (25.4)	**77.01 (0.0000)**	278 (22.3)	100 (27.5)	153 (29.4)	130 (32.7)	**25.91 (0.0002)**
		Often	189 (7.4)	65 (11.3)	107 (21.9)	187 (21.7)	91 (14.8)		226 (18.1)	69 (19.0)	78 (15.0)	74 (18.6)	
4. People act as if they think you are not smart.		Rarely	970 (38.1)	123 (21.4)	107 (21.9)	208 (24.2)	146 (23.9)	**84.69 (0.0000)**	263 (21.1)	96 (26.5)	132 (25.3)	90 (22.7)	**18.39 (0.0053)**
		Often	262 (10.3)	105 (18.3)	184 (37.6)	315 (36.6)	187 (30.6)		368 (29.5)	122 (33.7)	156 (29.9)	143 (36.0)	
5. People act as if they are afraid of you.		Rarely	723 (28.4)	159 (27.6)	246 (50.3)	383 (44.1)	257 (41.9)	**100.28 (0.0000)**	401 (32.0)	169 (46.6)	258 (49.4)	212 (53.5)	**151.26 (0.0000)**
		Often	165 (6.5)	39 (6.8)	60 (12.3)	105 (12.1)	61 (9.9)		96 (7.7)	37 (10.2)	66 (12.6)	63 (15.9)	
6. People act as if they think you are dishonest.		Rarely	804 (31.7)	156 (27.0)	245 (50.0)	376 (43.4)	248 (40.4)	**101.52 (0.0000)**	388 (31.0)	168 (46.2)	253 (48.6)	211 (53.1)	**157.20 (0.0000)**
		Often	106 (4.2)	23 (4.0)	46 (9.4)	79 (9.1)	41 (6.7)		60 (4.8)	25 (6.9)	57 (10.9)	46 (11.6)	

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Item												
7. People act as if you are not as good as they are.		Rarely	923 (36.3)	154 (26.7)	224 (45.9)	361 (41.6)	231 (37.7)	**101.06 (0.0000)**	366 (29.3)	165 (45.6)	242 (46.4)	191 (48.1)	**147.93 (0.0000)**
		Often	202 (7.9)	27 (4.7)	65 (13.3)	98 (11.3)	72 (11.7)		95 (7.6)	31 (8.6)	67 (12.8)	67 (16.9)	
8. You are called names or insulted.		Rarely	694 (27.2)	103 (17.9)	179 (36.6)	264 (30.4)	177 (29.0)	**80.12 (0.0000)**	229 (18.3)	128 (35.3)	210 (40.5)	153 (38.5)	**251.03 (0.0000)**
		Often	109 (4.3)	17 (3.0)	45 (9.2)	58 (6.7)	45 (7.4)		32 (2.6)	23 (6.3)	53 (10.2)	57 (14.4)	
9. You are threatened or harassed.		Rarely	615 (24.1)	124 (21.5)	191 (39.1)	289 (33.4)	200 (32.8)	**63.44 (0.0000)**	277 (22.2)	131 (36.0)	222 (42.6)	171 (43.2)	**152.27 (0.0000)**
		Often	38 (1.5)	9 (1.6)	28 (5.7)	43 (5.0)	26 (4.3)		31 (2.5)	13 (3.6)	30 (5.8)	32 (8.1)	
10. How often do people dislike you because you are Latino?	Perceived Discrimination	Rarely	713 (28.2)	147 (25.5)	216 (44.2)	343 (39.6)	217 (35.5)	**84.92 (0.0000)**	318 (25.5)	159 (43.7)	241 (46.3)	199 (50.1)	**256.59 (0.0000)**
		Often	535 (21.2)	20 (3.5)	50 (10.2)	78 (9.0)	54 (8.8)		48 (3.8)	29 (8.0)	60 (11.5)	65 (16.4)	
11. How often do people treat you unfairly because you are Latino?		Rarely	664 (26.1)	96 (16.6)	177 (36.2)	264 (30.4)	157 (25.6)	**81.14 (0.0000)**	197 (15.7)	120 (33.1)	214 (41.0)	160 (40.3)	**249.05 (0.0000)**
		Often	450 (17.7)	8 (1.4)	22 (4.5)	47 (5.4)	32 (5.2)		23 (1.8)	21 (5.8)	26 (5.0)	39 (9.8)	
12. How often have you seen friends treated unfairly because they are Latino?		Rarely	584 (23.0)	84 (14.6)	157 (32.0)	229 (26.4)	145 (23.6)	**59.71 (0.0000)**	163 (13.0)	104 (28.7)	189 (36.2)	155 (39.0)	**193.36 (0.0000)**
		Often	791 (31.2)	2 (0.3)	12 (2.4)	13 (1.5)	11 (1.8)		14 (1.1)	5 (1.4)	6 (1.1)	13 (3.3)	

Note. 4 respondents had missing responses for all discrimination items.

* 6 degrees of freedom

Bold=significant at the p<0.01 level

of 0.407. Items 8 (insulted) and 9 (threatened or harassed) had low negative loadings on the "Perceived" factor as well.

Table 4.5.2. Fit Statistics for Exploratory Factor Analysis of 12-item Discrimination Scale

Model	# Free Params	Chi-Square	DF	p-value	RMSEA (95% CI)	p-value	CFI	TLI	SRMR
1-factor	12	5491.671	54	0.0000	0.199 (0.194-0.203)	0.000	0.926	0.91	0.153
2-factor	*23*	*1610.03*	*43*	*0.0000*	*0.120 (0.115-0.125)*	*0.000*	*0.979*	*0.967*	*0.050*
3-factor	33	475.112	33	0.0000	0.072 (0.067-0.078)	0.000	0.994	0.988	0.017
4-factor	42	137.091	24	0.0000	0.043 (0.036-0.050)	0.947	0.998	0.996	0.008

Note: **Bold, italics** indicate chosen factor structure.
Params=Parameters; DF=Degrees of freedom; RMSEA=Root Mean Square Error of Approximation; CI=Confidence Interval; CFI=Comparative Fit Index; TLI=Tucker-Lewis Index; SRMR=Standardized Root Mean Square Residual

The standardized loadings from the ESEM models were of a similar pattern as that seen among the EFA loadings. And while this pattern was consistent across subgroups, there was some variation in loading strength contributing to the rejection on invariant loadings during MI testing. For example, loadings for item 12 (seen friends treated unfairly due to being Latino) on the perceived discrimination factor varied in strength from 0.686 in other Latinos to 0.836 in Cubans. In general, these differences were mild, and the moderate positive correlation between the factors was stable. Differences in standardized ESEM loadings by generational status were similarly mild, although again item 12 had a varying range in loadings on the perceived construct from 0.644 in 1.5 Generation Latinos to 0.797 in the First. Factor correlations, while similar, ranged from 0.294 in the 1.5 Generation to 0.407 in the First Generation, again putting the foreign-born groups at opposite ends of the spectrum.

Table 4.5.3. Summary of Goodness of Fit Statistics for All Measurement Invariance Models for the 2-factor Discrimination Scale

Model	# Free Params	CFI	TLI	RMSEA (95% CI)	p-value	WRMR	χ^2 DiffTest	df	Comparison Model	p-value	
Total group (TG) models											
ESEM	47	0.979	0.967	0.120 (0.115-0.125)	0.000	2.831	--	--	--	--	
Multiple group invariance (MGI) models											**Invariant Parameters***
By Subethnicity (4 groups)											
MGI1	**188**	**0.979**	**0.968**	**0.117 (0.112-0.122)**	**0.000**	**2.977**	**--**	**--**	**--**	**--**	**IN = none (FMn = 0)**
MGI2	128	0.988	0.986	0.077 (0.072-0.081)	0.000	3.199	93.749	60	[1]	0.0035	IN = FL (FMn = 0)
MGI4	N/A								[2]		IN = FL, FVCV (FMn = 0)
MGI5	N/A								[2]		IN = FL, INT
MGI8	N/A								[5]		IN = FL, FVCV, INT
MGI10	N/A								[5]		IN = FL, INT, FMn
MGI12	N/A								[10]		IN = FL, FVCV, INT, FMn
By Generation (4 groups)											
MGI1	**188**	**0.978**	**0.966**	**0.116 (0.111-0.122)**	**0.000**	**3.070**	**--**	**--**	**--**	**--**	**IN = none (FMn = 0)**
MGI2	128	0.986	0.984	0.081 (0.076-0.085)	0.000	3.339	116.796	60	[1]	0.0000	IN = FL (FMn = 0)
MGI4	N/A								[2]		IN = FL, FVCV (FMn = 0)
MGI5	N/A								[2]		IN = FL, INT
MGI8	N/A								[5]		IN = FL, FVCV, INT
MGI10	N/A								[5]		IN = FL, INT, FMn
MGI12	N/A								[10]		IN = FL, FVCV, INT, FMn

Note: Highlight indicates chosen model. Red text indicates invariant parameters at the p<0.05 level.
Params=parameters; CFI=comparative fit index; TLI=Tucker-Lewis Index; RMSEA=root mean squared error of approximation; WRMR=weighted root mean square residual; df=degrees of freedom; DiffTest=difference test.
*For multiple group invariance models, IN means the sets of parameters constrained to be invariant across the multiple groups: FL=factor loadings; FVCV=factor variance-covariances; INT=item intercepts; Uniq=item uniquenesses; FMn=factor means.

Table 4.5.4. Factor Loadings, Means and Variances for 2-Factor Models of 12-item Discrimination Scale

	EFA Factor Loadings Total Group		ESEM Standardized Factor Loadings Subethnicity (Model MGI1)							
			Puerto Ricans		Cubans		Mexicans		All Other	
	Observed	Perceived	Observed	Perceived	Observed	Perceived	Observed	Perceived	Observed	Perceived
1. Treated with less courtesy than others.	**0.691***	**0.350***	0.679*	0.330*	0.703*	0.411*	0.607*	0.436*	0.600*	0.514*
2. Treated with less respect than others.	**0.739***	**0.321***	0.741*	0.315*	0.745*	0.378*	0.665*	0.417*	0.638*	0.485*
3. Receive poorer service at stores.	**0.731***	**0.225***	0.702*	0.266*	0.739*	0.261*	0.640*	0.365*	0.686*	0.304*
4. People act as if you are not smart.	**0.761***	**0.210***	0.727*	0.262*	0.733*	0.291*	0.676*	0.361*	0.719*	0.275*
5. People act afraid of you.	**0.876***	**-0.041***	0.792*	0.085*	0.855*	0.078*	0.858*	0.026	0.829*	0.051
6. People act as if you are dishonest.	**0.896***	**0.004***	0.819*	0.090*	0.841*	0.133*	0.867*	0.104*	0.861*	0.121*
7. People act as if you are not as good.	**0.848***	**0.082***	0.763*	0.165*	0.820*	0.202*	0.804*	0.179*	0.803*	0.194*
8. You are called names or insulted.	**0.951***	**-0.155***	0.871*	-0.048	0.934*	-0.084*	0.912*	-0.043	0.917*	-0.032
9. You are threatened or harassed.	**0.978***	**-0.199***	0.905*	-0.094*	0.999*	-0.151*	0.910*	-0.036	0.969*	-0.131*
10. Disliked because you are Latino.	-0.021	**0.853***	-0.082*	0.872*	-0.071*	0.893*	-0.026	0.842*	-0.108*	0.898*
11. Treated unfairly because Latino.	**0.005***	**0.966***	-0.033	0.978*	-0.026	0.952*	-0.098*	1.008*	-0.063*	0.986*
12. Friends treated unfairly because Latino.	**0.099***	**0.721***	0.067	0.771*	0.010	0.836*	0.034	0.714*	0.039	0.686*
Factor Correlations	*0.407***		*0.328***		*0.323***		*0.370***		*0.335***	
Factor Means (se)	--		[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]
Factor Variances (se)	--		*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*

		Generational Status (Model MGI1)							
		First		1.5		Second		Third	
		Observed	Perceived	Observed	Perceived	Observed	Perceived	Observed	Perceived
1. Treated with less courtesy than others.		0.653*	0.404*	0.640*	0.441*	0.554*	0.496*	0.612*	0.464*
2. Treated with less respect than others.		0.694*	0.369*	0.695*	0.431*	0.630*	0.451*	0.654*	0.489*
3. Receive poorer service at stores.		0.638*	0.359*	0.713*	0.300*	0.657*	0.323*	0.635*	0.314*
4. People act as if you are not smart.		0.687*	0.333*	0.733*	0.239*	0.688*	0.298*	0.683*	0.336*
5. People act afraid of you.		0.846*	0.089*	0.814*	0.019	0.757*	0.092*	0.790*	0.087*
6. People act as if you are dishonest.		0.808*	0.205*	0.864*	0.003	0.838*	0.097*	0.873*	0.048
7. People act as if you are not as good.		0.794*	0.233*	0.776*	0.216*	0.777*	0.130*	0.728*	0.221*
8. You are called names or insulted.		0.919*	-0.036	0.918*	-0.063	0.886*	-0.010	0.868*	-0.077*
9. You are threatened or harassed.		0.981*	-0.085*	0.919*	-0.096*	0.886*	-0.030	0.910*	-0.141*
10. Disliked because you are Latino.		-0.048*	0.871*	-0.075*	0.855*	-0.034	0.881*	-0.071*	0.841*
11. Treated unfairly because Latino.		-0.044*	0.972*	-0.088*	1.012*	-0.057*	1.007*	-0.090*	0.990*
12. Friends treated unfairly because Latino.		0.036	0.797*	0.049	0.644*	0.023	0.741*	0.033	0.732*
Factor Correlations	--	0.407*		0.294*		0.391*		0.324*	
Factor Means (se)	--	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]
Factor Variances (se)	--	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*

*Significant at the p<0.05 level

EFA=Exploratory Factor Analysis; ESEM=Exploratory Structural Equation Modeling; se=standard error

Note. Loadings are Geomin Rotated. Brackets indicate fixed parameters. See Table 4.5.1 for exact item wording.

Table 4.6.1. Response Distribution of Acculturative Stress Scale Items in the Latino NLAAS Sample, by Subgroup

Scale Item	Response	Total (n=1624) n (%)	Cuban (n=501) n (%)	Puerto Rican (n=213) n (%)	Mexican (n=486) n (%)	All Other (n=424) n (%)	χ^2 (p-value)*	First (n=1253) n (%)	1.5 (n=364) n (%)	χ^2 (p-value)*
1. Do you feel guilty for leaving family or friends in your country of origin?	Yes	262 (16.5)	84 (17.2)	27 (13.2)	77 (16.1)	74 (17.7)	2.280 (0.5155)	227 (18.3)	33 (9.6)	**14.010 (0.0002)**
2. Do you feel that in the United States you have the respect you had in your country of origin?	Yes	1080 (69.9)	340 (71.7)	158 (79.4)	303 (66.0)	279 (67.7)	**13.520 (0.0036)**	849 (69.1)	226 (73.1)	1.700 (0.1929)
3. Do you feel that living out of your country of origin has limited your contact with family or friends?	Yes	773 (48.6)	264 (54.2)	59 (28.9)	252 (52.5)	198 (47.4)	**40.930 (0.0000)**	642 (51.7)	126 (37.0)	**22.810 (0.0000)**
4. Do you find it hard interacting with others because of difficulties you have with the English language?	Yes	695 (43.7)	214 (43.8)	47 (23.3)	246 (51.4)	188 (44.9)	**45.920 (0.0000)**	655 (52.8)	35 (10.2)	**195.980 (0.0000)**
5. Do people treat you badly because they think you do not speak English well or speak with an accent?	Yes	331 (21.0)	78 (16.1)	43 (21.4)	118 (25.0)	92 (22.0)	**11.760 (0.0082)**	288 (23.5)	41 (12.0)	**20.840 (0.0000)**
6. Do you find it difficult to find the work you want because you are of Latino descent?	Yes	410 (26.8)	87 (18.6)	45 (23.1)	160 (34.7)	118 (29.2)	**33.520 (0.0000)**	356 (30.5)	50 (14.1)	**36.600 (0.0000)**
7. Have you been questioned about your legal status?	Yes	390 (24.1)	79 (15.8)	36 (17.1)	171 (35.2)	104 (24.5)	**57.300 (0.0000)**	314 (25.1)	76 (20.9)	2.540 (0.1110)
8. Do you think you will be deported if you go to a social or government agency?	Yes	156 (9.9)	8 (1.6)	3 (1.5)	113 (24.6)	32 (7.7)	**166.160 (0.0000)**	142 (11.7)	11 (3.2)	**21.520 (0.0000)**
9. Do you avoid seeking health services due to fear of immigration officials?	Yes	99 (6.2)	4 (0.8)	0 (0.0)	76 (15.7)	19 (4.5)	**114.56 (0.0000)**	90 (7.3)	7 (2.0)	**12.150 (0.0005)**

Note. 11 foreign-born participants had missing responses on all items. Acculturative Stress items were not assessed on the foreign-born population.
*3 degrees of freedom.
Bold=significant at the p<0.01 level

4.4.6 Acculturative Stress

Acculturative stress items were not assessed in the US-born population. As displayed in Table 4.6.1, frequency of experiencing specific items pertaining to acculturative stress varied significantly across subethnic groups for all items except feeling guilty for leaving people in one's country of origin (Item 1). Conversely, this item differed significantly by age of migration among foreign-born Latinos, while items 2 (feeling respected in the US) and 7 (questioned about legal status) were not different by generation.

Table 4.6.2. Fit Statistics for Exploratory Factor Analysis of the 9-item Acculturative Stress Scale

Model	# Free Params	Chi-Square	DF	p-value	RMSEA (95% CI)	p-value	CFI	TLI	SRMR
1-Factor	9	314.588	27	0.0000	0.081 (0.073-0.089)	0.000	0.915	0.887	0.105
2-Factor	*17*	*157.221*	*19*	*0.0000*	*0.067 (0.057-0.077)*	*0.002*	*0.959*	*0.922*	*0.062*
3-Factor*	24	33.807	12	0.0007	0.033 (0.020-0.047)	0.979	0.994	0.981	0.029

Note: ***Bold, italics*** indicate chosen factor structure.
Params=Parameters; DF=Degrees of freedom; RMSEA=Root Mean Square Error of Approximation; CI=Confidence Interval; CFI=Comparative Fit Index; TLI=Tucker-Lewis Index; SRMR=Standardized Root Mean Square Residual
*Model came with a warning regarding rotated solution.

In the overall group, a 2-factor model fit the data best based on a combination of fit statistics and interpretability of factors (Table 4.6.2). Additionally, the 3-factor solution, although having more favorable fit statistics, produced a warning in Mplus regarding the rotated solution. Therefore, the 2-factor solution was chosen. Items 1 through 6 loaded most heavily on the first factor ("Interpersonal") and items 8 and 9 heavily on the second ("Legal"; see Table 4.6.4). Item 7 (questioned about legal status) loaded modestly and relatively evenly on both factors. Factors were highly correlated (r=0.522). Upon conducting EFA among subgroups to confirm a 2-factor structure, all groups except the 1.5

Table 4.6.3. Summary of Goodness of Fit Statistics for All Measurement Invariance Models for the 2-factor Acculturative Stress Scale

Model	# Free Params	CFI	TLI	RMSEA (95% CI)	p-value	WRMR	χ^2 DiffTest	df	Comparison Model	p-value	
Total group (TG) models											
ESEM	26	0.959	0.922	0.067 (0.057-0.077)	0.002	1.494	--	--	--	--	
Multiple group invariance (MGI) models											**Invariant Parameters***
By Subethnicity (3 groups)											
MGI1	**78**	**0.964**	**0.932**	**0.061 (0.050-0.073)**	**0.054**	**1.584**	**--**	**--**	**--**	**--**	**IN = none (FMn = 0)**
MGI2	Model did not converge								[1]		IN = FL (FMn = 0)
MGI4	N/A								[2]		IN = FL, FVCV (FMn = 0)
MGI5	N/A								[2]		IN = FL, INT
MGI8	N/A								[5]		IN = FL, FVCV, INT
MGI10	N/A								[5]		IN = FL, INT, FMn
MGI12	N/A								[10]		IN = FL, FVCV, INT, FMn
By Generation (2 groups)											
MGI1	Configural invariance not obtained						--	--	--	--	IN = none (FMn = 0)
MGI2	N/A								[1]		IN = FL (FMn = 0)
MGI4	N/A								[2]		IN = FL, FVCV (FMn = 0)
MGI5	N/A								[2]		IN = FL, INT
MGI8	N/A								[5]		IN = FL, FVCV, INT
MGI10	N/A								[5]		IN = FL, INT, FMn
MGI12	N/A								[10]		IN = FL, FVCV, INT, FMn

Note: Highlight indicates chosen model. Red text indicates invariant parameters at the p<0.05 level. Puerto Ricans were not included in testing Params=parameters; CFI=comparative fit index; TLI=Tucker-Lewis Index; RMSEA=root mean squared error of approximation; WRMR=weighted root mean square residual; df=degrees of freedom; DiffTest=difference test.
*For multiple group invariance models, IN means the sets of parameters constrained to be invariant across the multiple groups: FL=factor loadings; FVCV=factor variance-covariances; INT=item intercepts; Uniq=item uniquenesses; FMn=factor means.

Generation supported 2 factors. The 1.5 Generation, however, indicated a 1-factor solution. Because configural invariance (i.e., the same number of underlying factors) was not obtained, measurement invariance testing by generational status could not continue.

The result of MI testing among three subethnic groups is displayed in Table 4.6.3. Puerto Ricans were excluded from testing as there was no variability among item 9 (avoided health services due to fear of immigration officials); All Puerto Ricans in the sample answered No. However, when constraining factor loadings to be equal across Mexicans, Cubans and other Latinos in Model 2, model convergence was not achieved as loadings were so different across groups. Therefore, Model 1 (configural invariance only) was selected in moving forward.

Table 4.6.4 displays the results of the 3-group ESEM model, which varied drastically across subethnicities. The standardized factor loading structure among the subgroups were inconsistent in pattern. Cubans and Mexicans tended to resemble one another in the loading pattern and structure, although there were a few differences in smaller cross loadings. However, the loadings among other Latinos were drastically different with no clear pattern. Although a 2-factor solution was preferred in this group based on fit statistics, the factors were not meaningfully interpretable.

Because MI testing could not be pursued by generational group, stratified EFA results are presented instead in Table 4.6.4. The 2 factors in first-generation immigrants were similar to the pattern observed in Mexicans and Cubans, with clearly-distinguished "Interpersonal" and "Legal" factors significantly correlated with one another (r=0.447). The single factor that emerged for the 1.5 Generation, labeled "Stress", had loadings that ranged in absolute strength from 0.402 (item 2) to 0.990 (item 9). The two latent constructs

Table 4.6.4. Factor Loadings, Means and Variances for 2-Factor Models of 9-item Acculturative Stress Scale

	EFA Factor Loadings *Total Group*			ESEM Standardized Factor Loadings *Subethnicity (Model MGI1)*						EFA Factor Loadings *Generational Status*		
			Puerto Ricans	Cubans		Mexicans		All Other		First		1.5
	Inter-personal	Legal	n/a**	Inter-personal	Legal	Inter-personal	Legal	Factor 1	Factor 2	Inter-personal	Legal	Stress
1. Feel guilty for leaving family/friends.	**0.624***	**-0.171***	--	0.766*	-0.222	0.617*	-0.041	0.091	0.524*	0.576*	-0.130	0.466*
2. Have same respect as in country of origin.	**-0.296***	-0.089	--	-0.233*	-0.058	-0.396*	-0.097	-0.153	-0.154	-0.289*	-0.104	-0.402*
3. Limited contact with family/friends.	**0.561***	-0.008	--	0.643*	-0.016	0.488*	0.207*	0.158	0.454*	0.570*	-0.017	0.434*
4. Hard interacting with others due to English.	**0.688***	-0.024	--	0.604*	0.171	0.637*	0.140	0.709*	-0.077	0.662*	-0.042	0.721*
5. Treated badly because of English ability.	**0.795***	0.022	--	0.616*	0.417*	0.686*	0.179*	0.780*	0.119	0.772*	0.078	0.701*
6. Difficult to find work because Latino.	**0.738***	**0.169***	--	0.563*	0.520*	0.688*	0.314*	0.745*	0.132	0.720*	0.205	0.798*
7. Questioned about your legal status.	**0.282***	**0.383***	--	0.360*	0.350*	0.257*	0.408*	0.193*	0.325*	0.309*	0.426*	0.434*
8. Deported if go to social agency.	-0.005	**0.992***	--	-0.148*	1.011*	-0.004	0.967*	-0.042	0.741*	-0.009	0.964*	0.904*
9. Avoid seeking health services due to fear.	**0.204***	**0.775***	--	0.185	0.883*	0.117	0.825*	0.181	0.755*	0.158	0.818*	0.990*
Factor Correlations	*0.522*￼*		--	*0.329*￼*		*0.482*￼*		*0.348*￼*		*.447*￼*		*n/a*
Factor Means (se)	--		--	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	[0.0]	--		
Factor Variances (se)	--		--	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	*[1.0]*	--		

*Significant at the p<0.05 level
**Puerto Ricans were not included in measurement invariance testing.
EFA=Exploratory Factor Analysis; ESEM=Exploratory Structural Equation Modeling; se=standard error
Note. Loadings are Geomin Rotated. Brackets indicate fixed parameters. See Table 5.1.1 for exact item wording.

of interpersonal and legal stress were the most highly correlated for Mexicans (r=0.482), and the least among Cubans (r=0.329). All correlations were somewhat attenuated from that seen in the EFA.

4.5 Discussion

The Exploratory Factor Analysis results make substantive sense based on the design of the scales, corroborating the quality of theory and testing that went into the execution of the NLAAS (Alegría et al., 2004). The Language subscales naturally resulted in two factors, one for each language. This is particularly salient with the inverse loadings for the language preference items across the two factors, although the fact that these items were approximately two times more strongly related to the English factor than the Spanish was unexpected. The Ethnic Identity scale had too few items to explore a more complex factor structure, but all items were related to the underlying construct. The Neighborhood Context scale generally split across subscales, with Neighborhood Social Cohesion strongly relating to the Community factor and the Neighborhood Safety scale strongly relating to the Safety factor. The one exception was item 5 from the Neighborhood Safety subscale, which tended to load moderately on both factors. This is unsurprising, as the statement "I feel safe being out alone in my neighborhood during the night" intuitively relates to both the community structure of one's neighborhood and the perception of safety. Similarly, the 2-factor nature of the Family Context scale was logically consistent with the Family Pride and Cohesion subscales strongly loading on the Cohesion factor, while the Family Cultural Conflict (FCC) scale loaded highly on the Conflict factor. As noted in the results, the exception to this was the 1.5 Generation, where the FCC items often heavily cross-loaded on both factors. This finding highlights the understudied phenomenon that this generational

group is qualitatively different than other first-generation immigrants, and points towards the need to consider timing of developmentally-relevant risk and protective factors across the lifespan.

The two discrimination factors also split across subscales, as everyday discrimination items related to the "Observed" discrimination factor and the perceived to the "Perceived" factor. Although at first glance all scale items appear to be similar, even across subscales, this suggests that more non-specific experiences of discrimination are qualitatively distinct from experiences attributed to racial or ethnic background. However, some similarity is seen with the smaller but significant cross-loadings of items 1 through 4 on the perceived factor. Unexpectedly, items 8 (insulted) and 9 (threatened or harassed) had low negative loadings on the "Perceived" factor, possibly indicating the tendency of individuals to attribute verbal experiences of discrimination to something other than race.

Complete factorial invariance was not achieved for any scale across the subgroups examined, although this varied significantly by scale and subgroup. Some scales (e.g., Neighborhood Context and Ethnic Identity) were more similar across subgroups. This is important because although there were clear differences in how often individuals endorsed specific questionnaire items depending on their country of origin or generational status, the underlying constructs being measured by these scales are generally similar across group membership. However, inability to achieve latent mean invariance (and thus manifest mean invariance) underscores the importance of treating constructs such as neighborhood context as latent rather than observed.

Other scales (e.g., Language, Discrimination, and Acculturative Stress) attained only the loosest type of invariance (configural) regardless of the grouping characteristic.

This shows that certain constructs such as language usage are extremely heterogeneous by Latino subgroup, not just in observed self-report measures, but also in how individual questions relate to the constructs of interest. In fact, the underlying factor structure of acculturative stress differed by generational status such that it was bi-dimensional in first generation immigrants arriving as teenagers or adults ("Interpersonal" and "Legal" dimensions), but only one a single general stress factor was observed in Latinos arriving in the US as children (the so-called 1.5 generation). Again, this underscores the need to consider this group as distinct from older immigrants. Finally, some scales (e.g., Family Context) were similar for one subgrouping (subethnicity) but extremely variant on the other (generation). This indicates the need to take into account variations by not just one group but both country of origin and generational status. In addition, using highly variant scales to compare Latino generational groups is invalid, particularly at the observed level. Ignoring this fact can lead to biased results when looking at associations between family conflict and mental disorder. Combining Latino subgroups and failing to account for heterogeneity may also contribute to conflicting results in the literature.

It is clear from these results that Latinos are heterogeneous across countries of origin in more than just observed frequencies of specific experiences and perceptions. On average, Cubans tend to have higher ethnic identity scores than Latinos of other ancestry, however within-group variability is somewhat larger, especially as compared to Puerto Ricans. Cubans also tend to have more favorable neighborhood environments compared to other groups and report lower levels of family conflict and higher family cohesion. English and Spanish ability and preference are less correlated among Puerto Ricans, perhaps because they are developed at the same time or independently of one another. This may

also be why the language preference items are more strongly related to both English and Spanish constructs than other groups. In Mexicans, speaking ability is less related to the Spanish language construct than reading or writing, perhaps due to literacy disparities. Puerto Ricans have less family cohesion than all other groups, with more conflict. Finally, the individual feelings and experiences that are contributing to the idea of acculturative stress greatly varies by subethnic group. These inconsistent patterns, along with relatively poor model fit statistics, call into question whether "acculturative stress" is a valid construct across the board, or whether more nuanced and culturally relevant experiences need to be developed, particularly because the factor structure was uninterpretable among the still-heterogeneous group of "Other Latinos".

Latinos are also heterogeneous across generational groups. It is especially clear that it is imperative to look at the 1.5 Generation separately from their first-generation counterparts who arrived in the US as teenagers or adults. Most prominent is the completely different factor structures for the Acculturative Stress scale. This can also be seen in factor mean differences across groups for multiple latent constructs. For example, the final ESEM Ethnic Identity model found first generation immigrants to have a significantly higher "Identity" factor mean, whereas the 1.5 Generation did not differ from their US-born counterparts. This indicates that Latinos migrating at older ages identify more strongly with their country of origin, whereas immigrants spending their formative years in the US identify with their ethnic roots no more strongly than those born in the States. The 1.5 Generation also seem to have fairly independent English and Spanish abilities and preference, much like their second-generation counterparts. In a lot of ways, the underlying language constructs resemble those of US-born Latinos, except, understandably, the

"preference" of speaking a certain language with family members; instead, this more likely speaks to the necessity of speaking Spanish to family who are not proficient in English. Family Context loadings were also more reminiscent of Latinos born in the US, although the 1.5 Generation tended to have higher item cross loadings, suggesting a blurring of the line between conflict and cohesion.

The increased variability seen in the neighborhood context factors among first, 1.5 and second-generation Latinos as compared to third points to more heterogeneity even within generational subgroups the closer to migration that group is (i.e., either you or your parents have immigrated). The varying correlations among neighborhood community and safety across groups indicates that these constructs may be more interrelated for some groups rather than others, even though the constructs themselves are similar in content as evidenced by equality of factor loadings. Also, the generational differences in loadings without a clear pattern suggests that family context is a more muddled construct as measured by these 15 items, with a lot of overlap between factors and nuance by generational group.

4.5.1 Limitations

This study is not without limitations. The NLAAS data is self-report and therefore subject to bias. Although the NLAAS has a large Latino sample size, some subgroups were relatively small, reducing power and contributing to some model non-convergence. Due to small cell size within subgroups, some item response options had to be collapsed. This results in a loss of information and requires assumptions about meaningful cut points in how the data were grouped. Finally, the "Other Latino" category still represents a subethnic group with considerable heterogeneity. Further, information regarding the respondent's

time since migration was unable to be incorporated into the generational status groupings, potentially making the subgroups still heterogeneous. Finally, there were many statistical tests made which increases the probability of a Type I error (a spurious finding). However, we believe that reporting exact p-values is more valuable than choosing an arbitrary cutoff through a statistical adjustment such as the Bonferroni correction method.

4.5.2 Conclusions

This is the largest, nationally-representative sample of US Latinos with rich data on acculturation, ethnic identity, and other contextual factors relevant to this population, allowing the first testing of measurement invariance across both Latino subethnic and generational subgroups in these six scales. The separation of child immigrants from their first-generation counterparts is an important distinction not often accounted for. To our knowledge, this is also the first in-depth exploration of the factor structure of all scales, including assessment of measurement invariance. The findings underscore the need for accounting for Latino heterogeneity, not simply at the manifest level, but at the latent construct level. The results from this study will allow investigators to appropriately model language, ethnic identity, discrimination, acculturative stress, neighborhood and family contexts when investigating associations with health outcomes in the NLAAS Latino sample without having to formally test for measurement invariance. Because the details of the exact level of measurement invariance found in each scale across specific subgroups have been provided, researchers utilizing these scales in the future can replicate the specific model in their analyses. Finally, the resulting factor scores from each appropriate model are calibrated in regard to either subethnic or generational group, depending on the measurement invariance testing. These factor scores can then be used to make more valid

comparisons at the construct level and when estimating associations with mental and behavioral disorder prevalence across subgroups.

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CHAPTER 5. LATINO POPULATION HETEROGENEITY AND GENERATIONAL STATUS IN THE NATIONAL LATINO AND ASIAN AMERICAN STUDY

5.1 Abstract

The majority of health research treats Latinos in the United States (US) as a single population; however, Latinos display heterogeneous prevalence and patterns of mental and physical health conditions, which may be explained, in part, by subethnicity and generational status. There may also be meaningful subpopulations that experience life in the US in distinct ways, both in how they adapt to the host culture and retain ties to their original culture (i.e., acculturation and enculturation), but also in how they interact with their surroundings and the larger environment around them. This study aims to identify unobserved subgroups of acculturative experiences among a nationally-representative sample of US-residing Latinos (n=2,541) from the National Latino and Asian American Study using latent class analysis. Predictors of class membership are also examined, including ancestry and generational status. Findings show that a four-class model best fit our data. Classes were distinguished mostly on family context, neighborhood context, and discrimination: (1) Positive Experiences (n=1,743, 69%), (2) Cohesive-Conflict (n=424, 17%), (3) Marginalized Conflict (n=237, 9%), and (4) Marginalized (n=137, 5%). Generational status, subethnicity, and marital status were the salient predictors of class membership. Among the foreign-born sample (n=1,617), acculturative stress also predicted class membership.

5.2 Introduction

Latinos are the largest foreign-born and third-fastest growing minority in the United States (US; Colby & Ortman, 2014). As the Latino population grows, so will their contribution to the mental and behavioral health burden in the US. Greater levels of acculturation and increased time living in the US have been consistently linked with worsening mental health among Latinos disorders (Alcántara et al., 2014; Blanco et al., 2013; Ortega et al., 2000; Rivera et al., 2008; Valencia-Garcia et al., 2012), yet the mechanisms through which these processes operate have yet to be understood. Refined measures of acculturation and other potential disparities pathways, such as discrimination and family conflict, should be used in order to correctly explore their relationship with mental health outcomes. In addition, these relationships also need to be investigated in light of heterogeneity by Latino subethnicity and generational status (including age at time of migration).

In health research Latinos are often treated as a homogenous group even though their experiences and characteristics vary considerably. It is generally accepted that ancestry (i.e., country of origin or subethnicity) and generational status are two ways in which Latinos can differ significantly (Alegría et al., 2007a; Guarnaccia et al., 2007).

However, it is possible that there are meaningful subpopulations of US-residing Latinos that are not easily classified based on discrete, observable characteristics such as demographics or nativity. Instead, there may be distinct groups of Latinos that are similar in the ways through which they adapt to the culture of the US, retain the culture of their country or origin or that of their ancestors, and interact with and experience society. Some of these experiences, such as discrimination or family conflict, are known to be associated

with psychological distress and mental disorder (Cobb et al., 2017; Cook et al., 2009; Mulvaney-Day et al., 2007; Rivera et al., 2008; Torres et al., 2012). Most likely, acculturative characteristics and immigration-related experiences do not operate independently but instead cluster together in a meaningful way. In addition, how these experiences cluster may be influenced by Latino subethnicity or generational status. In this light, in order to elucidate the pathways that lead to mental health disparities among US-residing Latinos, differences in acculturative characteristics and other experiences as an ethnic minority across Latino groups should be explored in a more nuanced and holistic fashion.

5.2.1 Acculturation and Latinos' Experiences in the US

Differences in the prevalence of mental and behavioral disorder by both nativity and age at time of immigration have been consistently documented (Portes & Rumbaut, 2001; Vega et al., 2004). This epidemiologic phenomenon, often called the "immigrant health paradox", bringing into interest constructs such as acculturation in Latino health research. Acculturation has been defined as "the multidimensional process of the adoption of US cultural norms, values, and lifestyles" (Alegría, 2009; Lara et al., 2005). Traditionally, acculturation was conceptualized as a unidimensional construct, roughly represented by a continuum, along which individuals could be placed (Gordon, 1964). On one end of the spectrum a person could be completely acculturated (often referred to as assimilation) to US culture; on the other, completely unacculturated and holding firmly to their original culture.

In time it became clear that a unidimensional continuum was insufficient to understand the complex concept of acculturation. Acculturation researchers introduced the concept of

enculturation, or "the process of preserving the norms of the native group, whereby individuals retain identification with their ethnic cultures of origin" (Guarnaccia et al., 2007, p. 513). This expanded the more traditional unidimensional approach through this second enculturation dimension. Because acculturation and enculturation are considered separate domains, they can be measured separately (Kim & Omizo, 2006), allowing for individuals to be classified in a more complex manner. From this, John Berry (2003) conceptualized four acculturative groups: assimilated, integrated, marginalized and separated individuals. These groups relate to four general strategies by which immigrants can adapt to life in a new culture, depending on the level they choose to engage with their host country as well as how much they hold onto the culture and values of their country of origin. Through a psychological acculturation framework (Graves, 1967), researchers have theorized that these individual acculturation strategies coupled with associated behavioral changes may result in sociocultural, intercultural, and psychological changes, some of which may result in mental disorder (Berry, 2017).

However, acculturation and enculturation may not be the only way through which mental and behavioral disorder occur in migrants to the US. As minorities, immigrants are bombarded with a variety of contexts and experiences that are inextricably linked to the acculturation process. Neighborhood and family environment are two contexts in which Latinos may be impacted by their new host culture. These environments may either be protective or risky, depending on their characteristics. Social support, as experienced either through family or friends, has been shown to buffer the effects of stress among minorities or immigrants (Almeida et al., 2011; Park et al., 2014; Rivera et al., 2008; Vega et al., 1987). However, although neighborhood social cohesion has some support for improved

health outcomes (Bjornstrom & Kuhl, 2014; Mair et al., 2010; Mulvaney-Day et al., 2007; Ross, 2000), living in an immigrant-dense area often means increased levels of poverty (Hong et al., 2014). This, in turn, can mean higher levels of physical disorder and crime, which can have negative health effects (Alegría et al., 2014; Aneshensel & Sucoff, 1996; Aneshensel et al., 2007; Ross & Mirowsky, 2001). Similarly, although families can provide support, they can also be places of conflict, which has been associated with disorder (Guarnaccia et al., 2002; Park et al., 2014; Rivera et al., 2008).

Other experiences that arise through interacting with individuals and social systems in the US may also produce suboptimal health outcomes if these interactions are negative in nature. This includes discrimination, which has been linked to a variety of poor health outcomes (Chithambo et al., 2014; Cobb et al., 2017; Kessler et al., 1999; Pascoe & Smart Richman, 2009). Sadly, discrimination is not uncommon among Latinos living in the US (American Psychological Association, 2012; Driscoll & Torres, 2013). Other stressors are also common, such as fears regarding the legal system and deportation (Arbona et al., 2010; Cobb et al., 2017; Pérez & Fortuna, 2005) or, in the case of first generation immigrants, being separated from support systems in one's home country (Arbona et al., 2010). All these experiences are difficult to operationalize and disentangle from one another. Therefore, studies investigating the complex relationships between acculturation and other related experiences such as discrimination, family conflict, and acculturative stress, regardless of outcome, need to take a more nuanced approach that accounts for both the unobserved nature of the constructs of interest as well as the way these constructs interact. One way to accomplish this is through latent variable methods.

5.2.2 Using Latent Variable Methods to Understand Population Heterogeneity

Traditional regression methods assume independence of exposures when estimating their associations with an outcome of interest such as psychiatric disorder. In other words, the effect of family conflict on the odds of having depression is the same regardless of discrimination or social support. While researchers can incorporate interaction effects, allowing the association between conflict and depression to vary by level of discrimination, this is usually limited to one or two in a given study due to the need for parsimony. Further, the ability to detect interaction effects is often lowered depending on sample size. In the presence of complex mechanistic processes that may interact across multiple exposures to produce an outcome of interest, taking a more holistic approach may be advantageous to identify both at-risk and resilient subpopulations.

Applying latent variable methods is one approach to addressing this limitation. Rather than using observable characteristics to separate individuals into groups, person-centered methods such as latent class analysis (LCA) help capture underlying heterogeneity in a given population (Nylund, Asparouhov, & Muthén, 2007; Masyn, 2013; Lanza & Rhoades, 2013). This approach allows for the exploration of unobserved population groups. It seeks to find the smallest number of underlying classes to best characterize covariation in the observed responses. And while it is often viewed as data driven, there is a focus on interpretability so that the latent groups or classes have substantive meaning. This meaning will shed light on possible unobserved interaction between various exposures that naturally cluster together. And although LCA is by nature exploratory, it can be instrumental in generating hypotheses regarding mechanisms in the development of disorder or identifying high-risk populations.

The aims of this study were twofold: 1) explore and characterize unobserved population heterogeneity in a nationally-representative sample of US-residing Latinos according to their acculturative characteristics and other relevant experiences (neighborhood context, family context, and discrimination); and 2) quantify how generational status, subethnicity, and acculturative stress are related to group membership, after adjusting for sociodemographic characteristics.

5.3 Methods

5.3.1 Participants and Procedure

Data for this study are from the National Latino and Asian American Study (NLAAS), which is a nationally-representative, probability-based survey that was conducted between 2001 and 2003 as part of the Collaborative Psychiatric Epidemiology Surveys (CPES; Heeringa et al., 2004; Pennell et al., 2004). The CPES was a National Institute of Mental Health (NIMH)-funded project conducted by the Survey Research Center at the University of Michigan to collect data on the prevalence of psychiatric disorders, associated impairments, and service use patterns in the US. The CPES target population was all civilian, non-institutionalized adults (aged 18 years or older) in the contiguous United States. The NLAAS further narrowed that population to those of Latino or Asian origin and is the first nationally-representative study powered to examine acculturation and psychiatric disorder in these two minority populations by subgroup. A stratified, multi-frame probability sampling strategy, which oversampled Latinos and Asian Americans, was employed to achieve this goal. Specifically, NLAAS Investigators aimed to obtain information on language use and ethnic disparities, support systems, family environment, neighborhood factors, discrimination, and assimilation in order to estimate

how closely mental and behavioral disorders are related to social and cultural factors (Pennell et al., 2004).

These analyses limited the NLAAS sample to 2,541 participants of Latino ethnicity after excluding 13 individuals for whom generational status could not??? be computed. Computer assisted structured interviews were conducted in person at the respondent's home, administered by interviewers trained at UM's Institute for Social Research. Final response rate for the Latino sample was 75.5% (Heeringa et al., 2004). All NLAAS study procedures were approved by the Institutional Review Board (IRB) Committees of Cambridge Health Alliance, the University of Washington, and the University of Michigan (Pennell et al., 2004). Additional details regarding the study sample and procedures can be found elsewhere (Alegría et al., 2004; Heeringa et al., 2004; Pennell et al., 2004). The present study was approved by the IRB Office at the Johns Hopkins Bloomberg School of Public Health (IRB #00008615).

5.3.2 Measures

All non-diagnostic measures have been described in detail elsewhere, including reliability results (Alegría et al., 2004). All questionnaires for the Latino sample were rigorously adapted, translated into Spanish, and back translated to ensure cross-cultural equivalency in four domains: semantic, content, technical and criterion/conceptual validity (Alegría et al., 2004). Individual measures were thoughtfully selected, adapted and/or developed by the NLAAS investigators, with careful attention to language and idiomatic expressions. This current study utilizes ethnic subgroup, generational status and migration information, psychiatric diagnoses, measures of acculturation and related acculturative experiences (language, ethnic identity, discrimination, acculturative stress,

neighborhood context, and family context), and sociodemographic characteristics.

Respondents could complete the interview in the language of their choice, including

switching back and forth between English and Spanish, depending on their comfort level

for each subject matter. All six scales described below can be reviewed in full in

Appendix A.

5.3.2.1 Latent Class Indicators

Factor scores from the 11 latent constructs identified from analyses in Chapter 5

were computed for each participant using the appropriate generational status measurement

invariance (MI) model for that scale. As mentioned above, we chose to calculate factor

scores based on results from MI testing by generational status as opposed to Latino

subethnicity. This is because experiences highly relevant to Latinos living in the US varied

significantly by generational status within the measurement model, showing it was

important to take into account variation at the construct level. Table 5.1 summarizes the

MI models chosen for each scale, using taxonomy developed by Marsh et al. (2009). For

more details on the models and how they were chosen, please see Chapter 4.

Table 5.1. Final Models from Measurement Invariance Testing by Generational Status for Six Scales in the National Latino and Asian American Study

Scale	Factor Name(s)	Final MI Model	Invariant Parameters
Language	Spanish; English	Model 1	None (FMn = 0)
Ethnic Identity	Identity	Model 8p	FL, FVCV, INT(p)
Neighborhood Context	Social Cohesion; Safety	Model 10p	FL, INT(p), FMn
Family Context	Cohesion; Conflict	Model 1	None (FMn = 0)
Discrimination	Observed; Perceived	Model 1	None (FMn = 0)
Acculturative Stress	Interpersonal; Legal	N/A	Configural invariance not obtained

Note. MI=Measurement Invariance; FL=factor loadings; FVCV=factor variance-covariances; INT=item intercepts; Uniq=item uniquenesses; FMn=factor means.

The two acculturative stress factors were not included as latent class indicators due to planned missingness on the acculturative distress scale for US-born participants; including these factor scores as indicators would allow missingness (and thus, nativity) to influence the class structure, which was undesirable. Instead, the interpersonal and legal stress factor scores were used as a covariate to predict class membership, as described in section 5.3.2.2 below. The remaining five scales, which resulted in nine factors, are described below. For all scales, Exploratory Factor Analysis (EFA) was used to determine the factor structure, after which MI testing by four generational status groups was conducted within an Exploratory Structural Equation Modeling (ESEM) framework to determine the final measurement model. Due to software limitations, estimated individual-level factor scores for each scale were output using Mplus (L. K. Muthén & Muthén, 1998-2017).

Language. Two correlated latent factors were derived from the NLAAS Language Proficiency and Language Preference scales: Spanish and English. The six items (three Spanish-language and three English-language) regarding proficiency (Felix-Ortiz et al., 1994) were dichotomized into Poor/Fair and Good/Excellent. Three preference items, collapsed into three categories (Spanish "all/most of the time", Both "equally", and English "all/most of the time"), asked about three areas: speaking with family, speaking with friends, and thinking (Felix-Ortiz et al., 1994). Higher scores on both factors indicated higher use and preference of that language.

Ethnic Identity. Factor analysis of the four items from the Ethnic Identity scale (Guarnaccia et al., 2007) resulted in a single factor. Items assessed respondents' closeness and identification with, shared time with and similarity of feelings and ideas to others in

their own ethnic group. Prior to factor analysis, responses were collapsed into three categories: Low ("not at all" or "not very"), Medium ("somewhat"), and High ("very"). Higher factor scores indicate increased identification with one's own racial/ethnic group.

Neighborhood Context. Two correlated factors underlaid this 7-item scale: Neighborhood Cohesion and Neighborhood Safety. The factors generally reflected the scale's two subscales: The Neighborhood Social Cohesion scale (4 items) and the Neighborhood Safety scale (3 items) (Bearman et al., 1997; National Institute of Mental Health, 1994; Sampson et al., 1997). Item responses were dichotomized into Not true ("not very true" and "not at all true"), and True ("somewhat true" and "very true"). Higher scores on the cohesion factor indicate better cohesiveness among respondents' neighbors. Conversely, higher scores on the safety factor indicate that the respondent perceives his or her neighborhood as being more unsafe.

Family Context. Factor analyses revealed two underlying constructs for? this 15-item measure: Family Cohesion and Family Conflict. Cohesion generally relates to the 7-item Family Pride subscale and the 3-item Family Cohesion (D. Olson, 1989; D. H. Olson, 1986), and higher scores indicate greater feelings of respect, closeness and an increased degree of shared values and beliefs with one's family. Item responses were dichotomized: Agree ("somewhat" or "strongly") and Disagree ("somewhat" or "strongly"). The construct of conflict is mostly defined by the 5-item Family Conflict subscale (Cervantes et al., 1991), which addresses intergenerational and cultural conflict between respondents and their families. Again, items were dichotomized into No ("hardly ever or never") and Yes ("sometimes" or "often"). Higher scores on both factors indicate increased levels of familial cohesion and conflict, respectively.

Discrimination. Two latent discrimination factors were identified after EFA: Observed and Perceived. The former was strongly influenced by the 9-item everyday discrimination scale (Jackson et al., 1995; Williams et al., 1997); the latter by three items adapted from Vega and colleagues (1993). All items on both scales were collapsed into three categories (Everyday discrimination: Never ("never"), Rarely ("a few times a year" or "less than once a year") and Often ("almost every day", "at least once a week", or "a few times a month"); Perceived discrimination: Never, Rarely and Often (from "sometimes" and "often"). Higher factor scores indicate greater discrimination, whether observed in day-to-day-life (e.g., through experiences such as harassment or receiving poorer service) or perceived as being attributable specifically to race or ethnicity.

5.3.2.2 Predictors of Class Membership

Sociodemographics. Characteristics included: age at time of interview, gender, years of education (0-11: "less than high school", 12: "high school", 13-15: "some college", and 16 or more: "college degree"), and marital status (married/cohabitating, divorced/separated/widowed, and never married). Income was not included due to the high amount of missingness and the potential for high correlation with educational attainment.

Subethnicity. Self-reported ancestry or country of origin was collapsed into four major Latino subgroups: Puerto Ricans (n=495), Mexicans (n=868), Cubans (n=577) and All Others (n=614).

Generational Status. Four categories of generational status were created. First generation (arriving in the US at age 12 or older, n=1257), 1.5 generation (arriving when less than age 12, n=365), second generation (US-born with at least one parent foreign-born, n=522) and third generation (US-born with both parents US-born, n=397). The distinction

between the first and 1.5 generations is important from a developmental perspective, as it allows for differences based on age of migration to the US, which has been linked to increased prevalence of psychiatric disorder (Alegría et al., 2007; Vega et al., 2004).

Acculturative Stress. Acculturative stress was assessed in the foreign-born population only using a nine-item scale (Vega et al., 1998a), from which two latent factors were derived using EFA. Higher levels on the first ("Interpersonal") relates to greater feelings of stress both in leaving friends and family members behind as well as difficulties interacting with others in the US. Higher scores on the second factor ("Legal") indicate increased stress regarding immigration officials and deportation.

5.3.3 Statistical Analysis

Latent Class Analysis (LCA; Goodman, 1974; Lazarsfeld & Henry, 1968) with an expectation-maximum algorithm was used to classify individuals into similar subpopulations (Masyn, 2013; Nylund et al., 2007). These subpopulations or "classes" help explain observed covariation between observed indicator variables, allowing for the estimation of class prevalence in the population. Latent class membership is assumed to explain any differences in response patterns among the observed indicators, which in this case were comprised of nine factor scores across five domains: language use, ethnic identity, neighborhood context, family context, and discrimination. Factor scores within the same domain (e.g., neighborhood social cohesion and conflict) were allowed to correlate with one another in the measurement model.

Class enumeration occurred in the overall sample and was guided by fit indices and considerations of parsimony and interpretability. Models were compared using several fit indices: Log-likelihood, Akaike's Information Criteria (AIC; Akaike, 1987), Bayesian

Information Criteria (BIC; Schwarz, 1978), and the Lo-Mendell-Rubin (LMR) likelihood ratio test (Lo, Mendell, & Rubin, 2001). The bootstrapped likelihood ratio test (BLRT; McLachlan & Peel, 2000) was not used as it did not converge for all class solutions. Model entropy was also examined. Of equal importance is the substantive interpretation of the classes, i.e. evaluating the meaningfulness of each class in terms of factor score distributions. There is general agreement that BIC outperforms the other information criteria (Collins, Fidler, Wugalter, & Long, 1993; Hagenaars & McCutcheon, 2002; Magidson & Vermunt 2004), and simulation studies suggest that the adjusted BIC (Sclove, 1987) is even better. The final class model was chosen based on optimal fit indices and the substantive interpretation of the classes in accordance with general guidelines laid out by Nylund and colleagues (2007). Once the number of classes was determined, participants were categorized according to their assigned most probable class membership. Classes were described according to sociodemograhpics, subethnic and generational group composition, and distribution of factor scores.

The relationship between individual covariates and class membership was investigated by extending the unconditional latent class model to include class predictors. These predictors (generational status, subethnicity, age, sex, education, and marital status) were each included in the model separately using Vermunt's 3-step approach (2010), which is a modification of the BCH method and incorporates uncertainty regarding class membership (Asparouhov & Muthén, 2014a). In this approach, Step 1 involves class enumeration of the unconditional latent class model (i.e., without any covariates), as undertaken above. During Step 2, individuals are assigned most likely class membership according to their posterior probabilities via modal classification, while also estimating

classification error in these class assignments. Finally, Step 3 estimates the association between predictor variables and class membership using the modal class assignment and classification error estimations from Step 2.

This 3-step approach has the distinct advantages of 1) incorporating covariates into the model, either as potential confounders or predictors of interest, without altering the predetermined measurement model, and 2) correctly incorporating uncertainty (measurement error) regarding class membership when estimating regression parameters (Vermunt, 2010). It is preferred over the less complicated "1-step" approach (Clogg, 1981; Goodman, 1974; Hagenaars, 1993) which simultaneously estimates the latent class measurement model and the structural model with predictors of interest. This simpler technique has the disadvantage of distorting the class enumeration process if the model with covariates is misspecified (RW.ERROR - Unable to find reference:57931; Vermunt, 2010). Instead, 3-step procedures separate the classification model from the prediction model, allowing for better performance of the class enumeration process.

These analyses used the R3STEP auxiliary command in Mplus, which is recommended as the best way to model predictors of class membership (Asparouhov & Muthén, 2014a) and has the advantage of being automated in Mplus rather than having to execute each step manually. After the final class model was chosen, each predictor was entered separately into the model, followed by a final structural model in which all predictors were included. See Figure 5.1 for a visual representation of this model. Finally, both acculturative stress factor scores were entered into the full model. Due to listwise deletion, these model results only include the subset of foreign-born individuals for whom the acculturative stress scale was assessed.

Figure 5.1. Path Diagram of Final 4-Class Latent Model with Predictors of Latent Class Membership
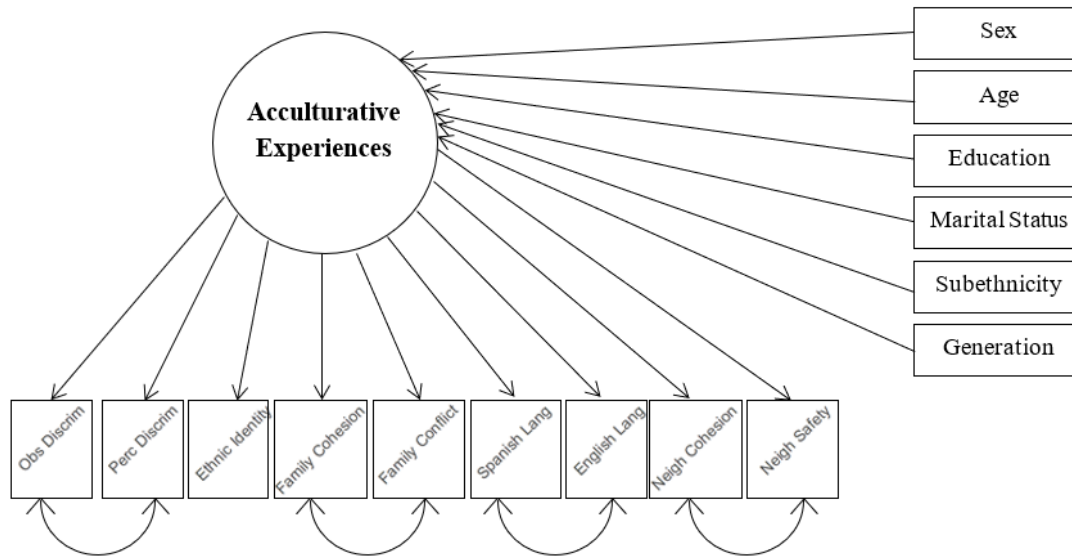
Note. Model A. Obs=Observed; Perc=Perceived; Lang=Language; Neigh=Neighborhood.
Data are from the National Latino and Asian American Study (n=2,541).

We also entered all covariates into the model as predictors of class membership in using the "1-step approach" to evaluate the stability of class structure. Because this traditional approach allows predictors to influence class membership, comparison of the two approaches enables assessment on whether classification is influenced by covariates.

All statistical analyses were conducted in Mplus Version 8 (L. K. Muthén & Muthén, 1998-2017), with data management and graphics conducted via using SAS® software, version 9.4 of the SAS System for Windows and RStudio (RStudio Team, 2015), and in particular the Mplus Automation R package (Hallquist & Wiley, 2018). Statistical weighting was not incorporated as inferences were not being made from the NLAAS sample to the larger US Latino population. Statistical significance of results was assessed at the 0.05 level.

5.4 Results

Results from the class enumeration process for the unconditional latent class model are presented in Table 5.2. One- to six-class solutions were explored. The log likelihood value was not replicated for the 6-class model; therefore, only solutions containing one to five classes were considered. The log likelihood, Akaike, Bayesian, and sample size adjusted Bayesian Information Criteria (LL, AIC, BIC, and aBIC, respectively) decreased with each additional class added to the measurement model. The Lo-Mendel-Rubin likelihood ratio test became non-significant when comparing four and five classes, indicating that the addition of a fifth class did not significantly improve fit. A scree plot of the AIC, BIC and aBIC was plotted to visually examine how each additional class impacted the information criteria, which supported a 4-class solution. Graphs of estimated factor means (the latent class indicators) by predicted class assignment were also inspected to ensure interpretability of each solution (not shown for all class solutions). Based on all statistical and substantive results, a 4-class solution was chosen as best fitting the data. The smallest class size for this model was acceptable (n=137, 5.4%). High entropy (0.966) confirmed that most probable class assignment was good (i.e., separation between classes is large).

Figure 5.2 graphically displays the estimated factor means by class for the 4-class solution. The largest class, those with generally Positive Experiences, are represented in green (n=1743, 68.6%). Members of the Positive Experiences class were estimated to have the lowest levels of discrimination and family conflict, the highest levels of ethnic identity and neighborhood cohesion, and felt like their neighborhoods were the safest. They also had average levels of family cohesion, English Language use and preference, and high levels of Spanish use and preference. The next largest class (16.7% of the sample, n=424)

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Table 5.2. Fit Indices for Latent 1- to 6-Class Models with Correlated Factors Within Scales

Classes	Free Parameters	Log Likelihood	AIC	BIC	aBIC	Statistic	p-value	Entropy	n	%	Error Message
			Information Criteria			LMR Likelihood Ratio Test		Entropy	Smallest Class Size		Error Message
1	22	-23992.78	48029.55	48158.04	48088.14	NA	NA	NA	2541	100.0	No
2	32	-23120.57	46305.14	46492.03	46390.36	1722.444	0.000	0.957	414	16.3	No
3	42	-22815.68	45715.35	45960.65	45827.2	602.106	0.010	0.88	366	14.4	No
4	52	-22318.6	44741.19	45044.89	44879.67	954.583	0.038	0.966	137	5.4	No
5	62	-21996.88	44117.75	44479.85	44282.86	635.336	0.117	0.954	102	4.0	No
6	72	-21754.6	43653.2	44073.71	43844.94	478.445	0.003	0.963	26	1.0	Yes

Note. AIC = Akaike Information Criteria; BIC = Bayesian Information Criteria; aBIC = sample size adjusted Bayesian Information Criteria; LMR = Lo-Mendel-Rubin

had similar levels of Spanish and English use to the largest class and also had average levels of family cohesion. However, they were characterized by medium levels of ethnic identity, lower neighborhood safety, and high perceived and observed discrimination. Although they had average family cohesion, they had extremely high levels of family conflict. Thus, we called them the "Cohesive-Conflict" class, as their family dynamics

Figure 5.2. Estimated Class-Specific Factor Means for a 4-Class Solution of Latent Acculturative Experiences in the National Latino and Asian American Study
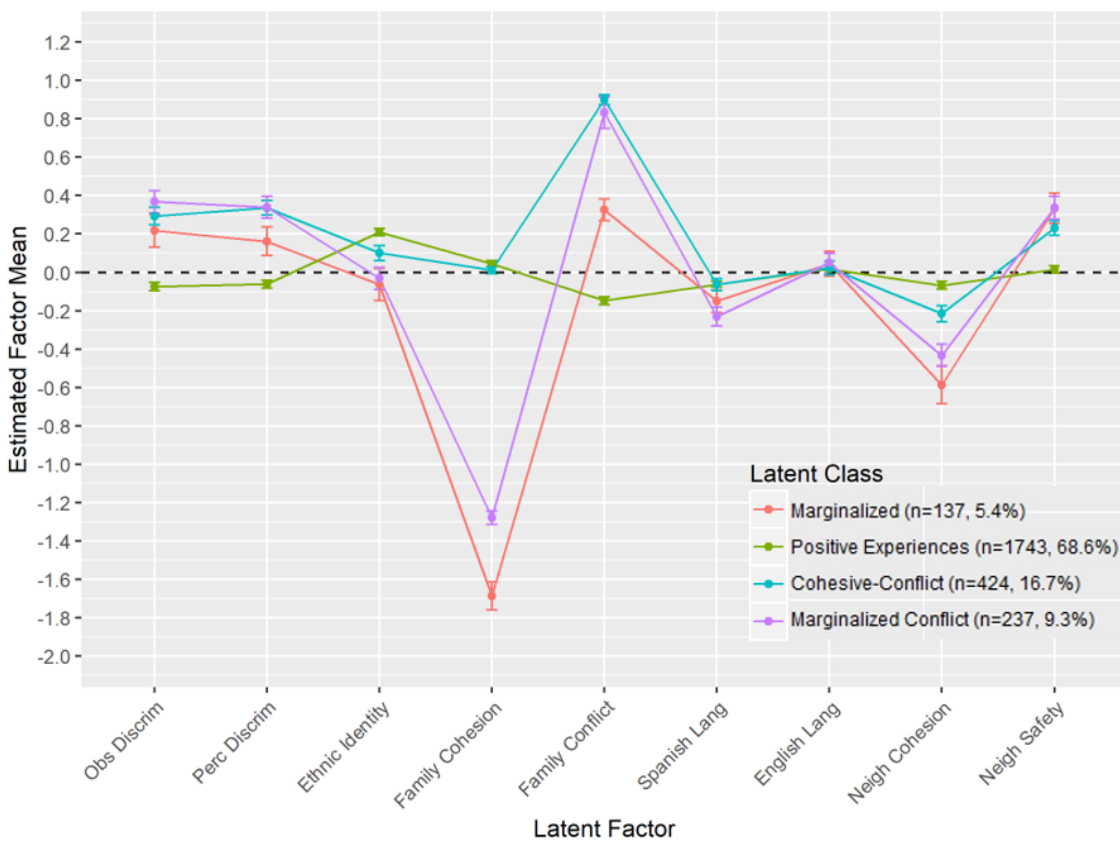
Note. Obs=Observed; Discrim=Discrimination; Perc=Perceived; Lang=Language; Neigh=Neighborhood.
Error bars indicate standard error of estimates.
Data are from the National Latino and Asian American Study (n=2541).

were distinct from the other conflict-laden classes. The "Marginalized Conflict" class (n=237, 9.3%) and "Marginalized" class (n=137, 5.4%) were both defined by low levels of family and neighborhood cohesion, low Spanish, and lower ethnic identity than the prior

classes. They also felt their neighborhoods were the least safe. However, they were differentiated by level of discrimination and family conflict (both higher in the Marginalized Conflict). The Marginalized Conflict class experienced equivalent levels of conflict to the Cohesive-Conflict class, hence the distinction between "Marginalized" and "Marginalized Conflict".

Sample demographics and observed factor score distributions are presented in Table 5.3, overall and by most probable class membership. Of the 2,541 Latino participants, the majority were female (55.8%), married or cohabitating (62.6%). A large proportion did not complete high school (38.7%). The largest ethnic subgroup was Mexican (33.9%), followed by other Latinos (24.1%), Cubans (22.7%), and Puerto Ricans (19.3%). About half of the sample were first generation immigrants who arrived at age 13 or later, and the average age at the time of interview was 40.6 years. As expected, all factor means were not significantly different than zero. All classes were similar in gender distribution. Broadly, the Positive Experiences class were slightly older, contained the most adolescent and adult immigrants (52.2%) and Cubans (24.4%), and were more likely to be married or cohabitating (66.0%). Both marginalized classes had the highest percentages of Puerto Ricans (approximately 29%) and fewest Cubans. They were also the youngest at the time of interview (approximately 36 years of age) and more likely to be single (30.0-33.6%). The Marginalized class had the lowest level of education (46.0% without a high school degree) and the Marginalized Conflict the highest (67.1% with a high school degree or higher), although the non-marginalized classes had the most members with at least a college degree (approximately 14.5%). Second generation Latinos were more likely to be in the Marginalized Conflict class, and the 1.5 generation in the Cohesive-Conflict class.

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Table 5.3. Characteristics of sample, overall and by latent class membership in the National Latino and Asian American Study (n=2541)

	Overall Sample 2541 (100%)		Positive Experiences 1743 (68.6%)		Cohesive-Conflict 424 (16.7%)		Marginalized Conflict 237 (9.3%)		Marginalized 137 (5.4%)	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Gender										
Male	1123	44.2	787	45.2	180	42.5	98	41.4	58	42.3
Female	1418	55.8	956	54.8	244	57.5	139	58.6	79	57.7
Education										
Less than high school	984	38.7	688	39.5	155	36.6	78	32.9	63	46.0
High school	632	24.9	416	23.9	114	26.9	63	26.6	39	28.5
Any post-secondary	565	22.2	382	21.9	95	22.4	67	28.3	21	15.3
College degree or more	360	14.2	257	14.7	60	14.2	29	12.2	14	10.2
Marital Status										
Married/cohabitating	1591	62.6	1151	66.0	265	62.5	105	44.3	70	51.1
Divorced/Widowed	477	18.8	314	18.0	81	19.1	61	25.7	21	15.3
Never Married	473	18.6	278	15.9	78	18.4	71	30.0	46	33.6
Subethnicity										
Puerto Rican	490	19.3	310	17.8	71	16.7	70	29.5	39	28.5
Cuban	576	22.7	426	24.4	93	21.9	42	17.7	15	10.9
Mexican	862	33.9	591	33.9	149	35.1	77	32.5	45	32.8
Other Latino	613	24.1	416	23.9	111	26.2	48	20.3	38	27.7
Generational Status										
1st Generation	1257	49.5	910	52.2	208	49.1	77	32.5	62	45.3
1.5 Generation	365	14.4	228	13.1	78	18.4	37	15.6	22	16.1
2nd Generation	522	20.5	361	20.7	64	15.1	72	30.4	25	18.2
3rd Generation	397	15.6	244	14.0	74	17.5	51	21.5	28	20.4
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Age at interview, in yrs	40.61	15.63	41.52	15.77	39.82	14.86	37.64	15.44	36.57	15.2
Factor Scores										
Spanish Language	-0.08	0.63	-0.06	0.62	-0.06	0.62	-0.22	0.66	-0.15	0.65
English Language	0.02	0.69	0.02	0.68	0.02	0.70	0.06	0.71	0.03	0.70
Ethnic Identity	0.15	0.79	0.21	0.78	0.10	0.78	-0.03	0.81	-0.06	0.84
Observed Discrim	0.05	0.86	-0.08	0.83	0.30	0.89	0.37	0.85	0.22	0.82
Perceived Discrim	0.06	0.79	-0.06	0.76	0.34	0.76	0.34	0.77	0.17	0.84
Family Cohesion	-0.18	0.63	0.04	0.34	0.01	0.36	-1.28	0.39	-1.69	0.47
Family Conflict	0.15	0.69	-0.15	0.51	0.91	0.49	0.83	0.63	0.33	0.58
Neighborhood Cohesion	-0.16	0.83	-0.07	0.80	-0.22	0.85	-0.44	0.85	-0.58	0.94
Neighborhood Safety	0.10	0.72	0.01	0.69	0.24	0.74	0.34	0.76	0.33	0.72
Interpersonal Stress*	0.07	0.71	0.00	0.70	0.22	0.72	0.17	0.62	0.26	0.77
Legal Stress*	0.13	0.65	0.07	0.62	0.30	0.71	0.17	0.63	0.34	0.72

Note. SD=Standard Deviation; Discrim=Discrimination.
*Acculturative stress only assessed on foreign-born participants (n=1617)

The estimated class-specific factor score distributions were similar to the observed (Figure 5.2). The two marginalized classes had lower levels of Spanish language preference and proficiency (range: -0.15- -0.22) and family and neighborhood cohesion, higher levels of family conflict and felt that their neighborhoods were much less safe (approximate mean=0.33). The class defined by positive experiences had the highest levels of ethnic identity (mean=0.21) and lowest levels of discrimination (approximately zero for both factors). There were no differences in English language across all classes. Interpersonal and legal stress, only assessed on the foreign-born population, were highest in the Marginalized class (means=0.26 and 0.34, respectively) and lowest in the class with positive experiences (both means approximately zero). The Marginalized Conflict class had medium levels of stress (both means=0.17).

Table 5.4 displays results from two structural models in which covariates predicted class membership. Model A included all sociodemographics (age, gender, education, marital status), as well as subethnicity and generational status. Model B further added the two acculturative stress factor scores (interpersonal and legal), which limited the sample to foreign-born participants (n=1617). The reference class for all models was the Positive Experiences class. In the sociodemographic model (Model A), only being in the 1.5 or second generation was significantly related to belonging to the Cohesive-Conflict class, although the associations were of opposite direction. Those arriving in the US as children had 40 percent increased odds of having the family dynamic that incorporated both cohesion and conflict (OR=1.41, 95% CI: 1.02-1.94), whereas US-born Latinos with at least one foreign-born parent were less likely to belong to that group (OR=0.69, 95% CI: 0.48-0.99). Having a higher level of education was inversely related to belonging to the

Table 5.4. Log Odds Coefficients and Odds Ratio for Predictors of Class Membership in Four-Class Model, Using Positive Experiences Class as the Comparison Group

Model A (n=2541)	Cohesive-Conflict n=424 (16.7%)				Marginalized Conflict n=237 (9.3%)				Marginalized n=137 (5.4%)			
	Coef	S.E.	p	OR (95% CI)	Coef	S.E.	p	OR (95% CI)	Coef	S.E.	p	OR (95% CI)
Sex												
Male	REF	--	--	--	REF				REF	--	--	--
Female	0.099	0.115	0.390	1.10 (0.88-1.38)	0.083	0.155	0.590	1.09 (0.80-1.47)	0.115	0.194	0.554	1.12 (0.77-1.64)
Age	-0.006	0.004	0.158	0.99 (0.99-1.00)	**-0.012**	**0.006**	**0.041**	**0.99 (0.98-1.00)**	-0.014	0.009	0.092	0.99 (0.97-1.00)
Education												
Less than high school	REF	--	--	--	REF	--	--	--	REF	--	--	--
High school	0.171	0.151	0.257	1.19 (0.88-1.60)	0.107	0.201	0.594	1.11 (0.75-1.65)	-0.096	0.232	0.679	0.91 (0.58-1.43)
Any post-secondary	0.076	0.161	0.635	1.08 (0.79-1.48)	0.232	0.201	0.248	1.26 (0.85-1.87)	**-0.706**	**0.294**	**0.016**	**0.49 (0.28-0.88)**
College degree or more	0.044	0.185	0.813	1.04 (0.73-1.50)	-0.052	0.265	0.844	0.95 (0.56-1.60)	-0.460	0.331	0.165	0.63 (0.33-1.21)
Marital Status												
Married	REF	--	--	--	REF	--	--	--	REF	--	--	--
Divorced	0.209	0.156	0.180	1.23 (0.91-1.67)	**0.929**	**0.196**	**0.000**	**2.53 (1.72-3.72)**	0.175	0.293	0.550	1.19 (0.67-2.12)
Never Married	0.164	0.165	0.318	1.18 (0.85-1.63)	**0.775**	**0.198**	**0.000**	**2.17 (1.47-3.20)**	**0.849**	**0.238**	**0.000**	**2.34 (1.47-3.73)**
Subethnicity												
Puerto Rican	REF	--	--	--	REF	--	--	--	REF	--	--	--
Cuban	-0.021	0.189	0.911	0.98 (0.68-1.42)	-0.45	0.251	0.073	0.64(0.39-1.04)	**-1.159**	**0.368**	**0.002**	**0.31 (0.15-0.65)**
Mexican	0.097	0.174	0.578	1.10 (0.78-1.55)	-0.379	0.197	0.054	0.68 (0.47-1.01)	**-0.609**	**0.259**	**0.019**	**0.54 (0.33-0.90)**
Other Latino	0.109	0.181	0.546	1.12 (0.78-1.59)	**-0.575**	**0.225**	**0.011**	**0.56 (0.36-0.87)**	-0.376	0.268	0.161	0.69 (0.41-1.16)
Generation												
1st Generation	REF	--	--	--	REF	--	--	--	REF	--	--	--
1.5 Generation	**0.341**	**0.165**	**0.039**	**1.41 (1.02-1.94)**	0.441	0.238	0.064	1.55 (0.97-2.48)	0.110	0.297	0.712	1.12 (0.62-2.00)
2nd Generation	**-0.368**	**0.182**	**0.044**	**0.69 (0.48-0.99)**	**0.510**	**0.208**	**0.014**	**1.67 (1.11-2.50)**	-0.410	0.288	0.153	0.66 (0.38-1.17)
3rd Generation	0.187	0.175	0.285	1.21 (0.86-1.70)	**0.646**	**0.226**	**0.004**	**1.91 (1.23-2.97)**	0.126	0.270	0.641	1.13 (0.67-1.93)
Model B (n=1617)	Cohesive-Conflict n=286 (17.7%)				Marginalized Conflict n=114 (7.1%)				Marginalized n=84 (5.2%)			
	Coef	S.E.	p	OR (95% CI)	Coef	S.E.	p	OR (95% CI)	Coef	S.E.	p	OR (95% CI)
Acculturative Stress												
Interpersonal Stress	0.204	0.129	0.116	1.23 (0.95-1.58)	0.306	0.206	0.137	1.36 (0.91-2.03)	0.175	0.226	0.439	1.19 (0.76-1.86)
Legal Stress	**0.419**	**0.144**	**0.004**	**1.52 (1.15-2.02)**	0.100	0.251	0.691	1.11 (0.68-1.81)	**0.467**	**0.236**	**0.047**	**1.60 (1.00-2.53)**

Note. Coef=Coefficient; S.E. = Standard Error; OR = Odds Ratio; CI = Confidence Interval. Estimates in bold indicate p<0.05.
Model B includes all covariates in Model A as well as Acculturative Stress factor scores.

Marginalized class (any post-secondary OR=0.49, 95% CI: 0.28-0.88). Not being a first-generation Latinos increased the odds of belonging to the Marginalized Conflict class (range OR: 1.55-1.91), but generational status was unrelated to low-conflict marginalization. As compared to Puerto Ricans, Cubans and Mexicans were much less likely to belong to the Marginalized class (OR=0.31, 95% CI: 0.15-0.65 and OR=0.54, 95% CI: 0.33-0.90, respectively), whereas other Latinos had 54% reduced odds of being marginalized with high conflict (OR=0.56, 95% CI: 0.36-0.87). Gender was marginally related to only the Marginalized Conflict class. When adding in acculturative stress (Model B), levels of interpersonal stress did not predict class membership. However, after adjusting for all other variables, legal stress significantly increased the odds of belonging in the Cohesive-Conflict and Marginalized classes by over 50 percent (OR=1.52, 95% CI: 1.15-2.02 and OR=1.60, 95% CI: 1.00-2.53, respectively). Legal stress was unrelated to marginalization with high conflict as compared to having positive experiences.

Using the 1-step approach to incorporate all predictors of class membership in the latent class model did not significantly change class sizes or membership (data not shown). This provides evidence of good class enumeration.

5.5 Discussion

Four subgroups of acculturative experiences in Latinos were found in the National Latino and Asian American Study. While this four-class structure aligns in number with the groupings proposed by bi-dimensional acculturation researchers such as Berry and colleagues (2003), the substantive natures of these classes are somewhat different. In Berry's model of four acculturative strategies (assimilation, integration, marginalization and separation), enculturation (relation to one's country of origin) and acculturation

(acceptance of the culture of one's host country) are measured on independent domains. Traditionally, ethnic identity and English language use have been used as proxy measures of enculturation and acculturation, respectively (Guarnaccia et al., 2007). Spanish language use is also sometimes used to measure enculturation (Guarnaccia et al., 2007). However, given that the four latent classes identified in our sample had nearly identical levels of English as measured by a more nuanced latent construct (see Figure 5.2), acculturation, at least as measured by language use and proficiency, may not be the most relevant construct to identify meaningful Latino subgroups. Levels of ethnic identity were more meaningful. Latinos identifying more strongly with their country of origin or ancestry also tended to have higher cohesion and lower conflict and discrimination. This subgroup of Latinos characterized by Positive Experiences may most closely align with Berry's "integrated" or bicultural group, who are theorized to embrace the culture of both one's home country and that of the new one. However, given that English language does not distinguish our four classes from one another, it is hard to determine whether this group could also belong to Berry's "separated" group, who maintain their original cultural identity while rejecting involvement in the host culture. These findings underscore the need for a more flexible model of acculturation in future studies.

The most salient characteristics to characterize Latino subpopulations in our sample were external: interpersonal and environmental. Even after allowing family factors to be correlated and neighborhood factors to be correlated in our measurement model, there was still variability at the population level. Interestingly, a class emerged that reported good family cohesion but also very high conflict. The construct of family cohesion was most strongly defined by items involving family pride, expressing feelings and feeling close to

one another, and enjoying spending free time together. Conflict within the family involved intergenerational dissonance, especially regarding the alignment of one's personal goals with the family as a whole. This tension between receiving emotional closeness and social support from one's family while also feeling at odds with them due to acculturative differences may represent a meaningful distinction from those families which let intercultural dissonance drive them apart. Belonging to this class of Latinos with a seemingly paradoxical family context was only significantly predicted by generational status and legal stress. It may be that undocumented immigrants are more likely to belong to this class, given that fear of immigration officials and deportation is highly correlated with documentation status (Arbona et al., 2010; Caplan, 2007; Pérez & Fortuna, 2005). This stress, unique from discrimination and separation from one's home country, may be what drives the family conflict while leaving social and emotional bonds intact.

The two marginalized classes may align with Berry's "marginalized" group (2003), which he proposed identifies with neither one's home nor host country's culture. Yet, within this group there still appear to be meaningful differences. The marginalized conflict group tends to have higher interpersonal conflict (as seen through high discrimination and family conflict) but slightly more cohesion (family and social) than the low-conflict marginalized group. While discrimination, family context, and neighborhood cohesion and safety do not directly measure enculturation and acculturation, they most likely correlate with them, as evidenced by the separation from the Positive Experiences class.

Our findings support the growing body of research showing that both nativity and age at time of immigration are salient predictors of important health-related exposures in Latinos. These exposures, such as discrimination, family conflict, and neighborhood

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characteristics, varied significantly by class, and were consistently less favorable in our Cohesive-Conflict, Marginalized, and Marginalized Conflict classes. We found that generational status significantly predicted class membership, with immigrants arriving as children and US-born Latinos being much less likely to belong to the group who has more positive experiences. The relationship between class membership and generational status persisted, even though the underlying constructs took into account measurement invariance by generation and the associations were adjusted for sociodemographic characteristics and ancestry. The exception was membership in the Marginalized class, which was predicted instead by education, marital status, and subethnicity. Puerto Ricans were much more likely to belong to this class, characterized by extremely low family and neighborhood cohesion, but also moderate levels of discrimination and family conflict.

5.5.1 Limitations

This study is not without limitations. The NLAAS data is self-report and therefore subject to bias. Although the NLAAS has a large Latino sample size, some subgroups were relatively small, potentially reducing power and contributing to some model non-convergence. Sample size and choice of outcomes also influence type and number of classes (Collins & Lanza, 2010; Dziak, Lanza, & Tan, 2014), although at this time there are no clear recommendations. Our chosen 4-class measurement model had a group of relatively small size, although there are no clear recommendations on the smallest class size cutoffs. The "Other Latino" category still represents a subethnic group with considerable heterogeneity. Further, information regarding the respondent's time since migration was unable to be incorporated into the generational status groupings, potentially

making the subgroups still heterogeneous. There is also no indication of documentation status, which may be an important correlate of class membership.

Due to limitations in the Mplus software, factor scores estimated from Aim 1 analyses were exported and treated as observed indicators in the LCA. This implies that factor scores are observed rather than latent traits estimated from a model, ignoring the inherent uncertainty around these estimations due to their unobserved nature. Although we took into account variation of the latent factors by generational status, we did not explore measurement invariance by generational or subethnic groups. The unobserved population structure of Latinos in our sample may be different by ancestry or generational status, and there may be differential item functioning of how the latent factors relate to classes.

Finally, the NLAAS data is approximately 15 years old. While this is the most recent dataset with the best data on psychiatric disorder, acculturation, and other experiences relevant to Latino immigrant and non-immigrant populations in the US, it may not be generalizable to Latinos' experiences in present data. This is particularly true due to the rapidly-changing immigration policy landscape in the US, along with the strong political discourse on illegal immigration and anti-immigration rhetoric at a national level. Numerous policies have changed the landscape for immigrants to the US, particularly unauthorized immigrants. Some changes have more positively impacted certain subpopulations (such as immigrants who entered the country as children and are therefore eligible for protected status under the Deferred Action for Childhood Arrivals (DACA). This program, enacted in 2012 under the Obama administration, temporarily protects program participants (colloquially known as "Dreamers") from deportation and allows them to study and work legally in the States. However, the majority of policy changes have

most likely contributed to significant levels of stress, even among immigrants with proper documentation. Even DACA has been in limbo under the new presidential administration, causing Dreamers to fear for their livelihoods.

These policies also vary by state. For example, in 2010 Arizona passed SB 1070, arguably the strictest anti-immigration law enacted at the time. This law, which spurred multiple similar bills after its passage, requires police to assess immigration status of any person when there is "reasonable suspicion" of their authorized residence in the US. Policies such as these breed stress and fear even among immigrants with proper documentation. Finally, the recent "zero tolerance" federal policy requires full criminal prosecution of unauthorized immigrants bringing children with them across the border. Under this stricter policy, children and parents are being actively and traumatically separated, often with no guidance on when reunification will occur. This clearly will contribute to negative mental health outcomes among both the parents and children, although there is no research on this yet.

5.5.2 Conclusions

The NLAAS is the largest, nationally-representative sample of US Latinos with rich data on acculturation, ethnic identity, and other contextual factors relevant to this population, allowing the exploration of unobserved population heterogeneity according to level of acculturation and related experiences. The large sample size also enables the investigation of the relationship between these latent subpopulations and often-ignored subgroups such as generational status and subethnicity. Finally, latent class indicators were estimated levels on underlying constructs of interest which accounted for measurement invariance by generational status, rather than observed item responses. Future directions

should include more fully exploring population heterogeneity of Latinos' acculturative experiences in two ways: 1) test for measurement invariance of the latent class structure by generational status and by subethnicity rather than only using these subgroups as predictors of class membership; and 2) use factor scores accounting for subethnic measurement variance as determined in Chapter 5 analyses as a basis for latent class analysis to confirm that the latent subgroups found are similar.

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CHAPTER 6. THE RELATIONSHIP BETWEEN LATINOS' ACCULTURATIVE EXPERIENCES AND MENTAL AND BEHAVIORAL DISORDER IN THE NATIONAL LATINO AND ASIAN AMERICAN STUDY

6.1 Abstract

Mental and behavioral disorders are among the leading contributors to disability among Latinos living in the United States. When treated as a homogeneous group, important disparities in the prevalence of such disorders among Latinos are obscured. In addition to subethnicity and generational status, Latinos may be characterized by acculturative experiences while living in the United States, such as discrimination, neighborhood context and family conflict. Certain subgroups may be more strongly related to psychiatric disorder than others. This study uses data from 2,541 Latino participants in the National Latino and Asian American Study to identify meaningful latent subgroups of acculturative experiences and identify differences by latent class in the proportion of three categories of DSM-IV disorder: depressive, anxiety and substance use. Eighteen percent of the sample ever met criteria for a depressive disorder, 16.9% for an anxiety disorder, and 9.5% for a substance use disorder. Latinos reporting more positive acculturative experiences had the lowest prevalence of all three disorders (14.8%, 13.6%, and 7.1%, respectively). Those whose lives were characterized by high levels of family conflict and discrimination combined with low levels of social cohesion and neighborhood safety had the highest disorder prevalence (34.0%, 26.6%, and 22.5%). Latinos with moderate levels of discrimination and conflict, along with those with high conflict and cohesion were better off as compared to those with high negative experiences and low cohesion. These patterns were consistent regardless of disorder category. These latent subgroups of Latinos may hold important implications for identifying groups at high risk of developing a mental or

behavioral disorder. Findings also point to the potentially protective role of family and neighborhood cohesion in the face of high levels of adversity, which may inform prevention and intervention efforts.

6.2 Introduction

Mental disorders contribute to a high burden of disability worldwide, with depressive, anxiety and substance use disorders being some of the most common contributors (Lopez & Murray, 1998; Murray & Lopez, 1996; World Health Organization (WHO), 2008). Although Latinos in the United States (US) have traditionally seen as having lower prevalence of these disorders, much of the research has treated Latinos as a homogeneous racial/ethnic group, ignoring important differences by ethnicity and nativity (Alegría et al., 2007a). Studies that have taken into account these subgroups have found significant differences in prevalence of mental and behavioral symptomatology across Latino subgroups (Alcántara et al., 2014; Alegría et al., 2007a; Fortuna et al., 2007; Torres et al., 2012; Wassertheil-Smolle et al., 2014). These findings suggest that there may be important distinctions in other constructs known to be associated with disorder, such as discrimination and family cultural conflict disorder (Cobb et al., 2017; Cook et al., 2009; Mulvaney-Day et al., 2007; Rivera et al., 2008; Torres et al., 2012), by these subgroups. Additionally, little attention has been paid to potentially meaningful subgroups within the Latino population that are harder to characterize and unlikely to be directly observed. To our knowledge, no study has looked at the complex processes related to the development of psychiatric disorder in US-residing Latinos from a latent variable perspective.

An unobserved subgroup of interest may be Latinos with distinct types of acculturative experiences while living in the US. Acculturative experiences may be

conceptualized as not just level of acculturation, but also those other experiences or contexts that immigrants or minorities encounter that may be related to acculturation level. These experiences may include discrimination, neighborhood context, and family conflict. Research has shown that acculturation and related experiences are associated with negative mental health outcomes (Alcántara et al., 2014; Blanco et al., 2013; Ortega et al., 2000; Rivera et al., 2008; Valencia-Garcia et al., 2012). Because these acculturative experiences are correlated, it stands to reason that they may cluster in meaningful ways. If this is true, distinct subgroups of Latinos that tend to experience and interact with their world in a certain way may be more likely to develop certain disorders. Further, different subgroups may be differentially related to different types of disorder, making it important to look at more specific mental and behavioral categories rather than any psychiatric disorder as a whole.

The primary objective of this study is to determine whether there are differences in the prevalence of depressive, anxiety and substance use disorders by latent acculturative experience classes of Latinos in the National Latino and Asian American Study after controlling for sociodemographic characteristics. A secondary objective is to estimate the direct association between Latino subethnic and generational groups and the three disorder categories after accounting for acculturative experiences.

6.3 Methods

6.3.1 Participants and Procedure

Data for this study are from the National Latino and Asian American Study (NLAAS), which is a nationally-representative, probability-based survey that was conducted between 2001 and 2003 as part of the Collaborative Psychiatric Epidemiology

Surveys (CPES; Heeringa et al., 2004; Pennell et al., 2004). The NLAAS target population was all civilian, non-institutionalized adults (aged 18 years or older) in the contiguous United States of Latino or Asian origin, making it the first nationally-representative study powered to examine acculturation and psychiatric disorder in these two minority populations by subgroup. The NLAAS questionnaires were specifically designed to obtain information on language use and ethnic disparities, support systems, family environment, neighborhood factors, discrimination, and assimilation in order to estimate how closely mental and behavioral disorders are related to social and cultural factors (Pennell et al., 2004).

These analyses limited the NLAAS sample to those 2,541 participants of Latino ethnicity with known generational status. Final response rate for the Latino sample was 75.5% (Heeringa et al., 2004). All NLAAS study procedures were approved by the Institutional Review Board Committees of Cambridge Health Alliance, the University of Washington, and the University of Michigan (Pennell et al., 2004). Additional details regarding the study sample and procedures can be found elsewhere (Alegría et al., 2004; Heeringa et al., 2004; Pennell et al., 2004). The present study was approved by the IRB Office at the Johns Hopkins Bloomberg School of Public Health (IRB #00008615).

6.3.2 Measures

All measures other than diagnostic measures have been described in detail elsewhere, including adequate reliability results (Alegría et al., 2004). Details regarding questionnaire development, adaptation, and characteristics are presented in prior chapters. The current study utilizes variables related to ethnic subgroup, generational status and migration information, psychiatric diagnoses, measures of acculturation and related

experiences (language, ethnic identity, discrimination, acculturative stress, neighborhood context, and family context), and sociodemographic characteristics. Respondents could complete the interview in the language of their choice, including switching back and forth between English and Spanish, depending on their comfort level for each subject matter. All scales described below can be reviewed in full in Appendix A.

6.3.2.1 Latent Classes of Latinos' Experiences

Four latent classes were derived from the sample based on nine factor score indicators (see Chapter 5): Positive Experiences (n=1,743, 69%), Cohesive-Conflict (n=424, 17%), Marginalized Conflict (n=237, 9%), and Marginalized (n=137, 5%). Classes were most differentiated by family context, neighborhood context, and discrimination.

See Table 5.3 in Chapter 5 for descriptive characteristics of the sample by most probable latent class membership, including factor score means.

6.3.2.2 Distal Outcomes

Mental and behavioral disorders were assessed via a modified version of the World Mental Health Composite International Diagnostic Interview (WMH-CIDI; Kessler, Abelson et al., 2004) to obtain the following Diagnostic and Statistical Manual, Fourth Edition (DSM-IV; American Psychiatric Association, 1994) psychiatric diagnoses: any Depressive Disorder (Major Depressive Disorder/Episode or Dysthymia); any Anxiety Disorder (Post Traumatic Stress Disorder, Generalized Anxiety Disorder, Panic Disorder, Agoraphobia or Social Phobia); and any Substance Use Disorder (Alcohol Abuse/Dependence, Drug Abuse/Dependence). Self-reported age of onset of

disorder was created for each diagnosis category, using the earliest age if criteria for multiple disorders were met.

6.3.2.3 Covariates

Sociodemographics. Characteristics included: age at time of interview, gender, years of education (0-11: "less than high school", 12: "high school", 13-15: "some college", and 16 or more: "college degree"), and marital status (married/cohabitating, divorced/separated/widowed, and never married). Income was not included due to the high amount of missingness and the potential for high correlation with educational attainment.

Subethnicity. Self-reported ancestry or country of origin was collapsed into four major Latino subgroups: Puerto Ricans (n=495), Mexicans (n=868), Cubans (n=577) and All Others (n=614).

Generational Status. Four categories of generational status were created. First generation (arriving in the US at age 12 or older, n=1257), 1.5 generation (arriving when less than age 12, n=365), second generation (US-born with at least one parent foreign-born, n=522) and third generation (US-born with both parents US-born, n=397). The distinction between the first and 1.5 generations is important from a developmental perspective, as it allows for differences based on age of migration to the US, which has been linked to increased prevalence of psychiatric disorder (Alegría et al., 2007; Vega et al., 2004).

6.3.3 Statistical Analysis

The final structural model (latent class model with predictors) as presented in Chapter 5 Model A (see Table 5.4) was used in these analyses with the addition of distal outcomes. Constructs of any depressive disorder, any anxiety disorder, and any substance use disorder were added as distal outcomes of class membership using the BCH method

(Bolck, Croon, & Hagenaars, 2004) laid out by Asparouhov and Muthén (2014b). The BCH approach is similar to the 3-step approach for class predictors as used in Chapter 5 but uses weights to avoid class shifting after the addition of external variables in the structural component. In addition, these weights reflect the uncertainty or measurement error associated with class membership as a latent variable. Simulations have shown that the modified BCH method outperforms other 3-step methods when estimating the association between class membership and a distal outcome, particularly when its variance differs significantly across classes (Asparouhov & Muthén, 2014a; Asparouhov & Muthén, 2014b; Bakk, Tekle, & Vermunt, 2013; Bakk & Vermunt, 2016).

This approach was carried out manually in Mplus Version 8 (L. K. Muthén & Muthén, 1998-2017). First, the unconditional latent 4-class model as described in Chapter 5 was estimated without covariates. From that model, BCH weights were created and saved. Finally, the auxiliary structural model including predictors, outcomes, and direct effects was estimated as a multiple group model using the BCH weights. Here, the groups are the latent classes, treated as "known" to prevent class shifting but using the weights to allow for measurement error.

Carrying out the steps manually allow incorporation of direct effects from each predictor (e.g., sex, subethnicity) on the outcome. We did not formally test whether the inclusion of each path was necessary in our structural model as we believed that the assumption that the associations between covariates, such as sex, and disorder are completely mediated through latent class membership was untenable. We used a Wald test and pairwise comparison z-tests to assess differences in the prevalence of each outcome across the four acculturative experiences classes. The association between the outcome and

each class is controlled for the influence of all the covariates (sex, age, education category, marital status, Latino subethnicity, and generational status) on both latent class membership and the three disorder categories.

Figure 6.1. Path Diagram of Final 4-Class Latent Model with Predictors of Latent Class Membership
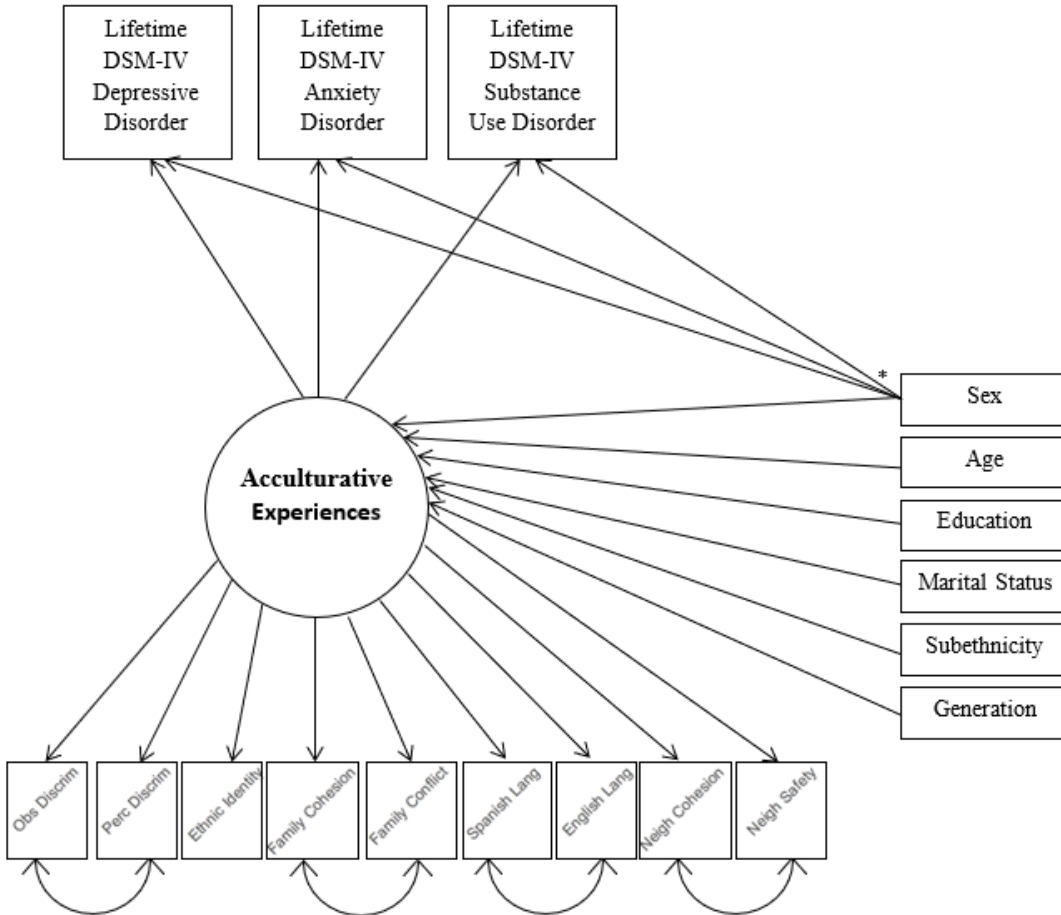
Note. Model A. Obs=Observed; Perc=Perceived; Lang=Language; Neigh=Neighborhood.
Data are from the National Latino and Asian American Study (n=2,541).
*For diagram simplicity, direct effects from all covariates to each disorder category are not displayed.

See Figure 6.1 for a path diagram of the final structural model. In addition to statistical analyses being conducted in Mplus Version 8 (L. K. Muthén & Muthén, 1998-2017), SAS® software, version 9.4 of the SAS System for Windows and RStudio (RStudio Team, 2015), in particular the Mplus Automation R package (Hallquist & Wiley, 2018), were utilized for data management and graphics. Statistical weighting was not incorporated

as inferences were not being made from the NLAAS sample to the larger US Latino population. Survey significance of results was assessed at the 0.05 level.

6.4 Results

The analytic sample was comprised of 490 (19.3%) Puerto Ricans, 576 (22.7%) Cubans, 862 (33.9%) Mexicans and 613 (24.1%) from other Latino countries (Table 6.1). Participants were approximately 40 years of age, mostly female (55.8%), married or cohabitating (62.6%), and about half comprised first generation immigrants arriving at age 13 or older (49.5%). A large majority did not complete high school (38.7%). Eighteen percent (n=460) of the total sample had ever met criteria for a DSM-IV depressive disorder, with an average age of first onset of 26.5 years of age (sd=15.5). Fewer participants ever met criteria for an anxiety disorder (n=429, 16.9%) or a substance use disorder (n=241, 9.5%) in their lifetime. Average age of onset was younger for both anxiety and substance use disorders as well (18.7 years, sd=13.8; 21.9 years, sd=7.8, respectively). Almost one third of participants met criteria for any lifetime disorder (n=779). Among those ever meeting disorder criteria, 471 (18.5%) individuals only met criteria for one disorder, whereas 265 (10.4%) met criteria for two and 43 (1.7%) for all three (data not shown).

Participants ever meeting criteria for a depressive disorder were more likely to be female and had received less education than the sample as a whole. They were also more likely to be divorced (27.6%). Fifty percent had ever met criteria for an anxiety disorder, and almost one fifth (18.7%) ever met criteria for a substance use disorder. Those ever meeting criteria for an anxiety disorder were similar in sociodemographics to individuals with a depressive disorder. Over half had ever met criteria for a depressive disorder (53.6%) and 18.2% met criteria for a substance use disorder.

Table 6.1. Sociodemographic Characteristics and Lifetime DSM-IV Disorder Prevalence in Overall Sample and by Disorder Category

	Overall Sample 2541 (100%)		Depressive Disorder 460 (18.1%)		Anxiety Disorder 424 (16.7%)		Substance Use Disorder 237 (9.3%)	
Age in years, *mean (sd)*	40.61	15.63	41.62	15.76	41.82	14.53	38.74	12.94
Gender, *N (%)*								
Male	1123	44.2	148	32.2	139	32.4	179	74.3
Female	1418	55.8	312	67.8	290	67.6	62	25.7
Education, *N (%)*								
Less than high school	984	38.7	200	43.5	178	41.5	85	35.3
High school	632	24.9	104	22.6	106	24.7	70	29.0
Any post-secondary	565	22.2	101	22.0	100	23.3	63	26.1
College degree or more	360	14.2	55	12.0	45	10.5	23	9.5
Marital Status, *N (%)*								
Married	1591	62.6	252	54.8	253	59.0	146	60.6
Divorced	477	18.8	127	27.6	97	22.6	41	17.0
Never Married	473	18.6	81	17.6	79	18.4	54	22.4
Subethnicity, *N (%)*								
Puerto Rican	490	19.3	113	24.6	101	23.5	63	26.1
Cuban	576	22.7	109	23.7	97	22.6	34	14.1
Mexican	862	33.9	137	29.8	130	30.3	95	39.4
Other Latino	613	24.1	101	22.0	101	23.5	49	20.3
Generational Status, *N (%)*								
1st Generation	1257	49.5	212	46.1	199	46.4	60	24.9
1.5 Generation	365	14.4	68	14.8	66	15.4	26	10.8
2nd Generation	522	20.5	92	20.0	88	20.5	78	32.4
3rd Generation	397	15.6	88	19.1	76	17.7	77	32.0
Any Depressive Disorder								
No, *N (%)*	2081	81.9	--	--	199	46.4	155	64.3
Yes, *N (%)*	460	18.1	--	--	230	53.6	86	35.7
Age of Onset, *mean (sd)*	26.49	15.46	--	--	25.9	14.46	21.94	12.01
Any Anxiety Disorder								
No, *N (%)*	2112	83.1	230	50.0	--	--	163	67.6
Yes, *N (%)*	429	16.9	230	50.0	--	--	78	32.4
Age of Onset, *mean (sd)*	18.69	13.82	19.25	14.36	--	--	14.09	8.73
Any Substance Use Disorder								
No, *N (%)*	2300	90.5	374	81.3	351	81.8	--	--
Yes, *N (%)*	241	9.5	86	18.7	78	18.2	--	--
Age of Onset, *mean (sd)*	21.85	7.84	21.74	6.95	21.19	6.98	--	--
Any Disorder, *N (%)*								
No	1762	69.3	--	--	--	--	--	--
Yes	779	30.7	--	--	--	--	--	--

Note: DSM=Diagnostic and Statistical Manual; sd=standard deviation.

Individuals with a substance use disorder tended to be slightly younger (38.7 years, sd=12.9), were overwhelmingly male (74.3%), and more likely to have never married (22.4%) than those with an anxiety or depressive disorder. A larger proportion of these individuals were Mexican (39.4%) and they were much more likely to be born in the US (64.4%). Approximately one third (35.7%) had ever met criteria for a depressive disorder and one third met criteria for an anxiety disorder at some point in time in their life (these categories are not mutually exclusive).

Table 6.2 displays the direct effects of all model covariates on each disorder category. After adjusting for class membership, Females were almost 80 percent more likely to have a depressive or anxiety disorder and 80 percent less likely to have a substance use disorder. Persons with a college degree or more were approximately 40 percent less likely to have a disorder regardless of type. Divorcees were 1.56 times more likely to meet criteria for a depressive disorder at some time in their lives (95% CI: 1.20-2.03).

Cubans and Puerto Ricans had similar odds of disorder for all categories. Mexicans and other Latinos were at least one third less likely to have a depressive disorder (OR=0.66, 95% CI: 0.49-0.89; OR=0.71, 95% CI: 0.52-0.97, respectively) than other subethnicities. Mexicans were also less likely to ever meet criteria for an anxiety disorder (OR=0.72, 95% CI: 0.53-0.98). There were no differences in the odds of lifetime substance use disorder by Latino subethnicity after accounting for acculturative experiences and other sociodemographic characteristics. Only third generation Latinos had an increased odds of a depressive disorder (OR=1.47, 95% CI: 1.08-2.01). Latinos born in the US had over three or four times the odds of ever meeting substance use disorder criteria, and those arriving as children were approximately 50% more likely to meet SUD criteria than those arriving
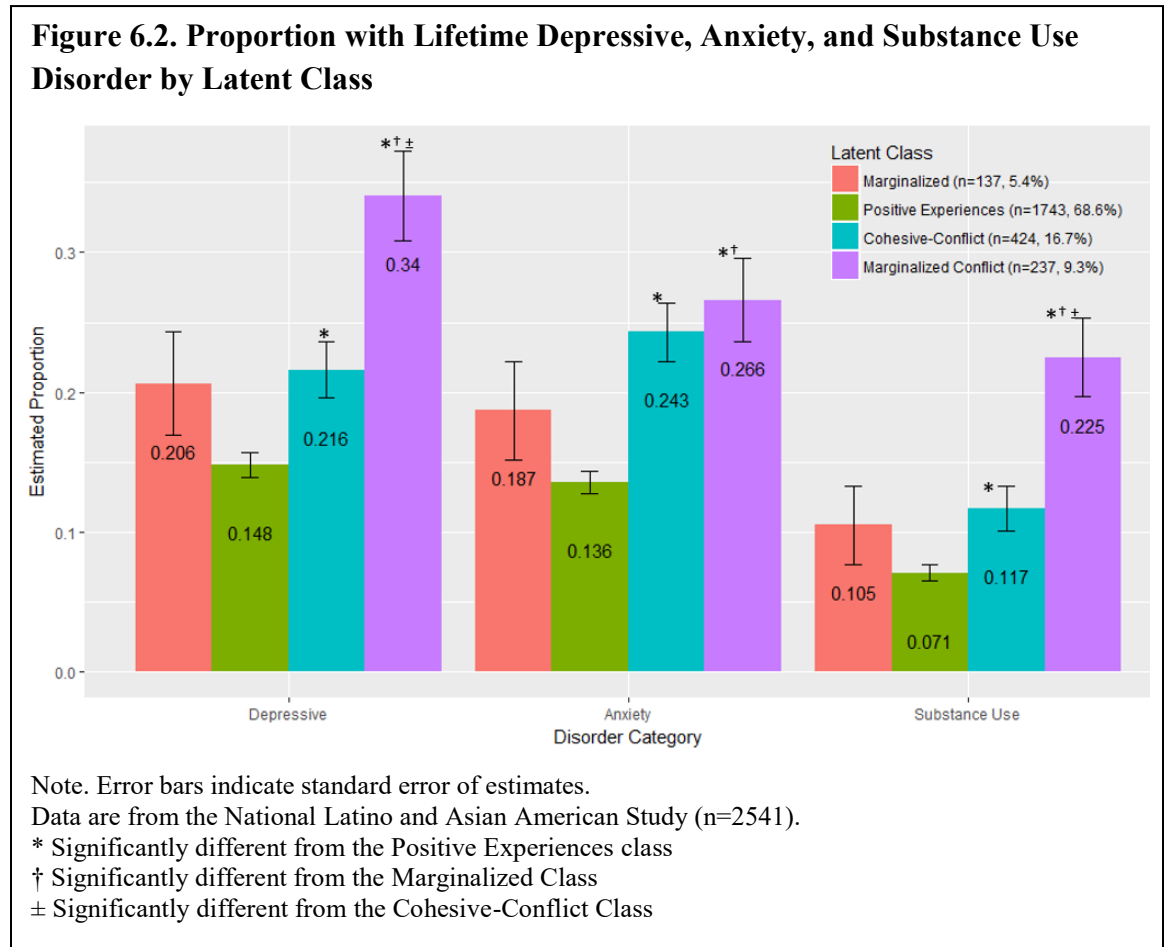
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Table 6.2. Direct Effects of Covariates on Lifetime Disorder Categories Adjusted for Latent Class Membership of Acculturative Experiences

	Any Depressive Disorder 424 (16.7%)					Any Anxiety Disorder 237 (9.3%)					Any Substance Use Disorder 137 (5.4%)				
	Coef	S.E.	p-value	OR	95% CI	Coef	S.E.	p-value	OR	95% CI	Coef	S.E.	p-value	OR	95% CI
Age in years	-0.002	0.004	0.665	1.00	(0.99-1.01)	0.006	0.004	0.107	1.01	(1.00-1.01)	0.006	0.005	0.207	1.01	(1.00-1.02)
Sex															
Male	REF	--	--	REF	--	REF	--	--	REF	--	REF	--	--	REF	--
Female	**0.571**	**0.113**	**0.000**	**1.77**	**(1.42-2.21)**	**0.579**	**0.115**	**0.000**	**1.78**	**(1.42-2.24)**	**-1.573**	**0.163**	**0.000**	**0.21**	**(0.15-0.29)**
Education															
Less than high school	REF	--	--	REF	--	REF	--	--	REF	--	REF	--	--	REF	--
High school	**-0.355**	**0.145**	**0.015**	**0.70**	**(0.53-0.93)**	-0.145	0.145	0.315	0.87	(0.65-1.15)	-0.032	0.190	0.867	0.97	(0.67-1.41)
Any post-secondary	-0.267	0.146	0.067	0.77	(0.58-1.02)	-0.108	0.148	0.468	0.90	(0.67-1.20)	-0.043	0.198	0.828	0.96	(0.65-1.41)
College degree or more	**-0.437**	**0.180**	**0.016**	**0.65**	**(0.45-0.92)**	**-0.519**	**0.193**	**0.007**	**0.60**	**(0.41-0.87)**	**-0.553**	**0.272**	**0.042**	**0.58**	**(0.34-0.98)**
Marital Status															
Married	REF	--	--	REF	--	REF	--	--	REF	--	REF	--	--	REF	--
Divorced	**0.443**	**0.135**	**0.001**	**1.56**	**(1.20-2.03)**	0.016	0.147	0.915	1.02	(0.76-1.36)	0.033	0.216	0.880	1.03	(0.68-1.58)
Never Married	-0.092	0.154	0.549	0.91	(0.67-1.23)	-0.036	0.155	0.816	0.96	(0.71-1.31)	-0.084	0.199	0.672	0.92	(0.62-1.36)
Subethnicity															
Puerto Rican	REF	--	--	REF	--	REF	--	--	REF	--	REF	--	--	REF	--
Cuban	-0.031	0.170	0.856	0.97	(0.69-1.35)	-0.084	0.171	0.626	0.92	(0.66-1.29)	-0.197	0.267	0.461	0.82	(0.49-1.39)
Mexican	**-0.414**	**0.152**	**0.007**	**0.66**	**(0.49-0.89)**	**-0.329**	**0.157**	**0.036**	**0.72**	**(0.53-0.98)**	0.037	0.196	0.850	1.04	(0.71-1.52)
Other Latino	**-0.343**	**0.162**	**0.034**	**0.71**	**(0.52-0.97)**	-0.193	0.163	0.235	0.82	(0.60-1.13)	-0.082	0.230	0.720	0.92	(0.59-1.45)
Generation															
1st Generation	REF	--	--	REF	--	REF	--	--	REF	--	REF	--	--	REF	--
1.5 Generation	0.123	0.166	0.458	1.13	(0.82-1.57)	0.200	0.169	0.236	1.22	(0.88-1.70)	0.455	0.250	0.069	1.58	(0.97-2.57)
2nd Generation	0.069	0.155	0.654	1.07	(0.79-1.45)	0.153	0.155	0.323	1.17	(0.86-1.58)	**1.308**	**0.204**	**0.000**	**3.70**	**(2.48-5.52)**
3rd Generation	**0.385**	**0.159**	**0.016**	**1.47**	**(1.08-2.01)**	0.261	0.166	0.117	1.30	(0.94-1.80)	**1.554**	**0.211**	**0.000**	**4.73**	**(3.13-7.15)**

Note. S.E. = Standard Error, OR = Odds Ratio, CI = Confidence Interval. Estimates in **bold** are significant at the p<0.05 level.

as adolescents or adults, although the result was marginally significant (OR=1.58, 95% CI: 0.97-2.57).

Figure 6.2 graphically displays the estimated proportion of individuals ever meeting criteria for each disorder category stratified by latent class. The prevalence of all disorder categories differed significantly by acculturative experiences class even after

Figure 6.2. Proportion with Lifetime Depressive, Anxiety, and Substance Use Disorder by Latent Class

Note. Error bars indicate standard error of estimates.
Data are from the National Latino and Asian American Study (n=2541).
* Significantly different from the Positive Experiences class
† Significantly different from the Marginalized Class
± Significantly different from the Cohesive-Conflict Class

adjusting for sociodemographic characteristics (Wald test: depressive χ^2=40.392, anxiety χ^2=36.230, substance use χ^2=34.330; all p<0.0001 (Table 6.3). Latinos belonging to the Positive Experiences class had the lowest proportion with a disorder for all disorder categories: 14.8% ever met criteria for a depressive disorder, 13.6% for an anxiety disorder, and 7.1% for a substance use disorder. Regardless of disorder, those in the Marginalized

Table 6.3. Prevalence of Distal Outcomes across Four Latent Classes of Acculturative Experiences in Adjusted Analysis

	Proportion	S.E.	Wald Test	Significant Pairwise Comparisons	Difference in Proportions	S.E.	p-value
Any Depressive Disorder			$\chi^2=40.392$ $p<0.0001*$				
Overall sample	0.181	--		Marginalized vs. Marginalized Conflict	-0.134	0.050	0.007
Positive Experiences	0.148	0.009		Positive vs Cohesive-Conflict	-0.068	0.022	0.002
Cohesive-Conflict	0.216	0.020		Positive vs Marginalized Conflict	-0.192	0.033	0.000
Marginalized Conflict	0.340	0.032		Cohesive-Conflict vs.	-0.124	0.038	0.001
Marginalized	0.206	0.037		Marginalized Conflict			
Any Anxiety Disorder			$\chi^2=36.230$ $p<0.0001*$				
Overall sample	0.169	--		Positive vs Cohesive-Conflict	-0.108	0.023	0.000
Positive Experiences	0.136	0.008		Positive vs Marginalized Conflict	-0.131	0.031	0.000
Cohesive-Conflict	0.243	0.021					
Marginalized Conflict	0.266	0.030					
Marginalized	0.187	0.035					
Any Substance Use Disorder			$\chi^2=34.330$ $p<0.0001*$				
Overall sample	0.095	--		Marginalized vs. Marginalized Conflict	-0.121	0.041	0.003
Positive Experiences	0.071	0.006		Positive vs Cohesive-Conflict	-0.046	0.017	0.008
Cohesive-Conflict	0.117	0.016		Positive vs Marginalized Conflict	-0.155	0.029	0.000
Marginalized Conflict	0.225	0.028		Cohesive-Conflict vs.	-0.109	0.032	0.001
Marginalized	0.105	0.028		Marginalized Conflict			

Note. All models are adjusted for direct effects of sex, age, education, marital status, subethnicity and generational status
*Wald test has three degrees of freedom. S.E. = Standard Error.

Classes experiencing conflict had much higher prevalence of disorder (34.0% had a depressive disorder, 26.6% an anxiety disorder, and 22.5% a substance use disorder). The Cohesive-Conflict and low-conflict Marginalized classes tended to look similar, having higher disorder prevalence than Latinos with Positive Experiences but lower than the Marginalized Conflict class.

This pattern was particularly true for depressive and substance use disorders. The two largest differences were seen between the Positive Experiences and the Marginalized Conflict classes for depressive (difference= -0.192, $p<0.001$) and substance use disorders (difference= -0.155, $p<0.001$). Fewer differences between classes were observed for lifetime prevalence of anxiety disorders, with no differences between the Marginalized and Marginalized Conflict Latinos or the Cohesive-Conflict and Marginalized Conflict Latinos.

6.5 Discussion

Few studies have reported on lifetime prevalence of categories of DSM diagnoses of Latinos in the United States. We found that Latinos in the National Latino and Asian American Study had similar lifetime prevalence estimates of disorder as compared to other nationally-representative studies of Latinos (Karno et al., 1987; Kessler et al., 1994; Vega et al., 1998b). Weighted lifetime prevalence of depressive, anxiety and substance use disorders from the NLAAS have been reported elsewhere (Alegría et al., 2007), which were similar to our estimates. Our sample also had a high burden of comorbidity, with approximately 12 percent meeting criteria for two or more disorder categories in their lifetime. As expected, depressive and anxiety disorders were highly comorbid. A large proportion of those with a substance use disorder were also likely to have either a

depressive or anxiety disorder. These high levels of comorbidity reinforce the notion of a significant mental health burden among Latinos affected by a mental disorder.

Latent classes of acculturative experiences were significantly related to lifetime diagnoses of disorder. This strong association lends credibility to the underlying latent construct of acculturation and other related experiences. It is not surprising that Latinos having overwhelmingly positive experiences, whether it be lower levels of discrimination and conflict or higher levels of neighborhood and family cohesion, have significantly lower prevalence of disorder. However, there are striking differences among Latinos' whose lives are characterized by less favorable experiences. In particular, the difference in depressive and substance use disorder prevalence between the Marginalized Conflict and Cohesive-Conflict classes suggests a potential buffering effect of social cohesion in the face of conflict, discrimination and less safe neighborhood environments. Latinos in both of these classes reported similarly elevated levels of family conflict, discrimination, and lack of neighborhood safety. The main distinguishing feature was the distinct levels of cohesion, particularly among the family, with the Cohesive-Conflict class having levels of family cohesion on par with the Positive Experiences class.

In light of the high levels of comorbidity in our sample, most likely those Latinos experiencing moderate to high levels of discrimination and conflict, coupled with low social cohesion are contributing to a large proportion of disorder in the population. Prior research in the NLAAS has shown this comorbidity of depressive and anxiety disorders does not differ by Latino country of origin (Ortega et al., 2006), but few psychiatric comorbidity studies have been conducted in this sample. Future work should specifically investigate the relationship between comorbidity and class membership in this framework.

The absence of a direct relationship between subethnicity and having a substance use disorder implies that any crude differences in SUD prevalence by Latino country of origin may be entirely accounted for by the experiences Latinos have in the US and other sociodemographic characteristics. Conversely, the strong dose-response effect of generational status on substance use disorder prevalence supports the well-replicated immigrant health paradox as it pertains to substance use problems (Alegría et al., 2007; Alegría et al., 2008; Alegría et al., 2006; Burnam, Hough, Karno, Escobar, & Telles, 1987; Escobar et al., 2000; Grant et al., 2004a; Vega et al., 1998b). While our results clearly indicate that acculturation and other experiences (whether positive or negative) have important implications with regard to mental health, other factors seem to be at play beyond the constructs assessed in this study. One such possibility is access to alcohol or other substances, which is a key distinction between risk for substance-related problems and anxiety or depression.

The same can be said for ethnic differences among Latinos and depressive and anxiety disorders. In particular, after accounting for acculturative experiences, there still exists a strong inverse relationship between Mexicans and both depression and anxiety as compared to Puerto Ricans. The fact that this association persists for Mexicans while disappearing for Cubans suggests that there may be additional factors unique to Mexicans that are not accounted for in this model. This is particularly noteworthy given that Cubans have consistently been shown to have the lowest prevalence of distress and disorder among all subethnic groups (Guarnaccia et al., 2002). It may be that Mexicans have other sources of resilience, such as religiosity or perceptions of social mobility in society, that can confer

extra protection against life's stressors (Alcántara et al., 2014; American Psychological Association, 2012; Gonzalez-Barrera & Lopez, 2013).

6.5.1 Limitations

Acculturative stress was not included in the model due to sample size constraints, but prior literature suggests that this is an important construct as it pertains to distress and disorder (Alderete, Vega, Kolody, & Aguilar-Gaxiola, 1999; Hiott, Grzywacz, Arcury, & Quandt, 2006; Hovey & Magana, 2002; Hovey & Magaña, 2000; Salgado de Snyder, Cervantes, & Padilla, 1990). Future work should explore how stress arising from leaving one's home country and adjusting to a new one fits into this picture. Our analyses did not explore whether the direct effects of subethnicity and generational status vary by class. This may be the case and should be investigated in future work. Also, as documentation status was not available in the data, effects of the lack of documentation on disorder were not accounted for. Comorbidity was high, particularly between depressive and anxiety disorders, but was not accounted for. Because a large proportion of our sample met diagnosis for two or more disorders, future work should explore the importance of comorbidity and how this is affected by acculturative experiences.

Finally, no causal statements can be made, as all data are cross-sectional. One way to address this may be to incorporate timing of disorder onset with respect to age at time of immigration. Our sensitivity analysis looking at past 12-month prevalence as opposed to lifetime disorder revealed similar results, but this does not distinguish between chronic and acute cases, which may have different causes. Further, because it is a cross-sectional study, it is possible that individuals with a mental or behavioral disorder may be more likely to report discrimination, conflict or other acculturative stressors as a result of their mental

illness. This may lead to biased results. There is also a possibility that there are reciprocal processes in play, and that the presence of mental illness actually leads to increased levels of acculturative stress and other negative experiences.

6.5.2 Conclusion

Despite the limitations, to our knowledge this study is the first to look at the relationship between acculturative experiences and DSM diagnoses of common mental and behavioral disorders in a nationally-representative sample of Latinos using a latent variable framework. The associations between the latent construct of acculturative experiences accounted for both the unobserved nature of the complex constructs of interest (e.g., discrimination and family environment) and the effects of relevant covariates on class membership and lifetime disorder. Further, the class indicators have been created after accounting for differences in measurement by generational status, a subgroup category that has been shown to be important at the construct level (see Chapter 4). These analyses also do not collapse disorders into one broad category, which is important particularly seen here in the sustained associations between subethnicity, generational status, and specific disorders.

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CHAPTER 7. DISCUSSION

7.1 Discussion

This dissertation aimed to advance mental health disparities research among minority populations by examining associations between acculturation and psychiatric disorders among US Latinos. The majority of research on acculturation and disorder in Latinos has been constrained by several key limitations: 1) lack of ethnic subgroup comparisons, 2) not accounting for generational status, and 3) inadequate measures of acculturation. This dissertation attempted to address these limitations by:

(1) taking a latent measurement approach to the complex constructs of acculturation and related experiences known to be associated with mental and behavioral disorder in Latinos;

(2) accounting for variance in the measurement of these constructs by Latino ethnic and generational subgroups;

(3) identifying homogenous Latino subgroups in regard to their acculturative experiences to address potential combined effects among these experiences; and

(4) investigating the complex relationships between these acculturative experiences subgroups and three common groups of mental and behavioral disorders, controlling for sociodemographic characteristics, subethnicity, and generational status.

The primary results for each research aim are detailed in Chapters 4 through 6. This chapter will summarize the primary findings and discuss implications for future research and practice. It will conclude with the limitations, strengths, and public health significance of this dissertation.

7.2. Summary of Principal Findings

7.2.1 Factor structure and Measurement Invariance

The results from the Exploratory Factor Analyses (EFA) aligned closely with the design of the six NLAAS scales (language, ethnic identity, neighborhood context, family context, acculturative stress, and discrimination). This corroborates the quality of theory and testing that went into the execution of the study (Alegría et al., 2004). Complete factorial invariance was not achieved for any scale across ethnic or generational subgroups. However, this varied according to scale and subgroup examined. Although some scales were more similar across subgroups (e.g., Neighborhood Context and Ethnic Identity), the inability to achieve full invariance underscores the importance of treating constructs such as neighborhood context as latent rather than observed. Other scales attained only the loosest type of invariance, showing that certain constructs such as language use and proficiency are extremely heterogeneous by Latino subgroup, not just in observed self-report measures, but also in how individual questions relate to the constructs of interest. Finally, some scales were similar by one subgroup categorization but extremely variant by the other, highlighting the need to account for Latino heterogeneity by multiple subgroupings. Further, using highly variant scales to compare Latino groups is invalid, particularly at the observed level.

Experts agree that the current state of the scientific literature regarding acculturation and mental and behavioral disorder in Latinos is conflicting (Alcántara et al., 2017; Alegría, 2009; Lara et al., 2005). This dissertation addresses significant pitfalls by accounting for heterogeneity by generational and ethnic subgroups, per expert recommendation (Alegría et al., 2007a). It also utilizes a bidimensional definition of

acculturation and operationalizes it accordingly, in line with current best practice guidelines (Alegría, 2009; Doucerain et al., 2017; Schwartz & Unger, 2017; Thomson & Hoffman-Goetz, 2009). Additionally, a primary strength of this study its latent variable approach, which accounts for the unobserved nature of the complex constructs of acculturation and other related factors such as neighborhood context or discrimination. Even though the EFA results underscore the high quality of these scales, they are not, in and of themselves, perfect measures of the construct they purport to measure. Applying a latent variable framework advances acculturation research into further refinement and nuance of measurement.

This dissertation also investigates and accounts for variation of these constructs at the latent level. To our knowledge, this is the first time that measurement invariance of these scales has been explored by Latino generational and ethnic groups. The results indicate that there is wide variation in the constructs at the latent level, particularly by generational status. Ignoring this fact can lead to biased results when looking at associations between acculturation, related experiences, and mental disorder. Although experts have acknowledged that combining Latino subgroups and failing to account for heterogeneity may contribute to conflicting results in the literature, they have not addressed the contribution of treating acculturation and other constructs as observed to this problem.

7.2.2 Latino Heterogeneity in Acculturation and Related Experiences

We identified four latent subgroups of acculturative experiences among Latinos living in the US. The largest class was comprised of Latinos with positive experiences: low levels of discrimination and conflict, high family and social cohesion, and high neighborhood safety. The remaining classes were distinguished mainly according to levels

of family conflict and cohesion, discrimination, and neighborhood characteristics. In particular, there were two marginalized classes (both characterized by low family and low neighborhood social cohesion), separated primarily by medium versus high levels of family conflict and discrimination. Finally, there was a Cohesive-Conflict class, which was characterized by high cohesion but also high conflict in their family environments. Unexpectedly, classes did not show significant variation in either English or Spanish language use and proficiency.

The substantive nature of these classes are somewhat different than the groupings proposed by bi-dimensional acculturation researchers. Traditionally, ethnic identity and Spanish language use have been used as proxy measures of enculturation, whereas English language use is often a marker of acculturation (Guarnaccia et al., 2007). Experts have cautioned against using simple proxies and unidimensional measures of acculturation (Alegría, 2009; Doucerain et al., 2017; Thomson & Hoffman-Goetz, 2009). However, in light of our results, other processes related to minority or immigrant status in the US may be more meaningful in distinguishing Latinos as opposed to more traditional measures of acculturation, such as language. While the results do not contradict Berry's (2003) model of four acculturative strategies (assimilation, integration, marginalization and separation), they suggest that other experiences, such as discrimination or family environment, are more indicative of the Latino acculturation experience.

The findings also support the growing body of research showing that both nativity and age at time of immigration are strong predictors of important health-related exposures in Latinos (Alcántara et al., 2014; Alegría et al., 2007; Alegría et al., 2007a; Alegría et al., 2008; Almeida et al., 2012; Breslau et al., 2009; Camacho et al., 2015; Cook et al., 2009;

Fortuna et al., 2007; Guarnaccia et al., 2007; Perreira et al., 2015; Wassertheil-Smolle et al., 2014). Conversely, subethnicity was not always the most salient predictor of class membership. This suggests that the desire to disaggregate Latinos by country of origin, while important, is not the only way to define meaningful subgroups. Instead, the results indicate that the experience of being Latino in the US is highly personal, and two Puerto Ricans may have vastly different experiences depending on their environments and resources. And while we also found that immigrants arriving as children (the "1.5 Generation") and US-born Latinos are much less likely to belong to the positive experiences group, generational status did not perfectly predict class membership. This further points to the importance of context that is more nuanced than traditional Latino subgroupings.

7.2.3 Acculturative Experiences and Mental and Behavioral Disorder

We found that Latinos in the National Latino and Asian American Study had similar lifetime prevalence estimates of disorder as compared to other nationally-representative studies of Latinos (Karno et al., 1987; Kessler et al., 1994; Vega et al., 1998b). Our sample also had a high burden of comorbidity, which reinforces the notion of a significant mental health burden among Latinos affected by a mental disorder.

Latent classes of acculturative experiences were significantly related to lifetime diagnoses of disorder. This strong association lends credibility to the underlying latent construct of acculturation and other related experiences created in this study. We hypothesized that other experiences related to acculturation (e.g., discrimination and family conflict) may cluster together naturally as opposed to operating independently. The results highlight that these experiences seem to cluster in meaningful ways as it relates to

the development of disorder. To our knowledge, this is the first study to evaluate the association between psychiatric disorder and latent Latino acculturative experience subgroups.

The results align with current consensus in the scientific literature that experiencing discrimination, family conflict, and an unsafe neighborhood environment increase the probability of having a mental or behavioral disorder (Alegría et al., 2014; Aneshensel & Sucoff, 1996; Aneshensel et al., 2007; Araújo & Borell, 2006; Cervantes et al., 2013; Gee et al., 2006; Gil et al., 2000; Kessler et al., 1999; Lau et al., 2005; Lui, 2015; Ross & Mirowsky, 2001; Sellers & Shelton, 2003; Torres et al., 2011; Tran et al., 2010). Latinos who have overwhelmingly positive experiences, whether it be lower levels of discrimination and conflict or higher levels of neighborhood and family cohesion, had significantly lower prevalence of all types of disorder. However, there are striking differences among Latinos' whose lives are characterized by less favorable experiences. In particular, the difference in disorder prevalence between the Marginalized Conflict and Cohesive-Conflict classes suggests a potential buffering effect of social cohesion in the face of family conflict, discrimination, and less safe neighborhood environments. This finding reinforces the literature showing the protective effect of social support for mental health (Almeida et al., 2011; Park et al., 2014; Rivera et al., 2008; Vega et al., 1987).

We found no direct relationship between Latino subethnicity and substance use disorder (SUD). This suggests that any differences in SUD prevalence by country of origin may be entirely accounted for by the experiences Latinos have in the US and other sociodemographic characteristics. However, the strong dose-response association between generational status and SUD prevalence provides additional evidence toward the

immigrant health paradox in this area problems (Alegría et al., 2007; Alegría et al., 2008; Alegría et al., 2006; Burnam et al., 1987; Escobar et al., 2000; Grant et al., 2004a; Vega et al., 1998b). It may be that other factors beyond acculturation and the experiences included in this study are important in Latino immigrant mental health. For example, access to alcohol or other substances may have significant implications for the development of disorder, which is a key distinction between risk for substance-related problems and anxiety or depression.

There were, however, direct relationships between Latino ethnic subgroup and depressive and anxiety disorders. After accounting for acculturative experiences, Mexicans were much less likely to meet criteria for a depressive or anxiety disorder as compared to Puerto Ricans. On the other hand, the direct association between Cuban ethnicity and disorder disappeared, even though they have consistently been shown to have the lowest prevalence of distress and disorder among all subethnic groups (Guarnaccia et al., 2002). This persistent association suggests there may be sources of resilience unique to the Mexican experience not explored in this study, such as religiosity or perceptions of social mobility in society (Alcántara et al., 2014; American Psychological Association, 2012; Gonzalez-Barrera & Lopez, 2013).

7.3 Implications for Future Research

Our study found significant measurement variance at the latent construct level for most measures of acculturation and related experiences by Latino subgroup. This was particularly true for generational status. Based on this, we recommend that, at the very least, future researchers move away from traditional regression models and into a latent variable framework. While these methods are relatively new in the world of psychiatric

epidemiology, they are increasingly more accessible with computer software such as Mplus (B. O. Muthén & Muthén, 1998-2017) and R (RStudio Team, 2015). We agree with experts who strongly advise against using overly-simplistic (i.e., proxies or unidimensional scales) measures of acculturation (Alegría, 2009; Doucerain et al., 2017; Thomson & Hoffman-Goetz, 2009). However, because of the complex nature of acculturative processes, treating certain constructs as observed may also be contributing toward the conflicting results in the acculturation literature. Similarly, as experts caution against treating all Latinos as a heterogeneous population (Alegría et al., 2007a), logically it should apply to differences at the construct level. Failure to do so may lead to biased results and further muddy the growing body of research in the acculturation field.

The field of acculturation research is continually developing. Over the past ten years, there have been repeated calls to be more intentional in the conceptualization and measurement of what are complex processes (Abraído-Lanza, Echeverría, & Flórez, 2016; Alegría, 2009; Doucerain et al., 2017; Lara et al., 2005; Thomson & Hoffman-Goetz, 2009). We wholeheartedly reaffirm this sentiment by experts in the field. Our recommendations to use a latent variable approach and adequately test for measurement invariance is an added layer that has not been adequately addressed in this field as of yet.

Our findings also highlight that commonly used constructs such as language use may be less meaningful in studying the mental health of Latino immigrants. Our study did not impose a priori assumptions on what the most salient characteristics defining Latinos' experiences in the US. Instead, the latent classes, representing meaningful heterogeneous Latino subpopulations, were characterized by external experiences: discrimination, family environment and neighborhood context.

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Some researchers believe that scales measuring English use and proficiency may best approximate acculturation (Pinedo et al., 2017). In our study we did not find language to vary extensively between our four latent Latino subgroups, which limited our ability to determine whether language was a meaningful construct relating to disorder. This may be because, in the presence of the other constructs such as family conflict, social cohesion, and discrimination, language is not as strongly associated with disorder. Future research should explore this further. As mentioned above, the practice of using English language as a simple proxy to measure acculturation is now considered poor practice. However, we would argue that may also be less relevant to both Latinos' experiences and the development of psychiatric disorder. We therefore recommend placing less emphasis on traditional measurement of acculturation, in particular language, with more emphasis on characterizing the environment in which Latinos live, work and play. This includes rethinking what we think is known about Latino "culture" and not definitively characterizing individuals by just their country of origin rather than embracing more holistic view of what it means to be Latino in this country.

The changing political and legal landscape regarding immigration policy will most likely have significant impacts on the wellbeing of Latinos in this country. Therefore, new and innovative research, including primary data collection, needs to be undertaken in this area. Researchers designing and implementing new studies should keep in mind the above recommendations when deciding what instruments to use and which constructs to assess.

7.4 Implications for Interventions and Clinical Practice

Clinical practitioners should avoid treating Latinos as a singular group. The simplest recommendation is to be cognizant that different Latino ethnic groups have

different histories with regards to immigration patterns and reception in the US. Therefore, cultural competence training in a clinical setting should incorporate basic understanding of these differences. However, our findings suggest that observable characteristics such as country of origin should not overshadow more meaningful characteristics that are less easily measured. Again, the experience of living as an immigrant and/or minority in this country is highly personal, characterized by multiple levels of influence. Two Cubans migrants may not experience the world in the same way, despite being of similar "cultural backgrounds".

The latent subpopulations uncovered in these analyses also have implications for identification of Latinos at high risk for developing a mental or behavioral disorder. Further, they provide clues to modifiable characteristics strongly associated with disorder. Such characteristics appear to operate at both a social and individual level, and interventions should be tailored to both. The majority of our sample had "positive experiences". However, the other groups experienced varying degrees of discrimination and lack of neighborhood safety. Interventions at a structural level should target these stressors. Similarly, family environment and neighborhood social cohesion was also less ideal for most of the other less favorable latent subgroups. These more individual (or less structural) environments are more easily targeted by clinicians, community workers, or other professionals who interact with Latino and immigrant populations. Notably, the large difference in disorder prevalence between the Latino classes with similarly high levels of family conflict but significantly different cohesion offers a clear modifiable factor on which interventions can operate. It also seems that less concern should be paid toward

active family conflict and more energy toward building up true cohesion, which may be a buffer in the face of adversity.

7.5 Limitations, Strengths and Next Steps

7.5.1 Limitations

This study is not without limitations. First, the NLAAS data is self-report and therefore subject to bias. Although the NLAAS has a large Latino sample size, some subgroups were relatively small, reducing power and contributing to some model non-convergence. Due to small cell size within subgroups, some item response options had to be collapsed. This results in a loss of information and requires assumptions about meaningful cut points in how the data were grouped.

Second, this was a secondary data analysis. Certain constructs of interest were either not collected or collected in a manner which limited our ability to incorporate them in the analysis. For example, acculturative stress measures were not asked of US-born participants. While the rationale for this is understandable, sample size limitations prohibited us from including it in the latent class analysis.

Third, this dissertation attempted to follow recommended best practices and disaggregate Latinos by country of origin and immigration characteristics. However, the "Other Latino" category still represents a subethnic group with considerable heterogeneity. Also, information regarding time since migration was unable to be incorporated into the generational status groupings, potentially making the subgroups still heterogeneous. Other potentially important variables that might contribute to Latino heterogeneity, such as race or geographical location, were also not incorporated in the analyses.

Fourth, these data were cross-sectional and therefore prevents making any causal claims regarding the nature of the associations between acculturative experiences and the development of mental and behavioral disorder. Further, because it is a cross-sectional study, it is possible that individuals with a mental or behavioral disorder may be more likely to report discrimination, conflict or other acculturative stressors as a result of their mental illness. This may lead to biased results. There is also a possibility that there are reciprocal processes in play, and that the presence of mental illness actually leads to increased levels of acculturative stress and other negative experiences. However, there are very few longitudinal datasets available with data on psychiatric disorder and rich information regarding acculturation and other contextual factors relevant to Latinos living in the US. There are even fewer that are both nationally-representative and powered to make extensive subgroup comparisons. Therefore, carrying out large, representative studies of US Latinos, although a nontrivial undertaking, should be an imminent priority in order to disentangle temporal ordering of experiences and disorder onset, as well as understand the longitudinal trajectories of acculturative experiences among this population.

Finally, this study is operating under the assumption that the immigrant health paradox is a true epidemiologic phenomenon. Alcántara, Estevez and Alegría (2017) note that there are currently three prevailing explanations regarding the immigrant paradox: psychosocial/behavioral explanations, sociological explanations, and methodological explanations. The theoretical framework put forth by this dissertation subscribes to the first category and therefore seeks to discover the cultural, behavioral and/or psychosocial factors that contribute to mental health disparities in Latinos. Future researchers should seek to design studies that take into account the recommendations put forth above but also

specifically test the two alternative explanations. For example, the "healthy migrant hypothesis" (Abraido-Lanza et al., 1999; Palloni & Ewbank, 2004; Palloni & Arias, 2004) is a primary sociological explanation that states immigrants to the US are naturally selected to be healthier than individuals from their home country who never migrate and those who have lived in the US for a longer period of time. While some studies have attempted to test this (Escarce, Morales, & Rumbaut, 2006; Jasso, Massey, Rosenzweig, & Smith, 2004), but the literature remains mixed. We believe that moving into a latent framework will help to advance this body of research. Other sociological explanations include the "salmon bias" or "return migration hypothesis", in which immigrants who become sick tend to return home, infLating the health of Latinos who remain in the US (Abraido-Lanza et al., 1999; Palloni & Ewbank, 2004).

On the other hand, methodological explanations assume that the immigrant health paradox is false and that any health advantages of immigrant populations are due to methodological errors (such as misclassification of race/ethnicity on death certificates) or other artificial reasons (Alcántara et al., 2017). We believe that this underscores the need for increasing rigor in methodology, which should include the use of latent variable methods.

7.5.2 Strengths and Public Health Significance

Despite these limitations, this dissertation has multiple strengths that contribute to its public health significance. It utilizes the largest, nationally-representative sample of US Latinos with rich data on psychiatric disorder, acculturation, ethnic identity, and other contextual factors relevant to this population in order to address significant gaps in the scientific literature. Because the NLAAS is a probability-based, nationally-representative survey, it

avoids sampling bias of clinical samples. This is especially important in Latino and immigrant populations in the US, as they may have difficulty accessing mental health services due to structural barriers (e.g., language or insurance), stigma, or fear of legal repercussions (especially for undocumented immigrants). To our knowledge, this is the first study of the association between acculturation, related experiences, and disorder in Latinos that followed expert recommendations regarding disaggregation of Latino subgroups and adequate measurement of acculturation, all within a latent variable framework. That being so, it was the first study to test for measurement invariance across both Latino subethnic and generational subgroups in the six scales considered. The findings underscore the need for accounting for Latino heterogeneity, not simply at the manifest level, but at the latent construct level. In addition, we identified meaningful latent subgroups of Latinos according to their acculturative experiences that were significantly associated with different categories of mental and behavioral disorder. Characteristics of these subgroups, particularly the differences in family dynamics, are especially suited for prevention and intervention efforts.

7.5.3 Next Steps

There are several logical next steps to further these analyses. First, measurement invariance of the latent class structure by generational and subethnic groups should be explored to ensure that the acculturative experiences of US Latinos do not differ by these subgroups. Second, how the latent classes relate to timing of onset of disorder (as opposed to simply disorder prevalence) should be explored using survival analysis. This will potentially elucidate "high risk" time periods for Latino immigrants and will attempt to disentangle temporal ordering between migration and disorder onset. Third, this work can

be naturally extended into the Asian subsample of the NLAAS, with the goal of furthering acculturation research in another large minority and immigrant population in the US and as a comparison of the findings in Latinos.

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    substance use in Hispanic/Latino, African-born black, and southeast Asian

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Intended to be blank.

Table A.1. List of NLAAS Study Instruments

Question	Response Options*
Language	
Subscale: Language Proficiency	
1. How well do you speak Spanish? 2. How well do you read Spanish? 3. How well do you write in Spanish? 4. How well do you speak English? 5. How well do you read English? 6. How well do you write in English?	Poor Fair Good Excellent
Subscale: Language Preference	
The next few questions ask about your language preference. For these questions, please tell me the number that applies from the list on page 44 of your respondent booklet.	
7. What language do you speak with most of your friends? 8. What language do you speak with most of your family? 9. In what language do you think?	Spanish all the time Spanish most of the time Spanish & English equally English most of the time English all the time
Ethnic Identity	
1. How closely do you identify with other people who are of the same racial and ethnic descent as yourself – very closely, somewhat, not very, or not at all? 2. How close do you feel, in your ideas and feelings about things, to other people of the same racial and ethnic descent -- very close, s omewhat, not very, or not at all? 3. If you could choose, how much time would you like to spend with other people who are of your same racial and ethnic group – a lot of the time, some, a little, or none of the time? 4. How important do you think it is for people who are from your same racial/ ethnic group to marry other people who are also from this group?	Very Close(ly)/ A Lot Somewhat Close(ly)/ Some Not Very Close(ly)/ A Little Not at All/ None
Neighborhood Context	
Subscale: Neighborhood Context	
How true is each of the following statements about your neighborhood?	
1. People in this neighborhood can be trusted. 2. People in this neighborhood generally get along with each other.	Very true Somewhat true Not very true

3. I have neighbors who would help me if I had an emergency.

4. People in my neighborhood look out for each other.

Not at all true

How true is each of the following statements about your neighborhood?

5. I feel safe being out alone in my neighborhood during the night.

6. People often get mugged, robbed or attacked in my neighborhood.

7. People sell or use drugs in my neighborhood.

Very true
Somewhat true
Not very true
Not at all true

Family Context

Subscale: Family Pride

Now I'd like to know how strongly you agree or disagree with the following statements about your family.

1. Family members respect one another.
2. We share similar values and beliefs as a family.
3. Things work well for us as a family.
4. We really do trust and confide in each other.
5. Family members feel loyal to the family.
6. We are proud of our family.
7. We can express our feelings with our family.

Strongly Agree
Somewhat Agree
Somewhat Disagree
Strongly Disagree

Subscale: Family Cohesion

Now I'd like to know how strongly you agree or disagree with the following statements about your family.

8. Family members like to spend free time with each other.

9. Family members feel very close to each other.

10. Family togetherness is very important.

Strongly Agree
Somewhat Agree
Somewhat Disagree
Strongly Disagree

Subscale: Family Cultural Conflict

Please tell me how frequently the following situations have occurred to you:

11. You have felt that being too close to your family interfered with your own goals.

12. Because you have different customs, you have had arguments with other members of your family.

13. Because of the lack of family unity, you have felt lonely and isolated.

14. You have felt that family relations are becoming less important for people that you are close to.

15. Your personal goals have been in conflict with your family.

Hardly Ever or Never
Sometimes
Often

Discrimination

Subscale: Everyday Discrimination

In your day-to-day life how often have any of the following things happened to you?

1. You are treated with less courtesy than other
people.
2. You are treated with less respect than other
people.
3. You receive poorer service than other people at
restaurants or stores.
4. People act as if they think you are not smart.
5. People act as if they are afraid of you.
6. People act as if they think you are dishonest.
7. People act as if you are not as good as they are.
8. You are called names or insulted.
9. You are threatened or harassed.

Almost Every Day
At Least Once a Week
A Few Times a Month
A Few Times a Year
Less than Once a Year
Never

Subscale: Perceived Discrimination

10. How often do people dislike you because you are
[ethnic/racial group of R]?
11. How often do people treat you unfairly because
you are [ethnic/racial group of R]?
12. How often have you seen friends treated unfairly
because they are [ethnic/racial group of R]?

Often
Sometimes
Rarely
Never

Acculturative Stress

Please tell me if you have felt this way, in the following situations:

1. Do you feel guilty for leaving family or friends in
your country of origin?
2. Do you feel that in the United States you have the
respect you had in your country of origin?
3. Do you feel that living out of your country of
origin has limited your contact with family or
friends?
4. Do you find it hard interacting with others because
of difficulties you have with the English language?
5. Do people treat you badly because they think you
do not speak English well or speak with an accent?
6. Do you find it difficult to find the work you want
because you are of Latino descent?
7. Have you been questioned about your legal status?
8. Do you think you will be deported if you go to a
social or government agency?
9. Do you avoid seeking health services due to fear
of immigration officials?

Yes
No

Intended to be blank.

CURRICULUM VITAE
Kimberly B. Roth, MHS, PhD candidate

624 North Broadway, Room 880b
Baltimore, MD 21205
Phone: 443-287-4956; Email: kroth4@jhu.edu

EDUCATION AND TRAINING

Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland   2018
Doctor of Philosophy, Department of Mental Health
>   Dissertation: *"Latinos' experiences in the US: acculturation, discrimination,*
>   *stress, social cohesion and psychiatric disorder."* (Advisory Committee: Drs.
>   William W. Eaton, Rashelle J. Musci, Ramin Mojtabai, John Jackson, JHSPH;
>   Dr. Kathleen Page, JHMI)

Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland   2009
Masters of Health Science, Department of Mental Health,
>   Thesis: *"Depressed mood and antisocial behavior problems as correlates for*
>   *suicide-related behaviors in Mexico."*
>   Advisors: Dr. Holly C. Wilcox, JHSPH; Dr. Guilherme Borges, Instituto Nacional
>   de Psiquiatria, Mexico City, Mexico

Hood College, Frederick, Maryland   2004
>   Bachelor of Arts, Psychology and Spanish

LANGUAGES

English, fluent
Spanish, proficient in reading, writing and speaking

PROFESSIONAL EXPERIENCE

2017-present   Data Analyst
               Department of Health, Behavior & Society, Johns Hopkins Bloomberg
               School of Public Health
               Funding: (PI: Guohua Li), AAA Foundation for Traffic Safety "The
               LongROAD Senior Cohort Study"

2009-2014	Research Data Analyst to Research Associate
	Department of Mental Health, Johns Hopkins Bloomberg School of Public Health
	Funding: UO1-AI-35043 (PIs: Lisa P. Jacobson & Alvaro Muñoz); NIAID, NCI "Center for the Analysis & Management of the Multicenter AIDS Cohort Study"
2004-2008	Research Assistant to Assistant Research Coordinator
	Department of Epidemiology, Johns Hopkins Bloomberg School of Public Health
	Funding: R01-DA026652 (PI: William W. Eaton); NIDA, NIMH "Evolution of Psychopathology in the Population"; and R01-DA009897 (PI: William W. Eaton); NIDA "Risks for Transitions in Drug Use Among Urban Adults"

TEACHING EXPERIENCE

Sp 2018	Didactic Lecture, Department of Mental Health Noontime Seminar Series, JHSPH
	"An Overview of Mental Health Issues for Latino and Asian Immigrants in the United States"
Fa 2016, 17	Graduate Teaching Assistant, Department of Mental Health, JHSPH
	"Psychiatric Epidemiology"
Sp 2017	Graduate Teaching Assistant, Department of Mental Health, JHSPH
	"Social, Psychological, & Developmental Processes in the Etiology of Mental Disorders"
Sp 2017	Didactic Lecture, Seminar on Statistical Methods for Mental Health Research, JHSPH
	"MplusAutomation in R"
Sp 2016, 17	Graduate Teaching Assistant, Department of Epidemiology, JHSPH
	"Data Management in Stata Programming"
Sp 2016	Graduate Teaching Assistant, Department of Health Behavior Science, JHSPH
	"Latino Health: Measures and Predictors"
Fa 2016	Graduate Teaching Assistant, Department of Mental Health, JHSPH
	"Psychopathology for Public Health"
Fa 2016	Didactic Lecture, Seminar on Statistical Methods for Mental Health Research, JHSPH
	"Discrete-Time Survival Mixture Analysis in Mplus"
Fa 2015	Graduate Teaching Assistant, Department of Mental Health, JHSPH
	"Public Mental Health"
Sp 2015	Tutor, Department of Biostatistics, JHSPH

PUBLICATIONS

Journal Articles

Roth, K.B., Borges, G., Medina-Mora, M., Orozco, R., Ouéda, C., & Wilcox, H.C. (2011). Depressed mood and antisocial behavior problems as correlates for suicide-related behaviors in Mexico. *Journal of Psychiatric Research*, 45(5), 596-602.

Eaton W.W., **Roth, K.B**., Bruce M., Cottler L., Wu L., Nestadt G., Ford D., Bienvenu O. J., Crum R., Anthony J., & Muñoz A. (2013). The Relationship of Mental and Behavioral Disorders to All-cause Mortality in a 27-year Follow-up of Four Epidemiologic Catchment Area Samples. *American Journal of Epidemiology*, 178(9), 1366-77.

Hemelt, S., **Roth, K.B**., & Eaton, W.W. (2013). Childhood Educational Interventions: Experimental Evidence on Postsecondary Impacts. *Educational Evaluation and Policy Analysis*, 35(4), 413-36.

Ramsey, C.M., Spira A.P., Mojtabai R., Eaton W.W., **Roth K.,** & Lee H.B. (2013). Lifetime manic spectrum episodes and all-cause mortality: 26-year follow-up of the NIMH epidemiologic catchment area study. *Journal of Affective Disorders*, 151(1), 337-42.

Takayanagi, Y., Spira A.P., Gallo J.J., Eaton W.W., **Roth, K.B.**, & Mojtabai R. (2014). Accuracy of reports of lifetime mental and physical disorders: results from the Baltimore Epidemiological Catchment Area Study. *JAMA Psychiatry*, 71(3), 273-80.

Sharifi, V., Eaton W.W., Wu L., **Roth, K.B**., Burchett, B.M., & Mojtabai, R. (2015). Psychotic experiences and risk of death in the general population: A 24-27-year follow-up of the Epidemiologic Catchment Area study. *British Journal of Psychiatry*, 207(1), 30-36.

Lopez-Quintero, C., **Roth, K.B.**, Eaton, W.W., Wu, L., Cottler, L.B., Bruce, M., & Anthony, J.C. (2015). Heroin Users in a Community Sample: Looking Forward Toward Living or Dying. *Drug and Alcohol Dependence*, 156, 104-11.

Newcomer, A., **Roth, K.B.**, Kellam, S.G., Wang, W., Ialongo, N.S., Hart, S.R., Wagner, B.M., & Wilcox, H.C. (2016). Higher childhood peer reports of social preference mediates the impact of the Good Behavior Game on suicide attempt. *Prevention Science*, 17(2), 145-56.

Jones, V., Rebok, G., Johnson, R., **Roth, K.B.,** Gielen, A., Baker, S., Pitts, S.I., DiGuiseppi, C., Hill, L.L., Strogatz, D., Mielenz, T.J., Eby, D.W., & Li, G. (In

press) Alternate sources of transportation and older adult drivers: Who uses it and does it reduce the importance of driving for mobility? *Journal of Transport & Health.*

In Preparation

Benke, K., **Roth, K.B.**, & Eaton, W.W. Searching for the Prodrome of Depressive Disorder. *JAMA Psychiatry.*

Roth, K.B., Kahn, G., Storr, C., & Wilcox, H.C. Early Childhood Predictors of Unnatural Death. *Lancet Psychiatry.*

Roth, K.B., Johnson, R., & Eaton, W.W. Acculturation, Acculturative Stress, Discrimination and Mental Disorder in a Nationally-Representative Sample of Latinos: Differences by Generational Status. *Social Psychiatry and Psychiatric Epidemiology.*

Schneider, K., Holingue, C., **Roth, K.B.**, Eaton, W.W. Enduring Mental Health in the Baltimore Epidemiologic Catchment Area Follow-Up Study. *British Journal of Psychiatry.*

Zandi, P., Holingue, C., Colder Carras, M., Riehm, K., Rojo Wisar, D., Ingram, W., **Roth, K.B.**, Nestadt, P., Musliner, K., Haroz, E., & Eaton, W.W. The Future of Psychiatric Epidemiology. *American Journal of Epidemiology.*

Chapters

Eaton, W.W., Alexandre, P., Kessler, R.C., Martins, S., Mortensen, P., Rebok, G.W., Storr, C.L., & **Roth, K.B**. (2012). The Population Dynamics of Mental Disorders. In *Public Mental Health* (Ed.: W.W. Eaton). New York: Oxford University Press.

PRESENTATIONS AND POSTERS

Scientific Meetings

2018:   Jones, V., **Roth, K.B.,** Baker, S., Johnson, R., Borkoski, C., Gielen, A., & Rebok, G.W. Do additional sources of transportation increase the satisfaction of getting around for older drivers? American Public Health Association (APHA), San Diego, CA.

Schneider, K., **Roth, K.B.**, Holingue, C. Racial Differences in the Effect on Adverse Childhood Experiences (Aces) on Adult Alcohol Consumption: A Latent Class Analysis. Research Society of Alcoholism (RSA), San Diego, CA.

Roth, K.B., Musci, R.J., Eaton, W.W. Differences in the Association of Neighborhood and Family Environments with Alcohol Abuse and Dependence between Latino Subethnicities. Research Society of Alcoholism (RSA), San Diego, CA.

Roth, K.B., Wilcox, H., Storr, C., Eaton, W.W. Childhood predictors of unnatural death among a cohort of Baltimore young adults: The importance of neighborhood, peers, and trauma. Society for Prevention Research (SPR), Washington, DC.

2017: Schneider, K., Holingue, C., **Roth, K.B.**, Eaton, W.W. Predictors of Enduring Mental Health in the Baltimore Epidemiologic Catchment Area Study. Poster presented at the American Public Health Association (APHA), Atlanta, GA.

Roth, K.B., Johnson, R.M., Eaton, W.W. Acculturation, Acculturative Stress, Discrimination and Mental Disorder in a Nationally-Representative Sample of Latinos: Differences by Generational Status. Oral presentation at the American Public Health Association (APHA), Atlanta, GA.

2016: **Roth, K.B.**, Johnson, R.M., Eaton, W.W. Acculturation, Acculturative Stress, Discrimination and Mental Disorder in a Nationally-Representative Sample of Latinos: Differences by Generational Status. Johns Hopkins Bloomberg School of Public Health Latino Health Poster Session, Baltimore, MD.

Roth, K.B., Anderson Goodell, E.M., Cox, C. All-cause mortality in a cohort of HIV-positive men: Differences in survival by level of depressive symptoms at HAART initiation. Poster presented at the American Public Health Association (APHA), Denver, CO.

2012: Newcomer, A., **Roth, K.B.**, Hart, S. R., Schembari, B., Wagner, B. M., Wilcox, H. C. First and second grade peer reports of social preference and risk for suicide attempt by young adulthood. Poster presented at the National Network of Depression Centers (NNDC), Rochester, MN.

Hemelt, S.W., **Roth, K.B**. Childhood Educational Interventions: Experimental Evidence on Postsecondary Impacts. Oral presentation at Association for Education Finance and Policy (AEFP), Spring Conference, Boston, MA.

HONORS AND FUNDING

2018   Morton Kramer Fund for the Application of Biostatistics and

Epidemiology in Research on the Prevention and Control of Mental Disorders
Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland

2017-2018   NIMH Psychiatric Epidemiology Training Fellow
Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland
Funding: 5T32MH014592-39 (PI: Peter Zandi)

2016   Paul V. Lemkau Scholarship Award
Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland

2014-2015   NIDA Drug Dependence Epidemiology Training Fellow
Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland
Funding: T32-DA007292 (PI: C. Debra Furr-Holden)

2014-2018   Department of Mental Health Scholar
Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland

2004   B.A. summa cum laude, Phi Kappa Phi Honor Society
Hood College, Frederick, Maryland

COMMUNITY SERVICE AND LEADERSHIP

2016-present Student representative to the faculty, Department of Mental Health, JHSPH
2011-2015   Maryland-certified HIV Tester