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Estimating the Prevalence and Correlates of Psychiatric Disorders and Mental Health Problems among Undocumented Mexican Immigrants using the National Latino and Asian American Study

Elián P. Cabrera-Nguyen
Washington University in St. Louis

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WASHINGTON UNIVERSITY IN ST. LOUIS

George Warren Brown School of Social Work

Dissertation Examination Committee:

Vetta L. Sanders Thompson, Chair

Lorena M. Estrada-Martínez

Melody Goodman

Nancy Morrow-Howell

Juan B. Peña

Edward L. Spitznagel

Estimating the Prevalence and Correlates of Psychiatric Disorders and
Mental Health Problems among Undocumented Mexican Immigrants using the
National Latino and Asian American Study

by

Elián P. Cabrera-Nguyen

A dissertation presented to the
Graduate School of Arts and Sciences
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Dedication

This dissertation is dedicated in loving memory of my brother Stephen Cabrera. He taught me not to take myself too seriously. Life will never be the same without him. This dissertation is also dedicated in loving memory of my aunt, Dr. Valerie L. Stephens, who inspired me to pursue higher education. There is no telling what would have become of me without her unconditional love, encouragement and support. I quite literally owe her my life.

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Chapter One: Overview and Specific Aims

Mexican immigrants belong to the largest and one of the fastest-growing minority groups in the United States, and they account for approximately one-third of the nation's foreign-born population. Census data show that 22% ($n = 11.7$ million) of all self-identified Latino/as ($N = 51.9$ million) in the US are Mexican immigrants (Pew Hispanic Center [PHC], 2013a; United States [US] Census Bureau, 2013). The size of the Mexican immigrant population likely exceeds U.S. Census Bureau figures due to the presence of undocumented Mexican immigrants (UMIs). Fearing detection and deportation, UMIs generally avoid participating in the census and are undercounted more than any other difficult-to-enumerate group (Massey & Capoferro, 2004). Demographer estimates of the size of the UMI population vary; some have estimated that there are roughly 6.05 million UMIs in the US, while others have estimated that 60% of all Mexican immigrants are undocumented (Massey, 2010; PHC, 2013b). UMIs therefore comprise a significant portion of the U.S. population.

Despite comprising a significant sector of the U.S. population, there is a dearth of research on UMI mental health (Sullivan & Rehm, 2005). This state of affairs is problematic because mental illness has been identified as a national public health concern in the United States (United States Department of Health and Human Services, 1999; 2001; World Health Organization, 2008). Psychiatric disorders are among the most debilitating conditions in the US, and they exact an even greater toll on minorities (Buka, 2008; United States Department of Health and Human Services, 2001; World Health Organization, 2008). Given the size of the UMI population, more research on UMI mental health is needed to understand the true nature and magnitude of the national public health concern posed by mental illness. The few quantitative studies that have examined adult undocumented Latino/a immigrants' mental health are limited because they (a) rely on clinical and convenience samples; (b) often do not disaggregate Latino/a immigrants by ethnicity; and (c) do not use standardized diagnostic instruments to obtain psychiatric diagnoses (Cavazos-Rehg, Zayas, & Spitznagel, 2007; Pérez & Fortuna, 2005; R. Rodriguez & DeWolfe, 1990). It is important to disaggregate Latino/as in the US by specific ethnic group in mental health research because of intra-group variations in culture, history, and context of reception (Alegría et al.,

2008; Alegría, Vila et al., 2004; Portes & Rumbaut, 2006; Umaña-Taylor & Fine, 2001). Furthermore, measurement differences make it difficult to compare results across studies. Findings from these studies and related research nevertheless suggest that UMIs may constitute a subgroup of Latino/as with a distinct profile and greater risk for mental illness in comparison to their documented and US-born counterparts (Sullivan & Rehm, 2005).

Demographic Profile

It is difficult to obtain precise demographic data on UMIs because they are a hidden population. Although these data are not based on national probability samples, consistent trends have emerged across studies based on demographer estimates (Passel, 2005; Passel & Cohn, 2009), purposive samples (Amuedo-Dorantes, Bansak, & Pozo, 2005; Kochhar, 2005; Suro, 2005), community probability samples (Marcelli & Lowell, 2005) and regional probability samples (Bustamante et al., 2010). The most consistent demographic findings have been for gender, age, time in the US, income, education, and occupation.

Studies suggest that the majority of UMIs are male, although the ratio of males to females varies by study. One study estimated that 56% of undocumented immigrants are male, with single adult males accounting for 36% of the entire undocumented population (Passel, 2005). Similarly, a random-digit telephone population-based study in California found that 54% of UMIs were male compared to 50% of documented Mexican immigrants, although the difference by documentation status was non-significant (Bustamante et al., 2010). Finally, males comprised 57% of a purposive sample of UMIs (Suro, 2005).

Further, UMIs are a younger population comprised primarily of newly-arrived immigrants. A population-based telephone survey in California found significantly more UMIs (32%) fell into the 18 to 29 year age range in comparison to documented Mexican immigrants (14%); the same was true for the 30 to 39 year age range (44% and 26%, respectively). Conversely, 31% of documented Mexican immigrants were 50 years or older compared to 5% of UMIs. Furthermore, 45% of UMIs had been in the US for less than nine years compared to 9% of documented Mexican immigrants; among those in the US 20 years or more, 8% were UMIs whereas 67% were documented Mexican immigrants (Bustamante et al., 2010).

These figures are similar to findings from a study using a purposive sample of UMIs: 44% were between 18 and 29 years old, 29% were between 30 and 39 years old, and 8% were 50 or older. Likewise, 43% had been in the US for five years or less and 18% had been in the US for 6 to 10 years (Kochhar, 2005).

Studies have consistently found UMIs have lower earnings and higher poverty rates compared to documented immigrants and the US-born (Bustamante et al., 2010; Garcia, 2011; Kochhar, 2005; Ortega et al., 2007; Passel, 2005; Passel & Cohn, 2009). Findings vary, but even conservative estimates¹ show that significantly more UMIs live below the federal poverty line in comparison to documented Mexican immigrants, at 55% and 29% respectively (Bustamante et al., 2010). Moreover, UMIs earn significantly less compared to all other undocumented immigrant groups, and it has been estimated that undocumented immigrants as a whole live below the poverty line at nearly twice the rate of documented immigrants (Passel & Cohn, 2009). Unlike their documented counterparts, undocumented immigrants' earnings do not increase significantly with greater time in the US (Passel, 2005). Despite their greater poverty, however, UMIs are significantly more likely than documented Mexican immigrants to send money to family and friends in Mexico (Amuedo-Dorantes et al., 2005; Marcelli & Lowell, 2005) and in greater amounts (Fairchild & Simpson, 2004). In one sample of UMIs, 85% reported sending money back to Mexico (Hadley et al., 2008).

Poverty rates among UMIs are consistent with their educational levels and occupations in the United States. UMIs have significantly lower levels of education compared to documented Mexican immigrants (Bustamante et al., 2010; Ortega et al., 2007). They also have lower levels of education than all other undocumented immigrant groups in the United States (Passel & Cohn, 2009). Estimates of high school non-completion for UMIs vary across studies but remain consistently high. At the lower end, an estimated 65% of UMIs did not complete high school (Passel & Cohn, 2009); other studies have reported

¹ This study was based on a probability sample of California residents with landline phones. Lower-income segments of the population such as UMI farmworkers were systematically underrepresented by this sampling frame.

non-completion rates of 72% (Kochhar, 2005) and 83 percent (Hadley et al., 2008). Finally, UMIs are overwhelmingly concentrated into the following industries: agriculture, hospitality, construction, cleaning/maintenance, and domestic service (Kochhar, 2005).

Psychiatric Epidemiological Research

No nationally representative psychiatric epidemiological survey has included questions about Mexican immigrants' documentation status. Psychiatric epidemiologists have therefore not examined the role of documentation status on Mexican immigrant mental health. However, psychiatric epidemiological research has generally found that Latino/a immigrants exhibit better mental health compared to U.S.-born Latino/as, despite immigration-related stressors and greater poverty. This finding is sometimes called the immigrant paradox or the Hispanic paradox (Alegría et al., 2008; Flores & Brotanek, 2005; Franzini, Ribble, & Keddie, 2001). Recent psychiatric epidemiological studies that disaggregated Latino/as by ethnic/national origin group—Cubans, Puerto Ricans, and Mexicans—found that this “paradox” existed only for Mexican-origin adults (Alegría et al., 2008; Alegría, Canino, Stinson, & Grant, 2006).

Theoretical Framework

This dissertation adapts the psychiatric eco-epidemiological framework used by the National Latino and Asian American Study (NLAAS) (Alegría et al., 2004) to conceptualize the potential relationship between documentation status and UMI mental health. Psychiatric eco-epidemiology is an adaptation of the eco-epidemiologic model (Schwartz, Susser, & Susser, 1999) and incorporates insights from ecosocial theory (Alegría et al., 2004; Krieger, 2001; McKinlay & Marceau, 1999). Central to ecosocial theory is the notion of embodiment. Embodiment refers to “how we literally incorporate, biologically, the material and social world in which we live, from conception to death” (Krieger, 2001, p. 672). Risk for illness is conceived as the outcome of one's embodiment of cumulative exposure to pathogenic factors shaped by the interaction of social, political, and economic forces which, in turn, are largely guided by societal arrangements of power and property (Krieger, 1999, 2001, 2003, 2012).

The finding that the immigrant paradox applies consistently to Mexicans, but not Cubans or Puerto Ricans, is arguably inconsistent with the idea of cumulative exposure as articulated by ecosocial

theory within the psychiatric eco-epidemiologic framework. However, researchers have not examined the mental health of Mexican immigrants by documentation status in existing national psychiatric epidemiology studies. Since UMIs are known to be systematically underrepresented in national probability surveys (Cornelius, 1982; Judson & Swanson, 2011; Massey & Capoferro, 2004), this factor may be especially salient. UMIs confront social attitudes and governmental policies which may contribute to certain experiences and socio-demographic differences that, in turn, may lead to differential exposure to risk factors for poor mental health compared to Puerto Ricans and Cubans.

Puerto Rican immigrants and Cuban immigrants have different experiences in the US compared to UMIs. First, the US invaded Puerto Rico in 1898 and continues to colonize Puerto Rico today. Puerto Ricans are thus U.S. citizens regardless of nativity. Foreign-born Puerto Ricans who relocate to the US are therefore not subject to many of the immigration-related stressors faced by UMIs. For example, Puerto Rican immigrants (a) do not have to contend with bureaucratic hurdles to remain in the country legally; (b) are guaranteed a basic set of rights as U.S. citizens; (c) have immediate access to federal social welfare programs that are unavailable to UMIs and that, under the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA), even documented Mexican immigrants cannot access for five years after establishing they are authorized by the U.S. government to be in the United States (Kilty & de Haymes, 2000); (d) do not have to live in fear of being captured and deported; and (e) are better able to maintain circular migration patterns compared to UMIs, which allows them to maintain ties with family members and friends on the island. Next, Cuban immigrants enjoy special privileges under U.S. immigration policies. For example, (a) Cubans who surreptitiously enter the US are granted a fast-track to citizenship, something that is not available to any other group in the world; (b) there is no such thing as an “illegal” Cuban immigrant under the so-called “wet foot-dry foot” policy, so Cuban immigrants do not live in fear of detection and deportation; (c) Cubans who enter the US surreptitiously can be legally employed; (d) all Cuban immigrants are exempt from the PRWORA provision that bars other immigrants from receiving federal social welfare benefits for five years—another privilege not available to any other group or nationality; (e) Cubans who enter the country

surreptitiously are the only group eligible for federal refugee assistance programs—cash assistance, medical care, and educational assistance—regardless of whether or not they are formally designated as refugees under U.S. law. Finally, Cuban immigrants who enter the US are received into the most economically successful Latino/a co-ethnic community in the US, one that is sometimes thought of as the “model minority” of Latino/a ethnic groups (Alberts, 2005; Portes & Rumbaut, 2006; Wasem, 2009).²

In contrast, most Mexican immigrants are undocumented (Massey, 2010). Unlike Puerto Rican immigrants, they are not privy to the benefits conferred by U.S. citizenship, nor are they given the special rights granted to Cuban immigrants by U.S. law. Findings which suggest UMIs may have worse mental health compared to U.S.-born and documented Latino/a immigrants appear consistent with the pathogenic effects of cumulative stress as posited within the psychiatric eco-epidemiologic framework. UMIs are subject to pre-migration stressors such as extreme poverty and potentially permanent separation from family members (Andrews, Ybarra, & Miramontes, 2002; L. R. Chavez, 1998; S. McGuire & Georges, 2003; Zuniga, 2004). UMIs also report enduring stressors and severe trauma during and after migration.

During migration, UMIs often experience life-threatening events and/or witness the deaths of other immigrants due to border militarization and border control policies intentionally designed to maximize migrant border deaths, and they are victimized by U.S. Border Patrol Agents and other criminals (Cornelius, 2001; Foster, 2001; S. McGuire & Georges, 2003; Vargas, 2001). After migration, UMIs are more likely to experience a range of stressors in comparison to U.S.-born and documented Latino/a immigrants due to myriad issues such as occupational problems, legal difficulties, perceived discrimination, and a lack of access to healthcare (Berk & Schur, 2001; Nandi et al., 2008; Ortega et al., 2007; Pérez & Fortuna, 2005). Further, UMIs are often severely victimized and exploited by employers and other criminals. Lacking any legal or social recourse, UMIs often do not resist or report these crimes to the police because they fear their victimizers will report them to U.S. immigration authorities. In

² These examples should not be misconstrued as an attempt to minimize the experiences of Puerto Rican or Cuban immigrants.

addition, many UMIs report social isolation due to the constant fear of detection and deportation (Foster, 2001; S. McGuire & Georges, 2003; Sullivan & Rehm, 2005). Moreover, Portes and Rumbaut (2001) have described the U.S. governmental and societal modes of incorporating Mexican immigrants as hostile and prejudiced, and they noted the comparatively favorable modes by which Cuban immigrants are incorporated. Finally, UMIs have been and continue to be demonized by nativists in the vituperative national debate over immigration (S. McGuire & Canales, 2010; Padilla, Shapiro, Fernández-Castro, & Faulkner, 2008).

Conclusion

Perhaps the finding that the Latino/a immigrant paradox applies mainly to Mexican immigrants is in part a methodological artifact. UMIs tend to avoid participating in academic research studies for the same reasons they avoid participating in the census: fear of detection and deportation (Cornelius, 1982; Massey & Capoferro, 2004; Massey & Riosmena, 2010). As a result, existing national psychiatric epidemiologic surveys have systematically under-sampled the largest sector of the U.S. Mexican immigrant population. Those same Mexican immigrants who may have the highest risk for psychiatric morbidity are likely to be severely underrepresented in existing national probability surveys, although possibly to a lesser extent in the NLAAS (Alegría et al., 2004) as discussed in later chapters. The systematic under sampling of UMIs and the lack of documentation status information in national psychiatric epidemiological studies is problematic because, as Massey (2010) noted, “The inability to measure and control for legal status creates a major source of unmeasured heterogeneity, leading to significant bias in models of immigrant assimilation and incorporation” (p. 132). Consequently, the knowledge base concerning the mental health of an especially vulnerable sector of the US population remains undeveloped, and findings regarding the Mexican immigrant population in general may be biased (Sullivan & Rehm, 2005). This problem precludes the development of effective interventions and services for UMIs and possibly documented Mexican immigrants.

Expanding the knowledge base regarding UMI mental health is a social justice imperative for mental health researchers in the fields of social work and public health. The Institute for the Advancement

of Social Work Research has emphasized that the pursuit of social justice should be central to social work research (Zlotnik, Biegel, & Solt, 2002). Similarly, Krieger (2003) has asserted that, “Social justice is the foundation of public health” (p. 1989). The purpose of this dissertation is to address the social injustice manifested as a lack of evidence based practices to guide social workers and other mental health professionals working with UMIs, which is caused by the ongoing gap in the knowledge base regarding fundamental matters in mental health research with UMIs.

To this end, I examine the prevalence and correlates of mental health problems among likely undocumented Mexican immigrants (LUMIs) in the NLAAS, a nationally representative psychiatric epidemiological survey. I use two methodological approaches to identify LUMIs in the NLAAS. First, I construct a proxy variable based on profiles of UMIs in the relevant empirical literature. This approach has previously been used to study UMI poverty using census data (Garcia, 2011). Next, I model likely documentation status among Mexican immigrants via multiple imputation using chained equations (MICE)—a technique usually reserved for modeling missing data (Royston, 2009). Statisticians affiliated with the U.S. Census Bureau and the Center for Disease Control and Prevention have recently suggested using this modeling approach to estimate the characteristics of undocumented immigrants in national probability samples (Judson & Swanson, 2011; Judson, personal communication, June 11, 2012). This technique has only recently been identified as a potential method for consideration by demographers and, to the best of my knowledge, has yet to appear in any peer-reviewed academic journal; it has not been used in psychiatric epidemiological research.

The aims of this study are:

Aim 1: To examine the relationship between an undocumented immigration status and measures of Mexican immigrant mental health, both at the bivariate level and after adjusting for potential confounders.

Aim 2: To test if perceived discrimination, social isolation, food insecurity, neighborhood safety, and context-of-exit (i.e., circumstances that that precipitated the decision to migrate) mediate the

relationship between an undocumented status and indicators of poor mental health among LUMIs.

Aim 3: To examine differences in the prevalence rates of psychiatric disorders and mental health problems among LUMIs, documented Mexican immigrants, US-born Mexicans, Cuban immigrants, US-born Cubans, Puerto Rican immigrants, and US-born Puerto Ricans.

Addressing these aims using the proxy variable approach and the MICE approach will provide a basis for a discussion of the relative strengths and weaknesses of each approach.

This study will constitute a unique contribution to the literature for several reasons. First, it represents the first effort to examine psychiatric disorders among UMIs as assessed by a structured psychodiagnostic interview based on criteria from the *Diagnostic and Statistical Manual of Mental Disorders: DSM-IV-TR* (American Psychiatric Association, 2000). In addition, it is the first attempt to examine UMI mental health in a nationally representative psychiatric epidemiologic survey. Finally, this study is the first to apply the aforementioned statistical modeling approach to the estimation of the prevalence and correlates of mental health problems of UMIs in a nationally-representative psychiatric epidemiologic survey.

The remainder of this dissertation is organized as follows. Chapter Two provides a summary of key concepts. Chapter Three includes a review of the empirical literature relevant to UMI mental health and a discussion of how the theoretical framework informs the questions proposed. Chapter Four provides a review of the original NLAAS methods and procedures and describes the analytic approaches used in this dissertation. Chapter Five presents the results of the analyses for the present study. Chapter Six discusses the findings in light of existing research and provides recommendations for future research, policy and practice.

Chapter Two: Key Terms and Concepts

This chapter defines key concepts and terms and provides a rationale for the choice of terms used in this study. There is a range of concepts and terms relevant to issues of immigration, ethnicity, race, culture, and mental health. In some cases, there may be ambiguity in the literature regarding a term's definition. In other cases, there are specialized terms and concepts that need to be defined. Finally, the politically charged nature of the subject matter has yielded different terms for similar referents. This chapter specifies how, and in some instances why, a term or concept is used in this study.

Latino, Latino/a, and Hispanic

The term "Hispanic" was developed in the 1970s by the federal Office of Management and Budget (OMB). This label was imposed by the US government on people in the US with diverse cultures, nationalities, and histories. It originally included anyone of Puerto Rican, Cuban, Mexican, Central or South American, and Spanish (i.e., Spain) origin or Spanish culture regardless of race (Hayes-Bautista & Chapa, 1987; Passel & Taylor, 2009). By this definition, the following people would be lumped into the same category: a wealthy, white, monolingual English-speaking third generation descendant of Spanish (i.e., Spaniard) immigrants; an impoverished, multiracial, monolingual Spanish-speaking Puerto Rican; a working class, bilingual English and Spanish-speaking black person of Cuban descent; and an impoverished, monolingual Triqui-speaking indigenous immigrant from Mexico.

In contrast to the label "Hispanic", the term "Latino" was created by people of Latin American-origin living in the US, some of whom viewed "Hispanic" as an effort by the US government to "Europeanize" them and enforce assimilation (Calderón, 1992). "Latino" refers to a diverse group of people of Latin American heritage whose nationality groups consist of nations and peoples who were historically subjugated as part of official US foreign policy (Calderón, 1992; Hayes-Bautista & Chapa, 1987). It specifically excludes Spanish-speaking people from Europe (Hayes-Bautista & Chapa, 1987). Although the pan-ethnic term "Latino" still encompasses heterogeneous groups characterized by diverse histories and cultures, "Latinos" share more in common compared to "Hispanics" in terms of their collective historical political relationship with and experience in the United States (Calderón, 1992).

This study uses the term “Latino/a” except when citing a source that uses “Hispanic,” “Latino” or “Latina”. First, the NLAAS uses “Latino” to refer to groups in its sample in a manner consistent with the above definition of “Latino”. Next, using the term “Latino/a” acknowledges minority groups’ right to define themselves as opposed to having their identities ascribed to them by the U.S. government. Finally, this study uses “Latino/a” instead of “Latino” because the latter is the masculine form of the noun in Spanish; “Latina” is the feminine form. The use of “Latino/a” is consistent with an emerging trend in the literature (e.g., Alamilla, Kim, & Lam, 2010; Gushue, Clarke, & Pantzer, 2006; Oboler, 1992; Raffaelli & Ontai, 2004) that is more inclusive³ and thus congruent with guidelines regarding gender bias in the *Publication Manual of the American Psychological Association* (2010).

Immigrant and Migrant

The distinction between “immigrants” and “migrants” is often unclear. While both terms can refer to foreign-born persons living in the US, researchers have used these terms in different ways. For example, some researchers consider settlement patterns as the distinguishing characteristic between an immigrant and a migrant. According to this definition, “immigrants” are foreign-born persons who intend to settle permanently in the US, whereas “migrants” intend to return to their countries-of-origin (Ellis & Wright, 1998; Passel, 2005). Other researchers would add that “migrant” also implies engaging in certain types of labor, such as seasonal agricultural work and construction (Piacenti, 2010). In addition, one study defined “immigrant” as any foreign-born person living in the US regardless of documentation status, and “migrant” as a foreign-born person with government authorization to live temporarily in the US and engage in seasonal employment (López, 2001). Further, it has been argued that the terms “migrant” and “immigrant” are no longer useful for referring to foreign-born persons living in the US because both terms presume that an im/migrant’s length of settlement is a fixed condition independent of external realities such as globalization (Piacenti, 2010). Finally, Piacenti maintains, “the terms ‘migrant’ and

³ A similar example in English might be choosing to use the gender neutral term “humankind” as opposed to “mankind”.

‘immigrant’ are politically divisive constructions of a nationalistic world. The continuing use of these terms only allows provincial and national governments, corporations, and anti-immigration vigilante groups to maintain a discourse of ‘we’ versus ‘them’.” (p. 3).

In this study, I will use the terms “immigrant” and “migrant” interchangeably to refer to foreign-born persons living in the US. By using “immigrant” and “migrant” interchangeably in reference to foreign-born Latino/as, I am recognizing that their settlement intentions and preferences are often frustrated by exogenous forces, such as U.S. border militarization in the case of UMIs which drastically reduced circular migration and caused an increase in permanent settlement in the US (Massey & Riosmena, 2010; Piacenti, 2010). Finally, I will apply both terms to island-born Puerto Ricans living in the “mainland” US despite their status as U.S. citizens in recognition of Puerto Rico’s colonial status.

Documentation Status

Immigrants in the US are often discussed from either a juridical perspective or a non-juridical perspective. The juridical perspective views immigrants living within the borders claimed by the US without government sanction as violating U.S. law and therefore as criminals who deserve punishment (Johnson, 1996). The non-juridical perspective emphasizes the economic, historical, and political contexts of immigration (De Genova, 2002) and challenges the notion that undocumented immigrants are by definition criminals deserving punishment (Johnson, 1996).

These perspectives have resulted in a number of terms to describe immigrants who live within the borders claimed by the US government without its sanction. Commonly used terms include “illegal aliens”, “illegal immigrants”, “unauthorized immigrants”, and “undocumented immigrants” (De Genova, 2002; Paspalanova, 2008). Use of the term “alien” to refer to non-citizens has been criticized for being dehumanizing. It has also been criticized as a pejorative code word to describe immigrants of color and as a way of cloaking racism under the guise of a respect for the law (Johnson, 1996; S. McGuire & Canales, 2010). Moreover, using “illegal” as an adjective to modify “immigrant” is problematic because (a) it is conceptually inaccurate; only acts are governed by the penal code and an “immigrant” is a person, not an act; (b) the term “illegal” has negative social and political emotive connotations that politicians and the

media have exploited to manipulate public sentiment about the issue of immigration and to scapegoat immigrants (Paspalanova, 2008).

In this study, I use non-judicial terminology and refer to an immigrant's "documentation status" and not his or her "legal status" unless citing a source that explicitly uses the term "legal status". I also use the term "undocumented immigrant" instead of the alternatives. Finally, I use the adjective "unauthorized" to modify behaviors defined as such by U.S. law (e.g., "unauthorized border-crossing") and not people.

Psychiatric/Mental Disorders, Mental Illness, and Mental Health Problems

This study uses "psychiatric disorders" and "mental disorders" to refer to diagnosable health conditions that involve changes in mood, thinking, or behavior associated with significant distress and/or impairment in functioning. "Mental illness" is used to refer collectively to all mental disorders. The term "mental health problems" is used to refer to psychiatric signs and symptoms that do not meet the criteria for a diagnosable mental disorder. These definitions are consistent with how the terms are defined in the Surgeon General's most recent report on mental health (United States Department of Health and Human Services, 1999).

Latino/a Immigrant Paradox

In this study I use the phrase "Latino/a immigrant paradox" to refer to findings that less "Americanized" Latino/a immigrants have superior health and mental health in comparison to US-born Latino/as and non-Latino/a whites across a range of indicators. This phenomenon has been referred to by various labels including the epidemiological paradox, the immigrant paradox, the healthy immigrant effect, and the Hispanic paradox (Alegría et al., 2008; Flores & Brotanek, 2005; Franzini et al., 2001). My decision to use this term is one of convenience due to widespread reference to the "paradox" in the literature and does not indicate agreement with the implicit assumption that minorities and/or foreign-born persons have inferior cultures, thereby rendering paradoxical or "counterintuitive" findings that they have superior mental health in comparison to US-born Latino/as and non-Latino/a whites (Rudmin, 2009).

Chapter Three: Conceptual Framework

This chapter addresses the causes of undocumented Mexican migration to the United States and how documentation status relates to psychiatric disorders and mental health problems among UMIs to the United States. I begin this review by discussing theories of undocumented Mexican migration to the United States. Second, I provide a detailed review of the few quantitative, peer-reviewed studies that examine the relationship between undocumented immigration status and mental health. I then discuss the psychiatric eco-epidemiological framework and use it to guide a review of additional literature relevant to how an undocumented immigration status might relate to psychiatric disorders and mental health problems among Mexican immigrants. Finally, I present research questions and specific hypotheses about mental disorders among UMIs derived from the psychiatric eco-epidemiologic framework and the literature review.

Theories of Mexican Migration to the United States

Four theories are predominant in the literature on Mexican migration to the United States. These theories include the neoclassical economic theory of migration, the new economic theory of labor migration, the theory of cumulative causation, and the theory of economic integration (Cornelius & Rosenblum, 2005; Massey, Durand, & Malone, 2003; Massey & Riosmena, 2010). These theories are not mutually exclusive and their relative explanatory value may vary across individual migrants and specific historical time points (Cornelius & Rosenblum, 2005; Massey & Riosmena, 2010). A review of these theories highlights the role that stressors such as pre-migration poverty and border militarization play in a Mexican migrant's decision to engage in an unauthorized border crossing and sets the stage for a discussion of the potential psychiatric sequelae.

Neoclassical Economic Theory of Migration

Neoclassical economic theory views Mexican migrants as individual rational actors seeking to maximize lifetime income. This theory posits that the decision to make an unauthorized border crossing is based on a simple cost-benefit analysis (Cornelius & Rosenblum, 2005; Massey et al., 2003; Massey & Riosmena, 2010). The benefit is presumed to be financial—mean wages in the US are five times greater

than mean wages in Mexico (Massey & Riosmena, 2010). Costs may include (a) the material costs of traveling to and resettling in the US, (b) the psychological costs of separation from family and friends, and (c) the physical and psychic costs of an unauthorized border crossing (Cornelius & Rosenblum, 2005; Massey et al., 2003). This theory predicts that a rational actor will choose unauthorized migration if the perceived benefit outweighs the perceived costs (Massey & Riosmena, 2010).

U.S. border control policies have been (and continue to be) guided by the neoclassical economic theory of migration despite studies showing it does not fully explain unauthorized Mexican migration to the US (Cornelius & Rosenblum, 2005; Massey et al., 2003; Massey & Riosmena, 2010). These policies aim to deter unauthorized Mexican migration by making the financial, physical and psychological costs of an unauthorized border crossing outweigh its benefits (Massey & Riosmena, 2010). Consequently, US border control policy has focused largely on achieving this aim by intentionally making an unauthorized crossing more lethal via militarization of the US-Mexico border (Dunn, 2001; Vargas, 2001).

Scholarship on undocumented Mexican migration suggests that the Reagan and Clinton administrations implemented neoclassical economic theory-based policies responsible for increased border militarization and the concomitant rise in border deaths among Mexican migrants (Cornelius, 2001; Cornelius & Rosenblum, 2005; Cornelius, 2005; Cornelius & Salehyan, 2007; Eschbach, Hagan, Rodriguez, Hernandez-Leon, & Bailey, 1999; J. Hagan & Phillips, 2008; Massey & Espinosa, 1997; Massey et al., 2003; Massey & Riosmena, 2010). The Immigration Reform and Control Act of 1986 (IRCA), signed into law by former President Ronald Reagan, was framed as a necessary response to a supposed national security threat of terrorism posed by a “tidal wave” of UMIs entering the US—despite statistics showing no increase in the number of UMIs entering the country (Massey et al., 2003). IRCA contained two provisions that initiated the rapid acceleration of the militarization of the US-Mexico border. First, it directly allocated \$400 million dollars to increase the number of U.S. Border Patrol agents and doubled the budgets of the Immigration and Naturalization Service (INS) by 1992. Next, it gave the President a range of powers that she or he could invoke by declaring a national immigration emergency. These powers include (a) ordering the military to seal the US-Mexico border, and (b) the ability to round

up and detain any group of immigrants deemed a threat to national security without a warrant. IRCA therefore allocated \$35 million of “immigration emergency” contingency funds to the INS and US Border Patrol (Massey et al., 2003).

In 1994, the Clinton administration directed the Immigration and Naturalization Service (INS) to implement a border control strategy called “Operation Gatekeeper”. Military analysts from the Department of Defense developed Operation Gatekeeper with the expressed purpose of increasing unauthorized migrant deaths (M. Jimenez, 2009; United States Border Patrol, 1994; Vargas, 2001). This plan involved the strategic placement of US Border Patrol agents to redirect the flow of unauthorized Mexican migrants through the most hazardous terrain, taking into account the seasons of the year to maximize the lethal potential of freezing weather or extreme heat (Vargas, 2001). Official records show that the incidence of border deaths tripled during Operation Gatekeeper’s first year—a disconcerting outcome since studies have found that official records systematically undercount the incidence of border deaths (Cornelius, 2001; Vargas, 2001).

Former President Clinton further enhanced Operation Gatekeeper by signing the Illegal Immigration Reform and Immigrant Responsibility Act of 1996 (IIRIRA) into law. IIRIRA was called “the Mexican Exclusion Act” by critics because it was perceived as primarily targeting Mexican immigrants (J. Hagan & Phillips, 2008). It provided additional funding for the US Border Patrol to purchase military surveillance equipment, hire thousands of additional agents, and build fencing along the border (Massey et al., 2003). Altogether, the Clinton administration allocated resources valued at two billion dollars per year to deter undocumented Mexican migration by enhancing border militarization (J. Hagan & Phillips, 2008; Massey et al., 2003). During this time, the U.S. Border Patrol became the largest armed branch of the federal government aside from the military (Massey & Riosmena, 2010).

Enhanced border militarization has had the opposite effect of what the neoclassical economic theory of migration would predict. Raising the financial, physical and psychological costs of an unauthorized border crossing paradoxically increases the likelihood that prospective migrants will attempt (or re-attempt) an unauthorized border crossing (Cornelius & Salehyan, 2007; Massey & Riosmena,

2010). Moreover, prospective migrants are aware of the increased costs of an unauthorized border crossing such as a greater risk of injury or death yet remain undeterred (Cornelius & Salehyan, 2007; DeLuca, McEwen, & Keim, 2010; Massey & Riosmena, 2010). As one Mexican migrant noted, “We have no other option...Our only solution is to work in the United States to be able to help the family” (DeLuca et al., 2010, p. 120). Consequently, factors beyond the individual-level cost-benefit analyses posited by the neoclassical economic theory of migration may be involved.

New Economic Theory of Labor Migration

The new economic theory of labor migration (NETLM) offers an explanation for why efforts to increase the costs of unauthorized migration have been unsuccessful. The NETLM differs from the neoclassical economic theory of migration in several ways. First, families and households serve as the unit of analysis in NETLM (Cornelius & Rosenblum, 2005). Second, NETLM posits that unauthorized migration is part of a collective effort to cope with a failed local market by sending one or more household members to work in the US. Third, the NETLM maintains that unauthorized migration is intended to be temporary with the goal being to resolve economic threats to the family’s ability to sustain the household in Mexico—not to maximize individual lifetime earnings (Massey et al., 2003; Massey & Riosmena, 2010). If unauthorized migration is a temporary collective strategy to ensure a household’s well-being in Mexico, then efforts to increase the costs of an unauthorized border crossing may fail because UMIs’ decision to migrate is the outcome of a collective process and not just a self-interested, individual cost-benefit calculation. The NETLM further suggests that increased border militarization disrupts UMIs preference for circular migration and provides an incentive for more permanent settlement in the US, which may explain why the population of UMIs more than doubled after the onset of border militarization (Cornelius, 2006; Massey & Riosmena, 2010).

Cumulative Causation Theory

Current scholarship has proposed cumulative causation theory to help explain the failure of border control policies guided by neoclassical economic theory (Massey & Espinosa, 1997; Massey & Riosmena, 2010). Cumulative causation theory holds that each Mexican migrant who successfully

engages in an unauthorized border crossing causes an increase in the social capital available to prospective UMIs. Social capital in this case includes social networks that serve as potential sources of material support, information, and social support. The cause of undocumented migration becomes cumulative because each migrant who makes a successful unauthorized border crossing also makes social capital in the US available to his or her particular network of friends, family and community members (Massey & Riosmena, 2010). Access to existing social networks may lower a prospective UMIs' perception of the risks associated with an unauthorized border-crossing. US efforts to raise the cost of unauthorized migration by increasing border militarization may have been counterbalanced by prospective UMIs' perceived access to existing social capital (Massey & Riosmena, 2010). In addition, cumulative causation theory also maintains that unauthorized migration is self-perpetuating because it creates a culture of migration in some Mexican communities over time. This so-called culture of migration refers to a set of ostensibly culturally transmitted values that encourage undocumented migration because of perceived benefits to the family and community. Unauthorized migration becomes normative and even expected of young adults—those who do not migrate are stigmatized as being lazy (Kandel & Massey, 2002).

Theory of Economic Integration

The final theory under consideration, economic integration, or world systems theory, describes a line of thought that views unauthorized Mexican migration from a structural perspective (Cornelius & Rosenblum, 2005; Massey et al., 2003). Central to this theory are the concepts of economic globalization and neoliberalism. Economic globalization refers to the increasing integration of international financial markets, and it often unfolds as corporations from wealthy nations insert capitalist “free market” systems into non-capitalist and poor nations—these nations are sometimes described as “pre-market” or “undeveloped” (Cornelius & Rosenblum, 2005; Massey et al., 2003; Massey & Sánchez, 2009). As discussed by McGuire and Martin (2007), the neoliberal model is “...a market oriented policy that maintains and perpetuates the power and hegemony of the global corporations that are its chief architects...[It] opposes governmental regulations or any external controls for accountability to

communities and seeks to privatize both goods and services for the sole purpose of economic profitability” (p. 17). Scholars argue that the neoliberal model involves rolling back social welfare benefits to insure a surplus of low-wage workers (Cleaveland, 2011), while imposing a set of structural adjustments on poor and/or non-capitalist countries by corporations under the auspices of the World Bank and International Monetary Fund with the stated goal of promoting economic growth. These structural adjustments include lowering tariffs, eliminating quotas, removing laws that restrict foreign ownership and investment, and privatization of the public sector (Massey & Sánchez, 2009; S. McGuire & Georges, 2003).

In the case of Mexico, the neoliberal model was enacted via the formal agreement known as the North American Free Trade Agreement (NAFTA). In accordance with the neoliberal model, NAFTA removed restrictions on the movement of capital but not labor, thereby further enriching Mexico’s wealthy elite while having a “devastating” (S. McGuire & Georges, 2003, p. 187) and “wrenching” (Massey & Sánchez, 2009, p. 8) effect on most Mexicans. Applied to Mexico, the neoliberal model exacerbated unemployment, increased poverty and caused a decline in wages (Massey & Sánchez, 2009; S. McGuire & Georges, 2003). The flood of US business investments to “develop” industry in Mexico following the passage of NAFTA was directly linked to the displacement of 15 million small farmers and rural people and a surge in undocumented Mexican migration to the US (Massey & Sánchez, 2009; S. McGuire & Georges, 2003). From an economic integration or world systems theory perspective, UMIs are compelled to migrate by exogenous economic forces which blur the line between refugees, who are *involuntarily* forced from their homes, and *voluntary* migrants, who *choose* to migrate for economic or family reasons (Boehm, 2011; Cornelius & Rosenblum, 2005; Massey et al., 2003; S. McGuire & Georges, 2003).

Conclusion

This brief review has highlighted the major theories used to explain some of the factors that may contribute to a prospective Mexican migrant’s decision to engage in an unauthorized border-crossing. Some of these factors may have the potential to be psychologically salubrious, such as the possibility of

supporting one's family and the benefits associated with employment. However, it is also clear from this review that there are factors that could reasonably be expected to have a deleterious impact on UMI mental health, most notably pre-migration poverty and experiences crossing the border. The next section addresses what is currently known about the association between an undocumented status and mental health.

Undocumented Status and Mental Health

In their review of the UMI mental health literature, Sullivan and Rehm (2005) did not include any quantitative studies that claimed to distinguish between Latino/a immigrants by documentation status. This more recent review found four peer-reviewed quantitative studies that examined the relationship between documentation status and mental health among Latino/a immigrants. This paucity of quantitative studies is understandable given that UMIs are a hard-to-reach hidden population, and researchers are forced to use suboptimal sampling techniques (Cornelius, 1982; Massey & Capoferro, 2004; Sullivan & Rehm, 2005). While the few relevant quantitative studies have methodological limitations such as questionable generalizability, their findings collectively suggest that UMIs may have worse mental health compared to their documented counterparts.

Rodriguez and DeWolfe (1990) conducted the earliest study of the relationship between documentation status and mental health among Mexican immigrants. The aim of the study was to assess Mexican immigrants' mental health following the passage of IRCA.⁴ The researchers obtained a convenience sample of 90 Mexican immigrant women from a community family practice medical clinic. Women were excluded if (a) they presented with current psychiatric symptoms as a primary or secondary condition, or (b) they had presented at the clinic with psychiatric symptoms for any reason in the preceding two years. The participants were then divided into three equal groups: (a) UMI women who reported that they were qualified to apply for legal residence under IRCA, (b) documented immigrants

⁴ IRCA contained an "amnesty" provision that allowed undocumented immigrants meeting certain criteria to apply to the US government for legal residence.

who had lived in Mexico at least up to age 12, and (c) UMI women who reported that they did not qualify to apply for legal residence under IRCA. Next, the researchers examined levels of social support for each group and then combined the documented immigrants and the UMI women qualified to apply for legal residence into one group.⁵ UMI women who did not qualify to apply for legal residence had significantly higher mean depression and hostility scores on the Symptom Checklist-90-Revised (SCL-90-R Derogatis, 1985; as cited in R. Rodriguez & DeWolfe, 1990) compared to the combined group, even after controlling for social support. They also had higher mean scores on the paranoid ideation subscale, but the difference was non-significant.

A pilot study by Pérez and Fortuna (2005) examined the incidence of psychiatric diagnoses and suicidal ideation in a convenience sample of outpatients at a New York City psychiatric facility. The sample consisted of undocumented Latino/a immigrants ($n = 29$), documented Latino/a immigrants ($n = 144$), and US-born Latino/as ($n = 24$). The authors stated the sample contained adult Latino/a patients of Mexican, South American, and Caribbean heritage, but they did not provide details about the sample's composition by specific Latino/a group. Suicidal ideation and psychiatric disorders were determined by reviewing patients' charts for the evaluating clinician's diagnosis and assessment of suicidal ideation. Similarly, documentation status was determined by reviewing the evaluating clinician's notes in the chart for any mention of documentation status. If this information was not available, the researchers assigned undocumented status by various combinations of methods including (a) consensus, (b) consulting the evaluating clinician, and (c) tagging charts of patients who lacked both a social security number and health insurance for further consultation with the evaluating clinician. This study found that undocumented Latino/a immigrants were more likely to be diagnosed with depressive disorders, anxiety disorders, adjustment disorders, and substance abuse disorders when compared to the other groups. There

⁵ Documented immigrants had the highest level of social support, followed by UMI women who qualified for legal residence, while the UMI women who did not qualify to apply for legal residence had the least social support.

was little difference in suicidal ideation across groups, but a small trend for less suicidal ideation among documented Latino/a immigrants was noted.

A third study by Cavazos-Rehg, Zayas, and Spitznagel (2007) examined emotional distress in a snowball sample of adult Latino/a immigrants ($N = 143$). Participants were recruited from Catholic churches and a Latino/a community festival in a Midwestern city. Most of the immigrants (88%) were from Mexico. The participants were asked if they thought they would be deported if they went to a social service or government agency. Participants who gave an affirmative response to this question (39%) were designated as having an undocumented legal status. The “undocumented” group had a significantly higher mean score on the anger subscale of the Emotional Distress Scale (EDS; Carver et al., 1993; as cited in Cavazos-Rehg et al., 2007) in comparison to the rest of the sample. There were no significant differences in EDS depression or anxiety subscale scores.

Finally, Potochnick and Perreira (2010) used a stratified cluster design to sample 218 Latino/a immigrant youth (70% Mexican) ages 12 to 19 in North Carolina. Documentation status was assessed by parental self-report. They used logistic regression models to examine the role of documentation status in predicting clinically significant depression and clinically significant anxiety after adjusting for age, gender, stressful migration experience, social support, time in the US, discrimination and optimism. Compared to documented Latino/a adolescents, the odds of being depressed were 30.77 times greater for undocumented Latino/a adolescents who have a documented parent. Furthermore, the odds of having clinically significant anxiety were 8.59 times greater for undocumented Latino/a adolescents who have a documented parent and 6.29 times greater for undocumented Latino/a adolescents with an undocumented parent.

Summary

These four studies of the relationship between documentation status and mental health suggest that UMIs may have worse mental health compared to documented Mexican immigrants and US-born Mexican-origin adults. Given the low number of studies and their methodological limitations (e.g., power concerns, small sample sizes, samples with questionable population validity vis-à-vis adult UMIs,

uncertain reliability in identifying undocumented immigrants, etc.), another approach to exploring and understanding literature with potential relevance to UMI mental health is needed. In the next section, I use the psychiatric eco-epidemiological framework to guide my review of additional relevant literature.

Psychiatric Eco-Epidemiological Framework

The NLAAS psychiatric eco-epidemiological framework is informed by ecosocial theory (Alegría et al., 2004). Ecosocially-based frameworks recognize that susceptibility to disease is in part a function of cumulative exposure to risk factors over time (Krieger, 1999, 2001). Stress is a well-known risk factor for psychiatric disorder (McEwen, 2004) and cumulative stressors, both chronic and acute, are known to be robust predictors of mental health problems (Thoits, 2010).

The NLAAS psychiatric eco-epidemiologic framework links the risk for psychopathology to stressors related to (a) social position indicators at the primary level, (b) environmental context at the secondary level, and (c) psychosocial factors at the tertiary level (Alegría et al., 2004). However, the NLAAS did not ask about immigrant documentation status and it is not included in the original framework. I propose adapting the NLAAS theoretical framework by adding “documentation status” to the primary level as an indicator of social position in the United States. Figure 3.1 presents the adapted NLAAS psychiatric eco-epidemiologic framework used in this study.

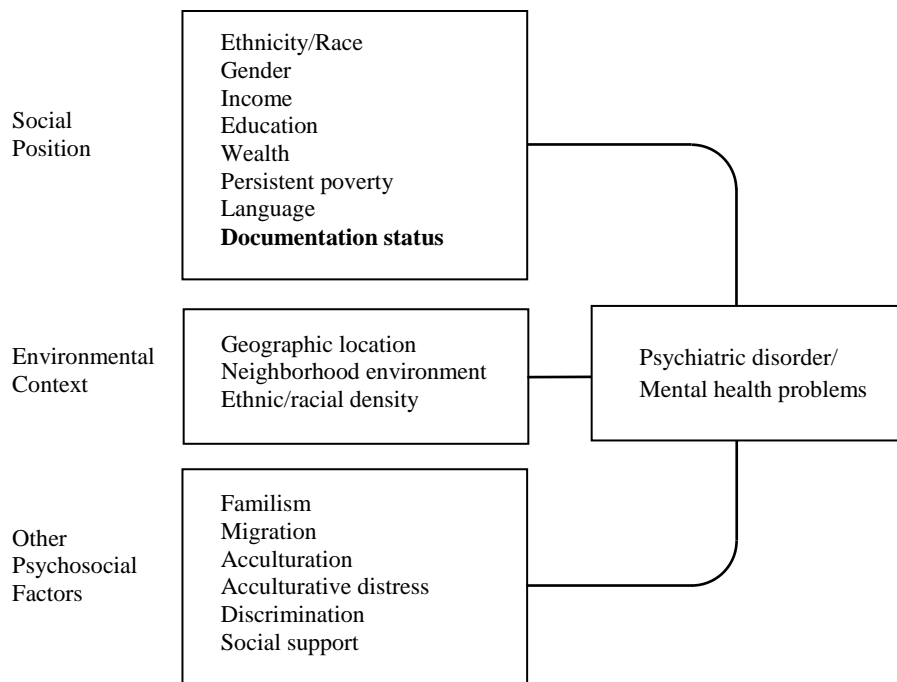


Figure 3.1. The Adapted NLAAS Psychiatric Eco-epidemiologic Model. Includes documentation status as an indicator of social position. Adapted from “Cultural Relevance and Equivalence in the NLAAS Instrument: Integrating Etic and Emic in the Development of Cross-Cultural Measures for a Psychiatric Epidemiology and Services Study of Latinos,” by M. Alegría, D. Vila, M. Woo., G. Canino, D. Takeguchi, M. Vera, et al., 2004, *International Journal of Methods in Psychiatric Research*, 13(4), p. 275.

This review will present the literature related to UMI stress organized according to an ecosocially-informed psychiatric eco-epidemiological framework which understands stressors as having a cumulative effect on the incidence of psychiatric morbidity across the life course. UMIs contend with a unique set of stressors not necessarily encountered by their documented and US-born counterparts (Sullivan & Rehm, 2005), and this differential cumulative exposure to stressors may lead to worse mental health outcomes for UMIs compared to other Latino/a ethnic and nativity groups. The literature pertaining to chronic and acute stressors that UMIs often experience is therefore presented in a temporal order consistent with the three stages of the migration process (Foster, 2001; Loue, 2009): pre-migration stressors, peri-migration stressors, and post-migration stressors.

Pre-Migration Stressors

There is scant research on the stressors that precede UMIs’ decision to migrate. Pre-migration stressors for UMIs fall into two main categories in the literature: chronic poverty and family separation.

Consistent with the idea of cumulative effect of exposure to risk, UMIs “interpret after-migration experiences from a lens that was created, at least in part, prior to the actual migration” (Grzywacz et al., 2006, p.86).

Poverty. Demographers, economists and political scientists have mostly analyzed pre-migration poverty indirectly at the macrosocial level. They have examined migratory trends, settlement patterns, and sociodemographic characteristics in relation to tests of various theories of migration. Their specific findings regarding UMIs’ pre-migration demographic characteristics relevant to poverty are sometimes contradictory. For example, Marcelli and Cornelius (2001) found that UMIs’ pre-migration educational levels increased dramatically starting in the 1970s, despite an association between increased education and greater financial success within Mexico (Kandel & Massey, 2002). This result could suggest that poverty may not necessarily be a pre-migration stressor. Conversely, Durand, Massey and Zenteno (2001) found that UMIs’ pre-migration educational levels decreased substantially during the same time period. In a study of whether or not greater border militarization deterred undocumented Mexican immigration, Cornelius and Salehyan (2007) found that it had very little impact on UMIs’ decision to migrate, even after accounting for UMIs’ knowledge of U.S. border control policies and the dangers associated with an undocumented border crossing. Cornelius and Salehyan concluded that for UMIs, US “restrictions on immigration are far outweighed by economic...incentives to migrate” (Cornelius & Salehyan, 2007, p. 149). UMIs’ willingness to take such life-threatening risks for “economic incentives” suggests that poverty may be a strong pre-migration stressor.

Health and health services researchers have also examined economic factors as precipitants for undocumented migration. In the nursing literature, McGuire and Georges (2003) argued in their qualitative study of UMI health that neoliberal economic policies such as NAFTA have exacerbated poverty in Mexico to the extent that UMIs who arrive in the US are de facto “economic refugees” (p. 187). Other researchers have shown that poverty may be a common pre-migration stressor for UMIs. First, in a multi-site community probability survey of undocumented Latino/a’s health care use ($N = 973$; 90% UMIs), the most common reason participants gave for migrating to the US was to find work (Berk,

Schur, Chavez, & Frankel, 2000). Next, a study of adult Latina immigrants' (97% Mexican) access to health care in Fort Worth, Texas, found that undocumented immigrants were significantly more likely than documented immigrants to report that they migrated for work or economic reasons (Marshall, Urrutia-Rojas, Mas, & Coggin, 2005). In addition, all UMI's in a recent qualitative study indicated that they migrated to the US to escape chronic poverty in Mexico (Bacallao & Smokowski, 2007). Similarly, all participants in a study of apprehended UMI men in a detention facility cited economic hardship as the main reason they chose to migrate. Most of the men stated they planned to try to cross the border again despite the potentially lethal risks because they had no other options (DeLuca et al., 2010). Taken together, the findings from these studies portray a group of people whose economic situation in Mexico is distressing enough that they are willing to risk their lives crossing the US-Mexico border without documentation in order to find work.

Family separation. Anticipation of family separation may be a pre-migration stressor for UMIs, and anticipatory stress contributes to the effects of cumulative stress (Carlson & Chamberlain, 2005). "Familism" is a core feature of Mexican culture that refers to an attachment to the nuclear and extended family characterized by intense loyalty and solidarity. Mexican culture accords primacy to the bonds of family relationships, within and across generations, throughout a person's entire lifespan (Organista, 2007; N. Rodriguez, Mira, Paez, & Myers, 2007). For example, Mexican men apprehended while attempting an unauthorized border crossing stated that their main motivation to migrate was to alleviate their families' economic distress and preserve family cohesion. Their emphasis on the importance of family cohesion is noteworthy because the men were aware that by migrating, they risked the permanent dissolution of their families and that this dissolution might persist even after apprehension and deportation (DeLuca et al., 2010).

Family separation may also be a powerful emotional stressor for those left behind, because the desire for family reunification often serves as an incentive for other family members to migrate. For instance, UMIs often leave their children with relative and nonrelative caregivers because of the danger associated with crossing the border. These children frequently run away and try to cross the border on

their own to reunite with their parents in the United States (L. R. Chavez, 1998; L. Chavez & Menjívar, 2010). Moreover, most UMI women in a Pacific Northwest study reported they had made repeated attempts to enter the US without documentation to reunite with family members (Andrews et al., 2002). In addition, reuniting with family members was among the top reasons UMIs gave for migrating to the US in a multi-site probability survey (Berk et al., 2000). Finally, epidemiological research supports the notion that Mexicans experience separation from family members who have migrated to the US as a significant stressor. A recent national psychiatric epidemiologic study in Mexico found that the odds for suicidal ideation were 50% greater for Mexicans with a family member who had migrated to the US than for Mexicans without a family member who had migrated to the United States. This study also found that the odds for attempted suicide were 68% greater for Mexicans with a family member who had migrated to the US than for Mexicans without a family member who had migrated to the United States (Borges et al., 2009).

Summary. While compelling, these studies of poverty and family separation as pre-migration stressors among UMIs are not without limitations. Some of the studies are qualitative and thus have limited external validity (Andrews et al., 2002; Bacallao & Smokowski, 2007; L. R. Chavez, 1998; DeLuca et al., 2010; S. McGuire & Georges, 2003). In addition, Berk and colleagues (2000) relied on self-reported documentation status, which may have threatened the study's internal validity. Further, their sampling frame may have compromised the study's external validity—it included undocumented Latino/a immigrants (90% UMIs) and was restricted to four communities: El Paso and Houston in Texas; Fresno and Los Angeles in California. Similarly, the internal validity of Marshall and colleagues' (2005) study may have been compromised due to reliance on self-reported documentation status. External validity may have been threatened by the use of purposive sampling and restricting the sample to Latina immigrants (97% Mexican) in Fort Worth, Texas. Finally, Borges and colleagues' (2009) national probability sample was only representative of the urban population in Mexico. Their findings may therefore not be generalizable to the rural Mexican population (Borges et al., 2009). Despite these limitations, the

available research suggests that poverty and family separation may be powerful pre-migration stressors for many UMIs.

Peri-Migration Stressors

The US-Mexico border has been described as the most militarized and deadliest border between two nations not at war (Massey & Riosmena, 2010; S. McGuire & Georges, 2003). Policies to increase border militarization persist despite evidence that they have (a) failed to deter unauthorized Mexican migration; (b) caused the UMI population in the US to more than double by creating a disincentive for the longstanding pattern of circular migration; and (c) dramatically increased migrant border deaths, migrant suffering, and the profits of human smugglers and other criminals (Cornelius, 2001; Cornelius, 2006; Cornelius & Salehyan, 2007; Massey et al., 2003; Massey & Riosmena, 2010; Vargas, 2001). To place the number of border deaths in perspective, the estimated number of Mexican migrants who died at the border from 1995 to 2004 was 10 times greater than the number of East Germans who died at the Berlin Wall during its 28 year existence (Rubio-Goldsmith, McCormick, Martinez, & Duarte, 2007). Consequently, the perilous experience of crossing the US-Mexico border is a shared source of traumatic stress among many UMIs (Foster, 2001; S. McGuire & Georges, 2003), so much so that helping professionals who serve them are advised to routinely assess for symptoms of PTSD (Hargrove, 2006; Zuniga, 2004).

Most UMIs have been exposed to increased risk for peri-migration stressors and traumas associated with an unauthorized border crossing, and many are exposed repeatedly. Undocumented immigrants usually enter the US by either overstaying a temporary visa or crossing the border without US government authorization. Over 90% of UMIs enter the US in the latter manner, because few can meet the financial requirements imposed by IRCA and IIRIRA to be eligible for a visa (Massey et al., 2003; Massey & Riosmena, 2010). Further, some researchers estimate that one-third of UMIs are apprehended while crossing the border without US government authorization. Of these migrants, 92% to 97% keep trying to cross until they eventually succeed (Cornelius, 2006; Cornelius & Salehyan, 2007). Another

study found that half of UMIs in a US sample were captured during migration. These UMIs reported up to three border-crossing attempts before succeeding (Andrews et al., 2002).

Peri-migration stressors and traumas may be categorized as follows: (1) stressors and traumas related to being forced into hostile environmental terrain; (2) stressors and traumas related to victimization by criminals; (3) stressors and traumas related to being forced to take greater risks to cross the border. Given the inherent difficulties of studying hidden populations like UMIs (Cornelius, 1982; Massey & Capoferro, 2004), the exact incidence of such stressors and traumas is unknown. In one study, however, most UMIs reported experiencing peri-migration stressors, including life-threatening dangers (Andrews et al., 2002).

Hostile environment. Studies suggest a large proportion of UMIs likely experienced a threat to their physical well-being due to hostile environmental conditions while crossing the border. First, in a survey of 262,989 migrants apprehended by the border patrol from December 1999 to May 2000, 70% reported experiencing some type of environmental threat. Thirty-six percent of these migrants reported suffering extreme cold or extreme heat, and 35% reported suffering due to a lack of food or water (Cornelius, 2001). Next, qualitative studies of UMI border crossings are replete with themes of dehydration, starvation, exposure to extreme heat or cold, attacks by wild animals, and near-drowning (L. R. Chavez, 1998; L. Chavez & Menjívar, 2010; DeLuca et al., 2010; S. McGuire & Georges, 2003; Singer & Massey, 1998). Finally, studies have found that most migrant deaths along the border are attributable to environmental causes due to US border control policies. The top environmental causes of death are heat exposure, hypothermia, dehydration and drowning (Cornelius, 2001; Eschbach et al., 1999; Sapkota et al., 2006).

Victimization by criminals. Many UMIs are exploited and victimized by criminals while crossing the border. For instance, Mexican migrants often pay *coyotes*, or human smugglers, to help them cross the border. The increase in US border militarization has caused an increase in the number and profits of *coyotes* (Cornelius, 2001; Cornelius & Salehyan, 2007; J. Hagan & Phillips, 2008; Massey & Riosmena, 2010). There are reports in the literature of *coyotes* (a) kidnapping UMIs and subjecting them to forced labor to work off “extra costs” (Foster, 2001; Gushulak & MacPherson, 2000); (b) raping UMI women (Andrews et al., 2002; Foster, 2001; Solis, 2003) and (c) robbing and abandoning migrants in remote locations (Andrews et al., 2002; L. Chavez & Menjívar, 2010; DeLuca et al., 2010). In addition, UMIs report being attacked and robbed by border bandits, and they are victimized and killed by armed nativist paramilitary vigilantes on the US side of the border (L. R. Chavez, 1998; Cornelius, 2005; DeLuca et al., 2010; Vargas, 2001; Zuniga, 2004) such as the so-called “Minutemen” (Smith, 2011).

Apprehended migrants often experience severe trauma at the hands of criminal US Border Patrol agents who have de facto impunity (Vargas, 2001). The US Border Patrol’s use of excessive force, beatings and racially motivated psychological abuse has been described as “routine” (Vargas, 2001, p. 42). Other abuses include unprovoked shootings, rape, sexual assault, torture, denial of food and water, and the withholding of medical care (J. Hagan & Phillips, 2008; Solis, 2003; Trevino, 1998; Vargas, 2001; Zuniga, 2004). Moreover, detained UMIs tend to underreport abuses by US Border Patrol agents; nevertheless, they lodged thousands of formal abuse complaints against US Border Patrol agents from 1997 to 2000, which resulted in virtually no prosecutions or convictions (Trevino, 1998; Vargas, 2001). Vargas (2001) noted that

the atrocities and brutal abuses inflicted by US Border Patrol agents upon undocumented Mexican nationals have been so numerous and egregious, that this untenable situation finally raised the attention of the US Congress. In 1994 and again in 1997...the US House of Representatives held special hearings to address the questions [and] investigate these abuses... (p. 55).

These “atrocities and brutal abuses” have escalated to the point where, according to one report, UMI women routinely take birth control pills in anticipation of being raped while crossing the border by gangs of criminals and the US Border Patrol (Falcón, 2001) .

Taking greater risks. Because of enhanced border enforcement, some UMIs suffer the consequences of taking life-threatening risks while crossing the border. They get hit by cars while running across busy freeways trying to avoid apprehension (L. R. Chavez, 1998). Moreover, fearing robbery and assault by border bandits, some UMIs reportedly carry insufficient supplies of food and water while crossing the desert so that they make less attractive targets (DeLuca et al., 2010). In addition, migrants often hop trains during a border-crossing attempt. Some migrants pack tightly together into boxcars with few supplies, later discovering the door locked from the outside. Railroad workers have found many of them suffering or dead from suffocation, starvation and dehydration. Other migrants ride the trains by hiding beneath the boxcars, with many dying or losing limbs due to this dangerous practice (L. R. Chavez, 1998; L. Chavez & Menjívar, 2010; Spener, 2001).

Summary. Although the exact incidence of peri-migration stressors and traumas among UMIs is unknown, the literature suggests that such stressors are not uncommon. Despite the methodological limitations inherent in studying this hidden population, the data suggest UMIs are often exposed to peri-migration stressors associated with the border's hostile environmental terrain, victimization by criminals, and engaging in riskier behaviors to cross the border.

Policies to increase border militarization may also contribute to and exacerbate peri-migration stressors. Guided by military planners from the Department of Defense, the US Border Patrol implemented a "prevention through deterrence" strategy in 1994 with the expressed intent of increasing the risks associated with unauthorized border-crossings and maximizing UMI deaths (United States Border Patrol, 1994; Vargas, 2001). As noted in the *Border Patrol Strategic Plan: 1994 and Beyond*,

The border environment is diverse. Mountains, deserts, lakes, rivers and valleys form natural barriers to passage. Temperatures ranging from sub-zero along the northern border to the searing heat of the southern border effect illegal entry traffic...Illegal entrants crossing through remote, uninhabited expanses of land and sea along the border can find themselves in mortal danger (United States Border Patrol, 1994, p. 2).

The report goes on to state, "No other institution has amassed a more comprehensive knowledge of the border environment. Strategic planners [from the Department of Defense] relied on this knowledge in generating the assumptions and predictions incorporated into this strategy...The prediction is that with

traditional entry and smuggling routes disrupted, illegal traffic will be deterred, or forced over more hostile terrain...” (pp. 5-7).

As a result of this strategic plan, the number of migrant border-crossing deaths tripled during the 1990’s (Massey et al., 2003), but there was no concomitant decrease in unauthorized border-crossing attempts (Cornelius, 2001; J. J. Durand & Massey, 2003; J. Hagan & Phillips, 2008). In addition, a substantial proportion of UMIs must often make multiple attempts before they are successful (Andrews et al., 2002; Cornelius & Salehyan, 2007). Consequently, many UMIs have likely experienced traumas such as witnessing the death of a loved one and threats to their own lives (Hargrove, 2006; Zuniga, 2004). U.S. immigration policy towards Mexico may therefore exacerbate peri-migration stress for UMIs and cause their cumulative stress—and thus the prevalence of mental illness—to surpass that of documented Mexican immigrants and US-born Mexican-origin adults.

Post-Migration Stressors

After arriving in the US, UMIs continue to endure a set of chronic stressors that give them a unique risk profile for psychiatric morbidity compared to documented and US-born Mexicans (Sullivan & Rehm, 2005). Common post-migration stressors among UMIs include documentation status anxiety; exploitation and victimization; social isolation; limited access to healthcare; poverty; and discrimination (Bustamante et al., 2010; L. R. Chavez, 1998; Fussell, 2011; Goldman, Smith, & Sood, 2005; S. McGuire & Georges, 2003; Ortega et al., 2007; Sullivan & Rehm, 2005). These post-migration stressors may further compound UMI’s cumulative stress and thereby increase risk of psychiatric morbidity.

Documentation status anxiety. An undocumented immigration status can be a chronic stressor that infuses most aspects of UMIs’ lives with constant fear of deportation (Dozier, 1993; S. McGuire & Georges, 2003; Shattell, Hamilton, Starr, Jenkins, & Hinderliter, 2008; Sullivan & Rehm, 2005). The US has been described as a “deportation regime” (DeGenova & Peutz, 2010, as cited in Boehm, 2011, p. 12) that inflicts a “culture of terror” (Scheper-Hughes & Bourgois, 2004, as quoted in Boehm, 2011, p. 12) on UMIs. The constant threat of apprehension and deportation creates a climate of fear among UMIs that can

lead to hyper-arousal and hypervigilance, conditions known to be conducive to illness associated with cumulative stress (Carlson & Chamberlain, 2005; S. McGuire & Georges, 2003).

Qualitative and quantitative studies suggest documentation status anxiety is indeed a powerful stressor for UMIs that may add to the pathogenic effects of cumulative stress. In qualitative studies, UMIs have reported feeling terrorized by the constant threat of deportation and having nightmares about being apprehended and deported by immigration authorities (L. R. Chavez, 1998; Safdie, 2009). Fear of deportation due to being undocumented also emerged as a pervasive theme in a qualitative study of access to mental health services among Latino/as (Shattell et al., 2008). Furthermore, the theme of being jailed is prevalent in ethnographic research involving interviews and analysis of folk music popular among UMIs, and it is related to fear of deportation. For example, the song *Jaula de Oro* (“The Gilded Cage”) contains the following verses:

¿De qué me sirve el dinero si yo soy como prisionero dentro esta gran nación? Cuando me acuerdo hasta lloro aunque la jaula sea de oro, no deja de ser prisión...De mi trabajo a mi casa. Yo no sé lo que me pasa aunque soy hombre de hogar. Casi no salgo a la calle pues tengo miedo que me hallen y me pueden deportar.

What good is money if I am like a prisoner in this great nation? When I think about it, I cry. Even if the cage is made of gold, it doesn't make it less of a prison...From my job to my home. I don't know what is happening to me. I am a homebody. I almost never go out to the street. I am afraid I will be found and could be deported (L. R. Chavez, 1998, pp. 160-161).

In addition, documentation status anxiety causes UMIs to engage in “fear-based behaviors” (Sullivan & Rehm, 2005, p. 248) to avoid detection by immigration authorities such as not seeking needed medical treatment, not reporting instances of victimization, and self-isolation (L. R. Chavez, 1998; S. McGuire & Georges, 2003; Safdie, 2009; Sullivan & Rehm, 2005).

Quantitative studies have also found that undocumented Latino/a immigrants experience their immigration status as a major stressor. In one study, undocumented Latino/as reported a significantly higher mean number of psychosocial stressors in comparison to documented and US-born Latino/as, and they were more apt to report immigration status-related stressors than their counterparts (Pérez & Fortuna, 2005). Further, a recent study found that undocumented Latino/a immigrants suffer from significantly greater legal status anxiety in comparison to documented Latino/as (Arbona et al., 2010). Finally, legal

status anxiety has been found to be related to increased allostatic load, a measure of cumulative stress that uses physical biomarkers (Stewart, 2006), among undocumented male Latino migrant day laborers (de Castro, Voss, Ruppin, Dominguez, & Seixas, 2010) and greater depression in a sample of Mexican immigrants with unknown documentation statuses (Finch, Kolody, & Vega, 2000).

Exploitation and victimization. Because of their documentation status, UMIs are especially vulnerable to exploitation and victimization (Bucher, Manasse, & Tarasawa, 2010; Fussell, 2011; Sullivan & Rehm, 2005). Mechanisms of this increased vulnerability include immigrants' fear of deportation and perpetrators' use of that fear (Bucher et al., 2010; Fussell, 2011). UMIs are disproportionately the victims of robbery, assault, and they are significantly more likely to experience labor exploitation in comparison to documented immigrants. The perpetrators include individual offenders, private businesses, and the US government (Bucher et al., 2010; Fletcher, Pham, Stover, & Vinck, 2006; Fussell, 2011; Gorman, 2010; Phillips & Massey, 1999; Sabates-Wheeler, 2009; Valenzuela, Theodore, Meléndez, & Gonzalez, 2006; Vinck, Pham, Fletcher, & Stover, 2009). The frequent victimization of UMIs and the higher rate of exploitation they experience in comparison to documented immigrants may contribute to higher scores on an indicator of cumulative stress (de Castro et al., 2010).

Robbery. UMIs are considered attractive targets for assault and robbery by criminals for several reasons. First, they generally do not have bank accounts. Perpetrators know that UMIs tend to carry large sums of cash and/or store large sums of cash in their homes—criminals often refer to them as “walking ATMs” (Bucher et al., 2010; Fussell, 2011). In addition, perpetrators are also aware that their UMI victims are unlikely to contact the police because they fear being deported (Bucher et al., 2010; Fussell, 2011). Moreover, many criminals assume that most UMIs cannot speak English well enough to file a police report (Bucher et al., 2010). Criminals assault and rob undocumented Latino/a immigrants so frequently that they have even developed a slang term for seeking out and targeting undocumented Latino/a immigrants: “amigo shopping” (Bauer & Reynolds, 2009).

Employer exploitation. UMIs are vulnerable to employers who exploit their immigration status and reluctance to report workplace abuses due to fears of deportation (Bucher et al., 2010; Fussell, 2011; Gleeson, 2010). Employers exploit UMIs' fear of deportation to cut costs by not paying or underpaying UMIs and ignoring occupational safety regulations (Gleeson, 2010; Vinck et al., 2009). Further, US immigration laws facilitate employers' exploitation of UMIs. For example, US law requires employers to screen their employees' documentation statuses and to report suspected UMIs to Immigration and Customs Enforcement (ICE). Although there are provisions in US law that impose fines on employers for hiring UMIs, these provisions are so rarely enforced as to be negligible (Gleeson, 2010; S. Lee, 2009). Indeed, immigration laws like IRCA have fostered a "culture of collaboration" (S. Lee, 2009, p. 1109) between private employers and US immigration authorities that have turned private employers into agents of the state. Private employers can therefore hire UMIs without fear of punishment and use their de facto powers as immigration officials as leverage to exploit UMIs (S. Lee, 2009).

According to Lee (2009), many employers

report workers in retaliation for unauthorized immigrants' attempting to assert their labor and employment rights. Employers, therefore, possess a great deal of discretion over whom they hire and whom they report, and in both instances it appears they exercise that discretion in a manner that elevates their interest in maximizing profit...[E]mployers are best understood as private immigration screeners who identify potentially unauthorized immigrants within their workforces for removal...[They] shape the conditions under which unauthorized immigrants remain in the United States and define the conditions triggering [ICE] detention and removal (pp. 1107 – 1109).

Gleeson (2010) also noted that US immigration laws perpetuate exploitation of UMIs by enabling an employer to "invoke the formidable powers of the government's law enforcement apparatus to terrorize its workers and suppress worker dissent under threat of deportation" (p. 216). A study of businesses raided by the Immigration and Naturalization Service (INS) in New York City found that 55% of the raids were precipitated by at least one formal complaint to a labor agency (Wishnie, 2003). According to Wishnie (2003), the INS has "allowed itself to be used as a tool of sweatshop bosses unlawfully retaliating against their workers" (p. 390). It is thus unsurprising that UMIs report high levels of workplace stressors related to wage exploitation, abusive behavior, and employer violation of

occupational safety regulations (Fletcher et al., 2006; Fussell, 2011; S. Lee, 2009; Mehta, Theodore, Mora, & Wade, 2002; Vinck et al., 2009; Walter, Bourgois, Margarita, & Schillinger, 2002).

Wage exploitation. UMIs suffer from higher rates of wage exploitation in comparison to their documented counterparts. For example, Phillips and Massey (1999) examined wage differentials between Mexican migrants by documentation status before and after the passage of IRCA. They found that, after controlling for sociodemographic factors and social networks, employers paid UMIs 33% less than documented Mexican migrants in the immediate aftermath of the law's enactment. Similarly, an undocumented status has been found to suppress an immigrant's earnings regardless of educational level, English proficiency, and length of residence in the United States (Mehta et al., 2002). Furthermore, a more recent study by Hall, Greenman and Farkas (2010) analyzed data from a national probability sample and found a 17% wage disparity between documented and undocumented Mexican immigrant men, and a 9% wage disparity between documented and undocumented Mexican immigrant women.

UMIs are routinely victims of wage theft and they experience it at a higher rate compared to documented immigrants (Fletcher et al., 2006; Fussell, 2011; Vinck et al., 2009). A recent study of mostly undocumented Mexican day laborers found that approximately half reported at least one instance of wage theft in the preceding two months (Valenzuela et al., 2006). Knowing UMIs lack legal recourse, some employers simply refuse to pay UMI workers and threaten to call ICE if the workers complain. In other cases, UMIs find ICE agents waiting for them when they arrive to pick up their paychecks (Fussell, 2011).

Abusive treatment. Undocumented workers are often subjected to various forms of abusive treatment by employers. One of the most common abusive employer practices is to overwork UMIs, who have identified physically exhausting labor as a major stressor (Bacallao & Smokowski, 2007). Employers either overtly refuse to allow UMIs to take lunch and bathroom breaks or create rules tying productivity to payment that are so difficult to meet that UMIs "voluntarily" abdicate lunch and bathroom breaks (Holmes, 2006; Valenzuela et al., 2006). In a study by Valenzuela and colleagues (2006), 44% of

day laborers reported that an employer had denied them food and/or bathroom breaks in the preceding two months. Holmes' (2006) ethnographic study of UMI farm workers provided a detailed account of such abusive practices on one farm:

Strawberry pickers must bring in 50 pounds of de-leafed berries every hour. Otherwise, they will be fired and kicked out of the camp. In order to meet this minimum weight requirement, they take few or no breaks from 5:00 A.M. until the afternoon or evening when that particular field is completed...Many do not eat or drink anything before work so that they do not have to take time to use the outhouse. They work as hard and fast as they can, picking and running with their buckets of berries to the white [teens who weigh the berries and determine if they meet the quota] (p. e448).

Other forms of employer abuse include physical assault and verbal abuse including threats and racist epithets (Fussell, 2011; Holmes, 2006; Holmes, 2007; Valenzuela et al., 2006).

Hazardous work conditions. Undocumented Latino/a immigrants experience unsafe work conditions as a stressor (Negi, 2011). US immigration law has provided employers with ample access to a low-wage labor force and enabled them to cut costs by flouting workplace safety regulations (Champlin & Hake, 2006; Nessel, 2001). UMIs are therefore over-represented in some of the lowest-paying and most dangerous occupations such as agricultural work and construction (Farquhar et al., 2008; Passel & Cohn, 2009; Walter, Bourgois, & Margarita Loinaz, 2004). In addition, studies have shown that undocumented workers are more likely to experience hazardous working conditions in comparison to documented workers (Fletcher et al., 2006; Mehta et al., 2002; Vinck et al., 2009). Due to their undocumented status, they are at an exceptionally high risk for work injury (de Castro et al., 2010; Walter et al., 2004). Latino/a immigrants in general have been found to have higher rates of workplace injury and fatality in comparison to other immigrants (de Castro et al., 2010), possibly because a large portion of Latino/a immigrants is undocumented.

Health care access. Difficulty accessing health care has been identified as a stressor for undocumented Latino/a immigrants (Pérez & Fortuna, 2005). Immigration status-related concerns, such as fear of deportation or denial of treatment, cause many UMIs to delay or avoid seeking care (Berk et al., 2000; Berk & Schur, 2001; Bustamante et al., 2010). For example, 39% of a sample of undocumented Latino/a immigrants from a multisite survey of undocumented Latino/a immigrants expressed fear related

to receiving medical treatment due to their documentation status. The number of undocumented Latino/a immigrants expressing fear across the four sites ranged from 34 to 45 percent. Furthermore, those undocumented immigrants who reported fear related to receiving medical treatment were substantially less likely to obtain needed medical treatment compared to those who did not report fear (Berk & Schur, 2001). Consequently, there have been reports of UMIs giving birth at home, refusing to seek treatment for lead poisoning, not seeking medical care for seriously ill children, and resisting medical treatment until they lose consciousness and are rushed to the emergency room (Berk & Schur, 2001; L. R. Chavez, 1998).

In addition, studies have consistently shown that UMIs tend to be uninsured and have low rates of access to a usual source of medical care (Berk et al., 2000; Bustamante et al., 2010; Marshall et al., 2005; Nandi et al., 2008; Ortega et al., 2007; Urrutia-Rojas, Marshall, Trevino, Lurie, & Mingua-Bayona, 2006). Findings regarding the rate of health insurance for UMIs and undocumented Latino/a immigrants vary across studies and range from roughly 10% (Marshall et al., 2005; Nandi et al., 2008; Urrutia-Rojas et al., 2006) to 47 percent⁶ (Bustamante et al., 2010). However, all studies have found that undocumented immigrants have significantly lower rates of health insurance compared to documented immigrants (Bustamante et al., 2010; Goldman et al., 2005; Marshall et al., 2005; Urrutia-Rojas et al., 2006). Similarly, studies have shown that UMIs and undocumented Latino/as are substantially less likely to have access to a usual source of medical care (Bustamante et al., 2010; Marshall et al., 2005; Ortega et al., 2007; Urrutia-Rojas et al., 2006). These results are concerning given findings that (a) UMIs and undocumented Latino/a immigrants have high rates of poor self-reported health (de Castro et al., 2010; Urrutia-Rojas et al., 2006), and (b) UMIs have worse self-reported health compared to their documented counterparts (Ortega et al., 2007; Urrutia-Rojas et al., 2006). For example, despite being much younger

⁶ This study was based on a probability sample of California residents with landline phones. Lower-income segments of the population such as UMI farmworkers were systematically underrepresented by this sampling frame.

compared to documented Mexican immigrants in one study, UMIs were 11 times more likely to report their health as poor (Urrutia-Rojas et al., 2006).

Social isolation. Social isolation is a major post-migration stressor for UMIs (Bacallao & Smokowski, 2007; S. McGuire & Martin, 2007; Negi, 2011; Sullivan & Rehm, 2005). Social isolation among UMIs can be categorized as purposive or non-purposive (Negi, 2011). Purposive social isolation describes a deliberate choice to avoid interacting with other people. When not at work, undocumented Latino/a immigrants often sequester themselves inside their homes to avoid negative peer influences (e.g., substance abuse); discrimination; and victimization by police, immigration authorities and other criminals (L. R. Chavez, 1998; Negi, 2011; Sullivan & Rehm, 2005). Non-purposive social isolation describes isolation that immigrants do not perceive as a deliberate choice, such as separation from family members left behind in Mexico.

Mexican immigrants have consistently listed social isolation, particularly non-purposive separation from family members, as one of their most challenging stressors (Clingerman & Brown, 2011; Hovey & Magaña, 2003; Kim-Godwin & Bechtel, 2004). Social isolation has thus emerged as a major predictor of mental health problems for Mexican immigrants across a range of multivariate models (Grzywacz, Quandt, Arcury, & Marín, 2005; Grzywacz et al., 2006; Hiott, Grzywacz, Davis, Quandt, & Arcury, 2008; Hovey & Magaña, 2002; Hovey & Magaña, 2003; Salgado de Snyder, 1993).⁷ Notably, studies suggest that UMIs are much more likely to be separated from family members in comparison to documented Mexican immigrants. For instance, Arbona and colleagues (2010) analyzed data from a snowball sample of Mexican and Central American immigrants in Texas ($N = 416$) collected in 1996 and found that a significantly greater proportion of undocumented immigrants were separated from one or all nuclear family members compared to documented immigrants. Likewise, undocumented Latino/a immigrants were much more likely to be separated from family members compared to documented

⁷ These studies use purposive samples of known UMIs or they use samples that are likely to contain large numbers of UMIs (e.g., Mexican migrant farmworkers, day laborers).

Latino/a immigrants in a study of a nationally representative sample of agricultural workers (Ward, 2010). Consequently, social isolation may be a greater source of cumulative stress for UMIs than it is for documented Mexican immigrants and US-born Mexicans.

Qualitative studies have also shown that social isolation is a major stressor for UMIs. Researchers have reported that UMIs experience intense sadness and guilt over leaving family members behind in Mexico, feelings that are exacerbated by their inability to visit loved ones in Mexico because of increased border militarization (Bacallao & Smokowski, 2007). Other studies have found that the stress of being separated from family members manifests as persistent anxiety about family members' well-being, intrusive thoughts about family members, loss of appetite, and depression (S. McGuire & Martin, 2007; S. McGuire & Georges, 2003). Finally, substance abuse among UMIs has been attributed to stress caused by separation from family members in Mexico and the deterioration of those relationships as time in the US increases (Negi, 2011).

Poverty. Poverty is associated with increased allostatic load (Juster, McEwen, & Lupien, 2010), which is a measure of cumulative stress (Stewart, 2006), and poverty rates are greater among UMIs than they are among documented Mexican immigrants and US-born Mexican Americans (Bustamante et al., 2010; Garcia, 2011; Ortega et al., 2007). Moreover, UMIs experience severe wage stagnation; their rate of wage growth is much slower compared to documented Mexican immigrants (M. Hall, Greenman, & Farkas, 2010b). Poverty and poverty-related sequelae may therefore be a greater source of pathogenic cumulative stress for UMIs than for documented Mexican immigrants and US-born Mexican Americans.

Researchers using state and national probability survey data have found that UMIs are more likely to live in poverty in comparison to documented Mexican immigrants and US-born Mexican Americans. Two studies of different random-digit telephone population-based surveys in California⁸ found that UMIs are more likely to live below the federal poverty line in comparison to other Mexican-

⁸ The use of random-digit telephone sampling underrepresents UMIs because UMIs are more likely to be among non-respondents and those without telephones (Bustamante et al., 2010; Ortega et al., 2007). Both studies may have under-estimated UMI poverty rates.

origin adults in the US. First, Ortega and colleagues (2007) found significant differences in the percentage of Mexican-origin adults living below the federal poverty threshold by immigration status as follows: US-born (14.0%); naturalized citizens (21.0%); green card holders (35.9%); UMIs (55.1%). Second, Bustamante and colleagues (2010) found that a significantly greater percentage of UMIs lived below the federal poverty line compared to documented Mexican immigrants, at 54.98% and 28.98%, respectively. At the national level, Garcia (2011) analyzed 2000 census data and found that for Mexican immigrants, after controlling for other sociodemographic covariates, being undocumented⁹ (a) increased the odds of living at or below the federal poverty threshold by 114 percent; (b) increased the odds of living in extreme poverty (defined as being at or below 50% of the federal poverty threshold) by 246 percent; (c) increased the odds of being classified as low income¹⁰ (defined as being at or below 200% of the federal poverty threshold) by 328 percent.

The high poverty rate among UMIs places them at risk for related pathogenic stressors including food insecurity and high household density (Garcia, 2011; Hadley et al., 2008; Hill, Moloney, Mize, Himelick, & Guest, 2011; Standish, Nandi, Ompad, Momper, & Galea, 2010). Among UMIs, food insecurity has been found to be associated with an increase in the number of past-month self-reported days of poor mental health (Hadley et al., 2008). In addition, results from a study of mostly Mexican migrant farmworkers suggest that UMI farmworkers may be much more likely to be food insecure than their documented counterparts (Hill et al., 2011). Finally, a study of household density among UMIs found greater density to be related to an increase in the number of past-month self-reported days of poor mental health and experiencing food insecurity during the past six months (Standish et al., 2010).

⁹ Undocumented legal status was a conservatively constructed proxy variable based on other sociodemographic indicators derived from the demography literature (see Garcia, 2011, for details).

¹⁰ This category was constructed because research shows that persons classified as low income in the US share the same risk factors as the two lower poverty groups and that the method for calculating the poverty threshold in the US underestimates actual poverty (see Garcia, 2011, for an extensive discussion).

Discrimination. UMIs have identified discrimination as a significant stressor that impacts their lives (Bacallao & Smokowski, 2007; Negi, 2011). Research shows that UMIs are aware of the increasingly hostile climate towards them in the US, a phenomenon that has been dubbed the “new nativism” (DeLuca et al., 2010; S. McGuire & Canales, 2010). There is evidence to suggest that UMIs perceive greater discrimination compared to documented Mexican immigrants and other Latino/as (Ortega et al., 2007).

Discrimination is defined as behavior engaged in by individuals or groups that involve disparate treatment of members of a specific group. This disparate treatment entails contempt, ridicule, degradation, derision, and it occurs across a variety of domains (Sanders Thompson, 2006). Minority researchers have long identified discrimination as an especially pernicious stressor that likely increases risk for a range of negative health and mental health outcomes (see Clark, Anderson, Clark, & Williams, 1999; see also Sanders Thompson, 1996). It is now widely acknowledged that discrimination is a chronic, unpredictable, and uncontrollable stressor—precisely the type of stressor known to have especially adverse physical and mental health consequences (Pascoe & Smart-Richman, 2009; Williams & Mohammed, 2009). In addition, researchers have linked the higher cumulative stress levels as measured by allostatic load found in racial and ethnic minority groups to perceived discrimination (Geronimus, Hicken, Keene, & Bound, 2006; Peek et al., 2010), and studies have established that perceived discrimination is associated with an array of adverse mental health outcomes (Araújo & Borrell, 2006; Gee, Ryan, Laflamme, & Holt, 2006; Pascoe & Smart-Richman, 2009; Williams & Mohammed, 2009).

Mexicans in the US may perceive discrimination due to documentation status, skin color, ethnicity and/or English proficiency (Córdova & Cervantes, 2010; Dovidio, Gluszek, John, Ditlemann, & Lagunes, 2010). Like Latino/as generally, they are a heterogeneous population in terms of skin color, ethnicity, and English proficiency, and their specific experiences of discrimination may vary accordingly (Dovidio et al., 2010; Pérez, Fortuna, & Alegría, 2008). UMIs are subject to both intergroup (i.e., from the broader US society) and intra-group (i.e., from other Latino/as including Mexican-origin people in the US) discrimination due to their documentation status and, perhaps increasingly, their skin color (Darity,

Dietrich, & Hamilton, 2005; Fox, 2006; Holmes, 2006; Johnson, 1998; Lavariega Monforti & Sanchez, 2010; S. McGuire & Canales, 2010; Uhlmann, Dasgupta, Elgueta, Greenwald, & Swanson, 2002).

UMIs are a hidden population, so there are no exact statistics on their racial and ethnic composition. Seasoned researchers engaged in fieldwork among the *indígenas*—members of Mexico’s marginalized, dark-skinned indigenous communities—have stated that most UMIs have indigenous heritage (S. McGuire, personal communication 3/12/11), and the literature appears to corroborate this assertion. Research suggests that *indígenas* comprise a large and fast-growing sector of the UMI population. Following President Clinton’s successful implementation of NAFTA, the US raised farm subsidies 300% whereas Mexico has continually reduced subsidies for corn production, a primary means of subsistence for Mexico’s indigenous communities. The result was the massive displacement of rural *indígenas* who were forced to migrate to the US for work (Holmes, 2006). Moreover, Riosmena and Massey (2010) noted a shift in Mexican migration patterns to the US relating to sending communities. Mexico’s central and southeastern states have the largest indigenous populations (Fox, 2006), and these states now account for almost 40% of Mexican migration to the United States (Riosmena & Massey, 2010). An estimated 90% of migrants from these regions are undocumented, which is significantly higher compared to all other regions (Riosmena & Massey, 2010). In another study, 57% of migrants from Mexico in suburban Atlanta self-identified as “indigenous” instead of “Mexican” (Arizpe, 2007). Finally, 90% of all farm laborers in Oregon are Latin American immigrants, and they are almost exclusively from Mexico. Forty percent of Oregon’s migrant farm workers are *indígenas* from Mexico (Farquhar et al., 2008), and most Mexican migrant farm workers are undocumented (Holmes, 2006).

If *indígenas* comprise a large sector of UMIs, then UMIs as a group are likely subject to racial discrimination more often compared to documented Mexican immigrants. In Mexico’s rigidly stratified colorist society, skin color is the primary predictor of wealth and social class even after controlling for other sociodemographic covariates (de Leff, 2002; Villarreal, 2010). The tiny minority of white Mexicans who claim pure Spanish ancestry are at the top of this hierarchy, and the dark-skinned *indígenas* are at the bottom (de Leff, 2002). Given the income requirements for a visa imposed by IIRIRA and IRCA,

undocumented migration to the US is generally the most viable option available to the indigenous populations and Mexicans with darker skin—the wealthy white Mexican aristocracy would not need to risk an undocumented border-crossing if they wanted to migrate to the United States. Consequently, researchers have implied that Mexican immigrants have brought Mexico’s colorist system with them to the US (Fox, 2006), which suggests that UMIs may be disproportionately subject to intra-group racial discrimination. Finally, ethnographers have noted intragroup and intergroup hierarchies of ethnicity-citizenship discrimination in the US agricultural industry, and UMIs were found to be at the bottom of these hierarchies (Holmes, 2006).

Summary. The literature related to UMI post-migration stressors is characterized by certain limitations. For instance, some studies have questionable external validity. These studies include (a) qualitative studies (e.g., Arizpe, 2007; Bacallao & Smokowski, 2007; Dozier, 1993; Holmes, 2006; S. McGuire & Canales, 2010; Negi, 2011); (b) pilot studies and studies with small sample sizes (e.g., de Castro et al., 2010; Hovey & Magaña, 2002) (c) studies with sampling frames consisting of heterogeneous “Latino/as” (e.g., Arbona et al., 2010; Uhlmann et al., 2002); (d) studies with sampling frames restricted to a single city (e.g., Hadley et al., 2008; Nandi et al., 2008; Standish et al., 2010); and (e) studies that used random-digit telephone population-based sampling restricted to California (e.g., Bustamante et al., 2010; Ortega et al., 2007). In addition, most studies that examined documentation status relied on participant self-report, which may have compromised their internal validity (e.g., Berk et al., 2000; Bustamante et al., 2010; Nandi et al., 2008). Similarly, Garcia (2011) created a proxy for undocumented status among Mexican immigrants in the 2000 census based on indicators derived from the demography literature. Although there is empirical support for this approach, one cannot be certain about participants’ documentation status; the study’s internal validity is therefore questionable. Despite these limitations, the available data on UMI post-migration stressors nevertheless suggest that UMIs may experience high cumulative stress due to documentation status anxiety, exploitation and victimization, social isolation, limited healthcare access, poverty and discrimination.

Conclusion

UMIs confront a distinct constellation of stressors before, during, and after migrating to the United States. Researchers have suggested that these stressors may place them at greater risk for mental health problems and psychiatric morbidity compared to their documented counterparts (Sullivan & Rehm, 2005). Yet, there is a dearth of research on the mental health of UMIs. No studies have used a standardized psychodiagnostic interview to examine the prevalence of psychological symptomatology and psychiatric disorders among UMIs in a nationally representative sample of Latino/a adults.

This chapter suggests an ecosocially-based psychiatric eco-epidemiologic framework to synthesize findings related to UMI stressors. This analysis also suggests that UMIs might have worse mental health compared to documented Mexican immigrants, US-born Mexican Americans, and other Latino/as in the United States. Consistent with this analysis, prior quantitative research related to UMI mental health, while scarce, tentatively suggests that UMIs experience a greater number of stressors and worse mental health compared to documented Latino/a immigrants and US-born Latino/as (Cavazos-Rehg et al., 2007; Potochnick & Perreira, 2010; Pérez & Fortuna, 2005; R. Rodriguez & DeWolfe, 1990). In conclusion, this analysis supports the need for further research into UMI mental health.

Study aims and hypotheses. Based on the evidence reviewed in this chapter using an adapted psychiatric eco-epidemiologic framework, this dissertation explores the relationship between documentation status and the mental health of Mexican immigrants in the NLAAS. Because the NLAAS did not inquire about documentation status, I use two approaches to ascertain likely documentation status, which are described in the next chapter. Mental health indicators include the following: (1) Lifetime and past-year composite DSM-IV-TR diagnostic categories (i.e., any depressive disorder, any anxiety disorder, any substance use disorder, any disorder); (2) Lifetime and past-year composite ICD-10 diagnostic categories (i.e., any depressive disorder, any anxiety disorder, any substance use disorder, any disorder); (3) A continuous measure of general psychological distress; (4) Self-rated mental health.

The first aim of this study is to examine the relationship between an undocumented immigration status and mental health among Mexican immigrants in the US, both at the bivariate level and after adjusting for potential confounders.

Hypothesis 1a: An undocumented status is positively associated with any past 12-month anxiety disorder.

Hypothesis 1b: An undocumented status is positively associated with any lifetime anxiety disorder.

Hypothesis 1c: An undocumented status is positively associated with any past 12-month depressive disorder.

Hypothesis 1d: An undocumented status is positively associated with any lifetime depressive disorder.

Hypothesis 1e: An undocumented status is positively associated with any past 12-month substance use disorder.

Hypothesis 1f: An undocumented status is positively associated with any lifetime substance use disorder.

Hypothesis 1g: An undocumented status is positively associated with any past 12-month disorder.

Hypothesis 1h: An undocumented status is positively associated with any lifetime disorder.

Hypothesis 1i: An undocumented status is associated with worse self-rated mental health.

Hypothesis 1j: An undocumented status is positively associated with psychological distress.

The second aim is to test if perceived discrimination, social isolation, food insecurity, number of potentially immigration-related traumatic events experienced, neighborhood safety, and context-of-exit (i.e., circumstances that precipitated the decision to migrate) mediate the relationship between an undocumented status and mental health (as measured by the aforementioned indicators) among LUMIs.

Hypothesis 2a: Perceived discrimination mediates the relationship between an undocumented immigration status and mental health indicators among Mexican immigrants.

Hypothesis 2b: Social isolation mediates the relationship between an undocumented

immigration status and mental health indicators among Mexican immigrants.

Hypothesis 2c: Food insecurity mediates the relationship between an undocumented immigration status and mental health indicators among Mexican immigrants.

Hypothesis 2d: The number of potentially immigration-related traumatic events mediates the relationship between an undocumented immigration status and mental health indicators among Mexican immigrants.

Hypothesis 2e: Neighborhood safety mediates the relationship between an undocumented immigration status and mental health indicators among Mexican immigrants.

Hypothesis 2f: Context of exit, such as not wanting to migrate to the US, mediates the relationship between an undocumented immigration status and mental health indicators among Mexican immigrants.

The third aim of this study is to examine differences in mental health among LUMIs, documented Mexican immigrants, US-born Mexicans, Cuban immigrants, US-born Cubans, Puerto Rican immigrants, and US-born Puerto Ricans.

Hypothesis 3a: LUMIs have greater rates for each DSM-IV-TR and ICD-10 composite diagnostic category compared to documented Mexican immigrants, as well as US-born Mexicans.

Hypothesis 3b: LUMIs have greater rates for each DSM-IV-TR and ICD-10 composite diagnostic category compared to Cuban immigrants, as well as US-born Cubans.

Hypothesis 3c: LUMIs have greater rates for each DSM-IV and ICD-10 composite diagnostic category compared to Puerto Rican immigrants, as well as US-born Puerto Ricans.

Hypothesis 3d: LUMIs have greater levels of psychological distress in comparison to documented Mexican immigrants, US-born Mexicans, Cuban immigrants, US-born Cubans, Puerto Rican immigrants, and US-born Puerto Ricans, respectively.

Hypothesis 3e: LUMIs will have greater rates of poor self-reported mental health in comparison to documented Mexican immigrants, US-born Mexicans, Cuban immigrants, US-born Cubans, Puerto Rican immigrants, and US-born Puerto Ricans, respectively.

The next chapter presents the analytic approach used in this study. It begins by describing the original NLAAS procedures and methodology. Next, it describes the techniques used to incorporate LUMIs in the NLAAS sample into multivariate models. Finally, it presents the specific data analytic techniques for testing the above hypotheses.

Chapter Four: Data and Methods

Data

The NLAAS is a nationally representative community household survey designed to estimate the prevalence and correlates of mental disorders and rates of mental health service utilization of Asians and Latino/as in the United States (Alegría et al., 2004). It is the first nationally representative psychiatric epidemiological study of English and Spanish-speaking Latino/as in the United States (Alegría et al., 2007). I chose to analyze the NLAAS data set (Alegría & Takeuchi, 2008) specifically because (a) it contains ethnic, cultural, immigration and sociodemographic data for Mexican respondents not available in other national psychiatric epidemiological surveys; (b) it is the only one of the three Collaborative Psychiatric Epidemiology Surveys (Alegría, Jackson, Kessler, & Takeuchi, 2008) that allowed Mexican-origin participants to be interviewed in Spanish or English; (c) the NLAAS sampling strategy may have facilitated greater access to UMI.

“The probability sample for the NLAAS was among the most complex designs ever developed and fielded by the University of Michigan’s Survey Research Center” (SRC) (Heeringa et al., 2004, p. 352). The SRC developed the sampling and data collection procedures which are described in detail elsewhere (Heeringa et al., 2004; Pennell et al., 2004). Briefly, the NLAAS used a multistage stratified probability sampling design of Latino/a and Asian adults 18 years and older in the coterminous United States. Institutionalized persons and people living on military bases were excluded from the sample. Probability sampling occurred in four stages: 1) metropolitan statistical areas and counties; 2) area segments; 3) housing units; 4) respondents. The sampling strategy had two main components: 1) the NLAAS core sample, which sampled the target populations regardless of geographic residential patterns; and 2) the NLAAS high density supplemental sample (NLAAS-HD), which oversampled geographic areas with more than 5% residential density for certain target groups. (Heeringa et al., 2004). This dissertation focuses on the NLAAS Latino/a sample which stratified Latino/as into four groups: Cubans ($n = 577$), Puerto Ricans ($n = 495$), Mexicans ($n = 868$), and “Other Latinos” ($n = 614$). There are 2,554 Latino/as in the NLAAS sample (Alegría, Vila et al., 2004; Heeringa et al., 2004). Sample weights were

created to adjust for differential probability of selection between the HD and core samples and to ensure that the pooled core and HD samples provided sample-based coverage of the national population (Heeringa et al., 2004). This dissertation does not include “Other Latinos” in its comparative analyses because it is not possible to determine the ethnicity or national origin of these respondents, and lumping of different Latino/a ethnic/national origin groups into a single group for analysis is not recommended (Guarnaccia, 2009; Umaña-Taylor & Fine, 2001).

Procedures

The NLAAS surveyed Latino/a respondents between May 2002 and December 2003 with a response rate of 75.5 percent. The instrument was administered by trained interviewers and required an average of 2.7 hours to complete. Participants were interviewed in either Spanish or English depending on the language in which they were most proficient. Bilingual participants could choose to be interviewed in either language, and a subset of bilingual individuals was randomly assigned to be interviewed in either Spanish or English. Approximately 59% of the participants were interviewed in Spanish (Alegría, Vila et al., 2004; Pennell et al., 2004; Shrout et al., 2008).

The NLAAS is unique among national psychiatric epidemiology surveys for its combination of translation procedures and its sample recruitment strategy. Recognizing the cultural and idiomatic heterogeneity across Spanish-speaking Latino/a groups, NLAAS researchers used Bravo and colleagues’ (1993) translation and adaptation model to ensure equivalency among the English and various Spanish versions of the NLAAS instrument (Alegría et al., 2004). By applying this model to the translation and adaptation procedures for the NLAAS, which are detailed elsewhere (Alegría, Vila et al., 2004), researchers helped ensure semantic equivalence, content equivalence, technical equivalence and conceptual equivalence among the English and various Spanish versions of the survey (Alegría et al., 2004).

The NLAAS sample recruitment procedures were tailored to and directly targeted Latino/as (Alegría et al., 2006). For the NLAAS, interviewers and prospective participants were matched according to cultural and linguistic characteristics, which usually entailed ethnic matching; subjects were offered

incentives to participate; interviewers provided reassurances of confidentiality; interviewers were fluent in Spanish; and interviewers introduced themselves as university researchers (as opposed to government workers) and displayed university identification (Pennell et al., 2004). The aforementioned practices, though not explicitly implemented in the NLAAS for the purpose of bolstering UMI recruitment, have been shown in previous studies to increase UMI participation (Cornelius, 1982; Marcelli & Lowell, 2005). The NLAAS' potentially greater access to undocumented Latino/a immigrants may explain why the NLAAS Latino/a sample is similar to the 2000 census for age, gender, education, geographic distribution and marital status, but different for income and nativity status (Alegría et al., 2007; Alegría et al., 2008). That is, the NLAAS Latino/a sample had lower incomes and more immigrants compared to Latino/as in the 2000 census sample. This finding is consistent with studies showing the census, which targets the general population and not just Latino/as, undercounts undocumented Latino/a immigrants more than any other hard-to-enumerate group (Massey & Capoferro, 2004).

All NLAAS protocols and materials were approved by Institutional Review Boards at the Cambridge Health Alliance, the University of Michigan, and the University of Washington. Written informed consent was obtained in the language of the respondents' choosing (Alegría et al., 2007). The University of Michigan's Inter-University Consortium for Political and Social Research (ICPSR) granted this author access to the restricted NLAAS data files (Alegría & Takeuchi, 2008) following review and approval of a data protection agreement by Washington University's Human Research Protection Office.

Measures

Socio-demographics

The NLAAS sociodemographic variables are gender, age, occupational classification, marital/partnership status, employment status, income, education, ethnicity, nativity status, years lived in the US, US citizenship, covered by Medicare, covered by Medicaid, covered by other health insurance, received federal "welfare" assistance (AFDC or TAN-F) since turning 18, ever lived as a refugee, age lived as a refugee, number of parents born in the US, and number of grandparents born in the US.

Gender is coded as (0) *male* and (1) *female*. Race/ethnicity refers to the four NLAAS Latino/a ethnic categories. Nativity status is coded as (0) *US-born* and (1) *foreign-born*. Marital/partnership status is coded as (0) *not married/partnered* and (1) *married/partnered*. Education, years in the US, and age are continuous and coded as years. Income was imputed by the data processors prior to the public release of the NLAAS and is not a true continuous variable. It was coded as US dollars and refers to annual household income. Employment status was coded as (0) *unemployed or not in labor force* or (1) *employed*. Number of parents born in the US ranges from 0 to 2, and number of grandparents born in the US ranges from 0 to 4 and was recoded as “any US-born parents” and “any US-born grandparents” (0) *no* and (1) *yes*. The following variables are coded as (0) *no* or (1) *yes*: US citizenship, covered by Medicare, covered by Medicaid, covered by any health insurance, ever received federal “welfare” assistance (AFDC or TAN-F) since age 18, and ever lived as a refugee. Finally, NLAAS researchers recorded occupation by assigning respondents a three digit code using the Bureau of Labor Statistics’ major occupational group (MOG) 2000 classification system. The three digit codes were then collapsed into 29 occupational categories. The CPES data processing notes indicate that these 29 categories were further collapsed into 10 occupational categories before the data set was made available to the public (CPES, 2008). Table 4.1 presents the NLAAS occupation variable (OCC28MOG) as it was made available to data analysts. For this study, the occupations were collapsed into two categories: (0) *not a likely UMI job* (created by collapsing OCC28MOG 1 to 5) and (1) *likely UMI-type job* (created by collapsing OCC28MOG 6 to 10).

Table 4.1. Recoded NLAAS Occupational Categories

Original Codes	NLAAS Recodes
1 LEGISLATORS/SENIOR OFFICIALS	1 CORP/GENERAL MANAGERS (2, 3)
2 CORPORATE MANAGERS	2 PROFESSIONAL (UNIVDEGREE) (4-7)
3 GENERAL MANAGERS	3 ASSOC PROFESSIONAL (SOME FML TRN) (8-11)
4 PHYS/MATH/ENG PROF/UNIV DEG	4 OFFICE CLERKS (12)
5 LIFE SCI/HLTH PROF/UNIV DEG	5 CUST SERV CLERKS (13)
6 TEACHING PROF/UNIV DEG	6 PERS/PROT SERV WORKER (14)
7 OTHER PROF/UNIV DEG	7 TRADES WORKERS (18-21)
8 PHYS/ENG ASSOC PROF/SME FORM TRN	8 OPERATORS (22-24)
9 LIFE SCI/HLTH ASSOC PROF/SME FORM TRN	9 PERF ROUTINE TASKS (25-27)

10 EACHING ASSOC PROF/SME FORM TRN	10 OTHER (1, 15, 16, 17, 28, 29)
11 OTHER ASSOC PROF/SME FORM TRN	
12 OFFICE CLERKS	
13 CUST SERV CLERKS	
14 PERS/PROT SERV WORKER	
15 MODEL/SALES/DEMOS	
16 SKILLED AGR/FISH WORK	
17 SUBSTINENCE AGR/FISH WORK	
18 EXTRACT AND BUILD TRADES	
19 METAL/MACHINE/ RELATED TRADES	
20 PREC/HANDI/PRINT/ RELATED TRADES	
21 OTHER CRAFT/ RELATED TRADES	
22 STATIONARY PLANT/ RELATED OPER	
23 MACHINE/ASSEMBLY OPER	
24 DRIVER/MOBILE PLANT OPER	
25 SALES/SERV/ELEMENTARY	
26 AGR/FISH/RELATED LABORER	
27 MINING/CONS/MANUF/ TRANSLABORER	
28 ARMED FORCES	
29 OTHER (SPECIFY)	

Note: Adapted from CPES (2008). *Data Processing Notes*. Retrieved September 2, 2011, from http://www.icpsr.umich.edu.libproxy.wustl.edu/icpsrweb/CPES/about_cpes/data_processing/notes/index.jsp

English Proficiency

The NLAAS' English proficiency scale consists of three items that were reverse scored so that a higher score indicates greater English proficiency ($\alpha = 0.97$). These three items are (1) how well do you speak English? (2) how well do you read English? (3) how well do you write English? Response options for each item are (0) *poor*, (1) *fair*, (2) *good*, (3) *excellent*.

Mental Disorders

The NLAAS used the World Mental Health Survey Initiative version of the Composite International Diagnostic Interview (WMH-CIDI) (R. C. Kessler & Üstün, 2004) to assess lifetime, past year, and past 30 day psychiatric disorders (Alegría et al., 2007). The WMH-CIDI is a fully structured psychodiagnostic interview based on the criteria of the *Diagnostic and Statistical Manual of Mental Disorders, 4th edition* (DSM-IV) (American Psychiatric Association, 1994) and the *ICD-10 Classification of Mental and Behavioral Disorders* (World Health Organization, 1992) that generates psychiatric diagnoses using DSM-IV and ICD-10 organic exclusion rules (Alegría et al., 2008). The WMH-CIDI has

been found to have strong psychometric properties for diagnosing most mental disorders (Alegría, Sribney, Woo, Torres, & Guarnaccia, 2007; R. C. Kessler & Üstün, 2004), and it demonstrated high concordance with the Structured Clinical Interview for DSM-IV (Haro et al., 2006; D. E. Jimenez, Alegría, Chen, Chan, & Laderman, 2010). The NLAAS instrument did not, however, assess for schizophrenia or bipolar disorder because lay-administered structured diagnostic interviews frequently overestimate the prevalence of schizophrenia, and the prevalence of bipolar disorder is so low that it is difficult to estimate in community samples (Alegría et al., 2007).

The ICPSR has updated the diagnostic algorithms in the NLAAS data set to reflect DSM-IV-TR diagnoses. This study collapses DSM-IV-TR diagnoses into the following composite lifetime and past 12 month diagnostic composites, respectively: any depressive disorder (dysthymia, major depressive disorder), any anxiety disorder (agoraphobia without panic disorder, generalized anxiety disorder, panic attack, panic disorder, post-traumatic stress disorder, social phobia), any substance use disorder (alcohol abuse, alcohol dependence, drug abuse, drug dependence), and any disorder. The use of these composite diagnostic categories is consistent with prior analyses of the NLAAS data set (Alegría et al., 2007; Alegría, Sribney et al., 2007; Alegría et al., 2008; Guarnaccia et al., 2010). This study similarly collapses ICD-10 disorders into the following lifetime and past 12 month diagnostic composites, respectively: any depressive disorder (dysthymia, severe depressive episode), any anxiety disorder¹¹ (panic disorder, panic attack, post-traumatic stress disorder, generalized anxiety disorder, social phobia), any substance use disorder (alcohol abuse, alcohol dependence, drug abuse, drug dependence), and any disorder.

Psychological Distress

The K-10 (R. C. Kessler et al., 2002) is a dimensional measure of non-specific psychological distress with established psychometric properties (R. C. Kessler et al., 2002). It consists of the following 10 items: During the last 30 days, how often did you: (1) feel depressed; (2) feel so depressed that nothing could cheer you up; (3) feel hopeless? (4) feel restless or fidgety? (5) feel so restless that you could not sit

¹¹ The NLAAS data set did not have the ICD-10 diagnosis of agoraphobia without panic disorder.

still? (6) feel tired out for no good reason? (7) feel that everything was an effort? (8) feel worthless? (9) feel nervous? (10) feel so nervous that nothing could calm you down? For the present study, response options were coded as (0) *none of the time* to (4) *all of the time*. In the NLAAS, items 2, 5, and 10 were skipped and coded as missing if the response to the preceding item was *none of the time*. The present study handled missing data resulting from skip patterns in the K-10 as follows: If the response to items 1, 4 and 9 was *none of the time*, the subsequent item was coded as (0) *none of the time*. A higher score on the K-10 indicates greater psychological distress ($\alpha = 0.92$ for the entire Latino/a sample). Exploratory factor analysis of the recoded K-10 scale for the entire Latino/a sample demonstrates good model fit ($CFI = 0.98$; $TLI = 0.97$; unstandardized factor loadings ranged from 0.73 to 0.92).

Self-rated Mental Health

Self-rated mental health was measured by asking participants, “In general, would you say your mental health is: excellent? very good? good? fair? poor?” This question is often used in large surveys and has been shown to be a valid indicator of general mental health (Mawani & Gilmour, 2010). Response options were recoded and dichotomized as (0) *excellent/very good/good* and (1) *fair/poor*.

Discrimination

The NLAAS perceived discrimination measure consists of three items that asked respondents how often they or their friends have been disliked or mistreated due to their ethnicity/race. The items are: How often (1) do people dislike you because of your race/ethnicity? (2) do people treat you unfairly because of your race/ethnicity? (3) have you seen friends treated unfairly because they are [same race/ethnicity of respondent]? Response options were recoded to range from (0) *never* to (3) *often*, with a higher score indicating greater perceived discrimination. Cronbach’s alpha is 0.81.

Social Isolation

The present study assessed social isolation with six items from the NLAAS social network scale (Alegría et al., 2004). Scores can range from 0 to 20 with a higher score indicating greater social isolation ($\alpha = 0.72$). The first three questions pertain to family isolation excluding respondents’ spouses or partners (if applicable): (1) How often do you talk on the phone or get together with family or relatives who do not

live with you? (2) How much can you rely on relatives who do not live with you for help if you have a serious problem? (3) How much can you rely on relatives who do not live with you if you need to talk about your worries? The last three questions pertain to isolation from friends: (4) How often do you talk on the phone or get together with friends? (5) How much can you rely on your friends for help if you have a serious problem? (6) How much can you open up to your friends if you need to talk about your worries?

Food insecurity

For the present study, the following item from the NLAAS was used as a proxy for food insecurity: “How many months in the past 12 months did you either cut the size of your meals or skip meals because there wasn't enough money to buy food?”

Context of Exit

The NLAAS instrument contained questions about circumstances related to migration to the United States. This study used the following question about pre-migration circumstances: “Did you move from your country of origin because you or your family wanted to or because you had to?” Response options were (0) *wanted to* and (1) *had to*.

Remittances

Participants were asked whether or not they send money to relatives living in their country of origin, and the response options are coded as (0) *no* and (1) *yes*.

Number of Potentially Immigration-related Traumatic Events Experienced

The NLAAS survey contains items that ask about respondents' experience of traumatic events. This dissertation uses questions about the types of peri-migration and post-migration traumatic events and stressors that UMIs have reported experiencing. These questions include: Have you (1) ever been kidnapped or held captive? (2) ever been exposed to a toxic chemical that could cause you serious harm? (3) ever been mugged, held up, or been threatened with a weapon? (4) ever been raped? (5) ever been sexually assaulted other than rape? (6) ever seen someone badly injured or killed/ unexpectedly see a dead body? (7) ever had someone very close to you die unexpectedly? The response options for each question are (0) *no* and (1) *yes*. This study uses the sum of potentially immigration-related traumatic events

reported by the respondents which can range from 0 to seven. The NLAAS instrument only asked about types of traumatic events experienced and did not allow for a summative score of all traumatic events experienced.

Deportation Anxiety

Deportation anxiety is assessed using two items from the NLAAS acculturative stress measure. The first item is “Do you think you will be deported if you go to a social or government agency?” The second item is “Do you avoid seeking health services due to fear of immigration officials?” The response options for each question were coded as (0) *no* and (1) *yes*.

Neighborhood Safety

Three items were used to measure perceived neighborhood violence and neighborhood safety: (1) I feel safe being out alone in my neighborhood at night; (2) People often get mugged, robbed or attacked in my neighborhood; and (3) People sell and/or use drugs in my neighborhood. Participants indicated their responses on a 4-point Likert scale that ranged from (0) *not at all true* to (3) *very true*. The total score can range from 0 to 9 ($\alpha = .72$).

Determination of Documentation Status

This dissertation used two methods to identify likely undocumented Mexican immigrants in the NLAAS sample. First, I constructed a proxy variable for documentation status among Mexican immigrants. This method has been used by other researchers to identify LUMIs in survey data (Bean, Browning, & Frisbie, 1984; Garcia, 2011) and involves specifying a set of indicators with a response option pattern likely associated with an undocumented status using the best empirical evidence to select the best variables in the data set. Next, I use multiple imputation to model likely documentation status for non-citizen Mexican immigrants using chained equations based on a Markov Chain Monte Carlo Gibbs-like sampler algorithm (Heeringa, West, & Berglund, 2010; Royston, 2009). Demographers and survey statisticians have recently suggested that multiple imputation modeling may allow estimation of parameters related to documentation status in national surveys that do not directly ask about

documentation status. Quantitative methodologists have indicated research is needed in the application of this approach (Judson, 2012a; Judson & Swanson, 2011; Judson, 2012b).

Proxy Variable

The first step in creating a proxy variable for Mexican immigration status involved identifying respondents who cannot be classified as UMIs. The NLAAS contains items that identify the following groups: US-born Mexican-origin adults, Mexican immigrants who are naturalized citizens, and Mexican immigrant non-citizens. US-born Mexican-origin adults and naturalized foreign-born Mexican-origin adults are by definition not undocumented. UMIs may only be found among the remaining foreign-born non-citizens. The second step conservatively identifies LUMIs among the Mexican immigrant non-citizens by using the most viable behavioral, attitudinal and sociodemographic indicators in the NLAAS data set. I only retained those cases with response options likely to be characteristic of UMIs based on the best available empirical data. The behavioral and attitudinal indicators are (a) remittance-sending behavior and (b) deportation anxiety. The sociodemographic indicators are (a) ethnicity, (b) nativity status, (c) US citizenship status, (d) number of US-born parents, (e) number of US-born grandparents, (e) occupational classification, (f) possibly granted refugee status since migrating to the US, (g) receipt of Medicare or Medicaid, (h) received welfare since turning 18; (i) covered by private health insurance plan. Table 4.2 presents the indicators and the required set of response options for respondents to be retained as LUMIs.

Table 4.2. Indicators and Response Options used to Create LUMI Proxy

Indicator	Required Response Option
Race/Ancestry	(7) <i>Mexican</i>
Nativity status	(1) <i>foreign-born</i>
US citizenship	(0) <i>not a US citizen</i>
Number of US-born parents	(0) <i>none</i>
Number of US-born grandparents	(0) <i>none</i>
Occupation (OCC28MOG)	Coded as "UMI Job": (1) <i>Yes (6 to 10)</i>
Ever lived as a refugee?	(0) <i>no</i>
Covered by Medicare or Medicaid?	(0) <i>no</i>
Any other health coverage?	(0) <i>no</i>
Received welfare since age 18?	(0) <i>no</i>

Send remittances to relatives in Mexico?	(1) <i>yes</i>
Deportation anxiety	Responds “yes” to at least one of the following items:
Think might be deported if go to social/gov't agency	(1) <i>yes</i>
Avoids seeking health services because fears immigration officials	(1) <i>yes</i>

Despite efforts to create a valid indicator for LUMIs grounded in empirical data, the proxy approach is not without limitations. First, it is based in part on previous demographic research that used residual methods to estimate UMI population characteristics (Garcia, 2011). Next, the creation of the LUMI proxy was constrained by the sample size and the nature of the variables in the NLAAS data set. The number of empirically-informed variables selected from the NLAAS had to be balanced with issues such as the number of Mexican immigrants in the sample and the conservative nature of the proxy approach, which only designates as LUMIs those participants who endorse an exact response pattern to a set of indicators. In addition, because of the way occupational classification (OCC20MOG) was collapsed by the NLAAS data processors (see Table 4.1), it is not possible to limit this proxy indicator entirely to respondents with occupations that are completely consistent with demographic findings.¹² Finally, it is not possible to definitively test the LUMI indicator’s validity. Despite efforts to select variables based on the best available empirical evidence, it is possible that some UMIs in the NLAAS were excluded by the criteria used to create the proxy. It is also possible that these criteria did not entirely filter out documented participants and that the proxy identifies some documented immigrants as LUMIs.

Chained Equations

The second method for estimating statistical models with LUMIs involves using fully conditional specification, also called multiple imputation using chained equations (MICE) (Enders, 2010) to model likely documentation status among all non-citizen Mexican immigrants. Two types of MICE models were

¹² The “other” response option includes occupational classifications that are prevalent among UMIs (e.g., agriculture and fishing-related), occupations unlikely to contain UMIs (e.g., legislators and senior officials), and unknown occupations that may or may not be prevalent among UMIs (i.e., “other”).

required to enable analysis of all three study aims because there are two different variable types that capture Mexican immigrants' documentation status. As discussed later, an MI model must include all analysis variables.

The first type of MICE models were used for Aims 1 and 2. I created a nominal variable *V* with the following dichotomous response options: (0) *documented Mexican immigrant*; and (1) *LUMI*. "Documented Mexican immigrants" include (a) naturalized US citizens, (b) non-citizen immigrants who report having ever received certain federally-funded social welfare services (e.g., Medicare, Medicaid and/or AFDC/TAN-F), and (c) any non-citizen Mexican immigrants who claim to have "lived as a refugee" after migrating to the United States. "LUMIs" consist of the respondents identified by the proxy approach. The remaining foreign-born Mexican respondents were coded as missing. Next, I specified MICE models that assigned the missing respondents a value for nominal variable *V* in addition to imputing missing values for other analysis variables.

The second type of MICE models were used for Aim 3. I created a polychotomous nominal variable *W* with the following response options: (0) *US-born Cubans*; (1) *Cuban immigrants*; (2) *US-born Puerto Ricans*; (3) *Puerto Rican immigrants*; (4) *US-born Mexicans*; (5) *Mexican immigrants*; and (6) *LUMIs*. The values for response options 5 and 6 were assigned using the same process to create nominal variable *V*. Next, I developed multiple imputation models that assigned the missing respondents a value for nominal variable *W*.

Background and rationale. Multiple imputation (MI) is considered a state-of-the-art approach for handling missing data (Enders, 2010). The term "multiple imputation" encompasses a variety of techniques that create multiple copies of a data set (e.g., $m = 10$) where missing values for specific variables are "filled in" with different estimates for each m data set. Subsequent statistical analyses (e.g., logistic regression) are then performed m times, once for each imputed data set. Finally, the resulting m parameter estimates and standard errors are pooled into a single set of results (Enders, 2010).

MI has been described as a robust model-based approach that accounts for the uncertainty associated with missing values to yield correct estimates of population parameters (Heeringa et al., 2010).

It is model-based because it requires the specification of a statistical model to impute missing values, thereby preserving the statistical properties of survey data. It is robust because it can produce valid estimates and inferences despite violations of its theoretical assumptions regarding the joint posterior distribution of model variables (e.g., multivariate normal, general location) and the missing data mechanism, i.e., the data are missing at random (MAR) (Enders, 2010; Heeringa et al., 2010). MI is robust to violations of the MAR assumption because it is an inclusive strategy for handling missing data—analysis variables are nested within a broader imputation model that consists of all analysis variables and a set of auxiliary variables (Collins, Schafer, & Kam, 2001; Enders, 2010). Auxiliary variables are

ancillary to the substantive research questions but [are] potential correlate[s]...of the missing variable[s]. Incorporating these variables into the missing data handling procedure can mitigate (or eliminate) bias and improve power...by recapturing some of the lost information in the missing variable[s]...Consequently, it is nearly always beneficial to include auxiliary variables into the [multiple imputation model], and there appears to be no downside to an inclusive strategy (Enders, 2010, pp. 128-129).

Indeed, MI's robustness to violations MAR is such that missing data experts recommend the use of MI for data that are not missing at random (NMAR) over the comparatively newer and methodologically tenuous approaches for handling NMAR data (e.g., pattern mixture models, selection models) (Enders, 2010). Consequently, one should be more concerned with developing well-specified MI models by using available auxiliary variables to make the MAR assumption more plausible, and less concerned about the specific missing data mechanism (Rose & Fraser, 2008).

MI with complex survey data is an area of active research. Some studies have shown that failing to condition on the survey design features can at times result in severe bias (Heeringa et al., 2010; Reiter, Raghunathan, & Kinney, 2006). Researchers therefore recommend that complex survey data analysts routinely include design features in the MI model even if the relationship to the missing data is uncertain. Simulation studies have found that including variables that make up the survey design features (e.g., sampling weights and the sampling error calculation model) in an MI model is at worst neutral and computationally inefficient. On the other hand, including these variables in an MI model is often beneficial because they add information that mitigates bias by increasing the plausibility of the MAR

assumption, decreasing standard errors, and increasing power. Indeed, some researchers recommend including as many auxiliary variables in an MI model as possible (Collins et al., 2001; Enders, 2010; Reiter et al., 2006).

MICE, a popular method of multiply imputing missing data using sequential regressions, was devised to handle imputation models where the inclusion of many mixed type variables (e.g., continuous, count, nominal, ordinal, etc.) makes it impossible to specify the joint posterior distribution of model variables. MICE uses an iterative MCMC algorithm similar to the Gibbs sampler to simulate draws of missing values from the unknown joint posterior distribution of the model variables (Heeringa et al., 2010; Royston, 2004). The Gibbs-like sampler algorithm uses iterative chains of regression equations where the order of imputation for the model variables is determined by the amount of missingness. In the first iteration, the variable with the least amount of missing data in the imputation model is regressed on variables with no missing data. In the next iteration, the variable with the second least amount of missing data is regressed on the first imputed variable and all other model variables with complete data. This process continues until the variable with the most missingness is regressed on all other model variables with complete data, which now include imputed variables from prior iterations. The algorithm estimates a regression model at each iteration appropriate to the scale level of the variable being imputed (e.g., an ordinal logistic regression imputes an incomplete ordinal variable; a linear regression imputes a normally distributed continuous variable, etc.) (Enders, 2010; Heeringa et al., 2010; Royston, 2004).

Multiple imputation models. The purpose of using MICE in this dissertation is to use known information about immigration statuses of the Mexican-origin respondents combined with a conservative, empirically-based approach to identifying LUMIs, and a set of status-related auxiliary variables to model the likely documentation statuses of the non-citizen Mexican immigrants who were not assigned values for nominal variables V or W (i.e., missing). Insofar as the empirically-based assignment of participants as LUMIs is accurate, the chained equations approach may enable estimation of multivariate models of mental health outcome variables among Mexican immigrants by documentation status and facilitate comparisons to other NLAAS Latino/a populations with increased precision.

These MI models consisted of many mixed-type variables including nominal variables V and W . MICE was therefore the MI procedure of choice. Mindful of recommendations to use an inclusive MI strategy (Collins et al., 2001), the MICE models include all analysis variables and auxiliary variables related to documentation status, all of which are further conditioned on the complex survey design features. A longstanding and common rule of thumb is that it is sufficient to impute $m = 20$ data sets with a burn-in period of 10 iterations (Enders, 2010). However, it is often necessary in practice to increase the number of imputations as high as $m = 200$ and to increase the burn-in period substantially to achieve convergence, such as when an analysis variable has a high fraction of missing information (Kenward & Carpenter, 2007).

A large number of MICE models had to be specified in the present study because it contains numerous dependent variables (e.g., composite DSM-IV-TR and ICD-10 diagnostic categories as well as individual psychiatric diagnoses). Dependent variables must be included in MI models or parameter estimates based on the imputations will be biased (Moons, Donders, Stijnen, & Harrell, 2006; Sterne et al., 2009; White, Royston, & Wood, 2011). However, including all or even too many categorical dependent variables in a single MICE model can cause instability resulting in non-convergence, a common occurrence associated with MICE (White et al., 2011). Twenty different MICE models were therefore required to impute missing values for nominal variable V and other analysis variables because I had to spread the mental health dependent variables out across the MICE models. Similarly, I specified 19 MICE models for nominal variable W . This practice is somewhat consistent with White et al.'s assertion that imputing data once for each analysis makes it easier to specify a congenial imputation model compared to imputing data with many variables so that one may conduct a wide range of analyses based on imputations generated from a single MICE model.

The imputed variables and independent variables¹³ used in the MICE models for each documentation status variable type are listed in Appendix A (excluding the mental health outcome variables). The burn-in iterations were set at 150 to generate $m = 100$ imputations for each of the MICE models. I used recommended diagnostic procedures to assess convergence and simulation error for every MICE model to evaluate model stability. These diagnostic procedures are described in greater detail in the next chapter.

There are several analytic and interpretive implications of using chained equations for modeling likely documentation status. The chained equations approach models documentation status, whereas the proxy approach imposes an exact response pattern on a set of immigration-status related indicators for a respondent to be identified as a LUMI. MICE permits the inclusion of auxiliary variables related to nominal variables V and W (i.e., the immigration status of Mexican participants) to stochastically model likely documentation status for the missing values. Because MICE uses iterative sequential regression equations, it will assign slightly varying values for missing data for nominal variables V and W (and all other imputation model variables with missing values) for each m data set. All analyses based on the chained equations approach were conducted for every m data set and the final parameter estimates were pooled into single values. MICE will most likely identify a larger number of LUMIs in comparison to the proxy approach by modeling the values for cases with missing values on nominal variables V and W ; that is, it will assign a likely documentation status for those cases that remained unassigned (or missing) using the more restrictive proxy approach. Findings from the chained equations approach should be interpreted in light of the following: (1) If the results are stable across all m data sets, then the MICE approach may have an advantage over findings based on the proxy approach—the MICE approach will identify more LUMIs based on more immigration-related information in comparison to the proxy approach while accounting for the uncertainty inherent in handling missing data; (2) The results from the MICE approach

¹³ When referring to MICE models, “independent variables” include the mental health outcome variables because they are used as independent variables in the iterative regressions to impute missing data.

must be interpreted with caution given this novel use of MICE; the MICE model cannot improve upon the proxy approach if the proxy approach lacks validity.

Data Analysis

This section describes the specific methods that will be used to test the hypotheses associated with each study aim. The first aim is to test the independent relationship between an undocumented immigration status and Mexican immigrant mental health (i.e., for each composite diagnostic category, self-rated mental health, and psychological distress) after adjusting for Americanization and demographic covariates. The second aim is to test if perceived discrimination, everyday discrimination; social isolation, food insecurity, neighborhood safety and context-of-exit mediate the relationship between an undocumented immigration status and mental health. The third aim is to test for differences in psychological distress, self-rated mental health, and rates of composite psychiatric diagnostic categories among LUMIs, documented Mexican immigrants, US-born Mexicans, Cuban immigrants, US-born Cubans, Puerto Rican immigrants, and US-born Puerto Ricans.

Descriptive statistics for standard sociodemographic variables (i.e., gender, age, nativity status, US citizenship status, marital/partnership status, income, education, employment status) are reported for each Latino/a ethnic group. These data have been reported in prior NLAAS studies. They are being re-analyzed and reported again in this dissertation. ICPSR technical documentation states that data analysts will not necessarily be able to reproduce findings reported in past studies because of ongoing updates to the data set as errors are detected and corrected.

Analyses were conducted using Stata version 12.1/SE (StataCorp, 2009), and Mplus version 6 (Muthén & Muthén, 2010). All analyses incorporated the sampling error calculation model to account for clustering effects and stratification, and sample weights were used to adjust for unequal probability of selection and to ensure the results were representative of US Mexican immigrants nationally. For analyses based on the chained equations approach, Rubin's (1987) rules were used for calculating parameter estimates by accounting for variability in results across the imputed datasets (Sterne et al., 2009).

Aim 1

For the proxy approach, second-order F-transformed Rao Scott chi-squares were used to identify significant differences in prevalence rates of psychiatric disorders and poor self-rated mental health between LUMIs and documented Mexican immigrants. Complementary Log Log (CLL) models, or gompit regressions, were used to test hypotheses 1a-1i. CLL models are preferable to binomial logistic regression models when the cumulative distribution function is not symmetric around the midpoint, that is, when the cumulative distribution function is close to zero or one. They are therefore useful for estimating models with rare outcomes in epidemiological studies such as the endorsement of a psychiatric disorder and they provide more accurate confidence interval estimates in such situations. CLL models function like binomial logistic regression models (i.e., they provide coefficients for covariates after adjusting for all other independent variables in the model), and one may obtain odds ratios by exponentiating the unstandardized coefficients. (Heeringa et al., 2010; StataCorp., 2011a).

These models tested the relationship between an undocumented immigration status and each composite diagnostic category as well as the relationship between documentation status and self-rated mental health. The composite diagnostic categories and self-rated mental health are the dependent variables. The CLL models were estimated by entering independent variables in a sequential manner. First, unadjusted odds ratios (OR) were estimated for each DV and undocumented immigration status. Next, “Americanization” factors known to be associated with poor mental health among Latino/a immigrants were entered as IVs into the models: years lived in the US and English proficiency. The final model included undocumented immigration status, both “Americanization” covariates, and the following demographic covariates: gender, age, marital/partnership status, employment status, and education.

Because Stata cannot calculate Rao Scott chi-squares for imputed data, prevalence rates based on the chained equations approach were obtained by calculating the weighted means of the dichotomous mental health variables for LUMIs and documented Mexican immigrants. Bivariate gompit regressions of documentation status on the categorical mental health variables were estimated to obtain a statistical significance test of the difference in prevalence rates between LUMIs and documented Mexican

immigrants. I then calculated recommended diagnostic statistics for the MICE models based on the results of the bivariate gompit regressions.

This study did not categorize continuous independent variables in regression models with dichotomous outcomes. Scholars have recommended against the common practice of categorizing continuous covariates (either arbitrarily or by data-driven methods) in models with dichotomous dependent variables because doing so has been shown to inflate the type I error rate and produce incorrect regression coefficients (Austin & Brunner, 2004; Royston, Ambler, & Sauerbrei, 1999). As Austin and Brunner (2004) stated, “Investigators are encouraged to treat continuous variables as such, rather than to simply reduce them to categorical variables. Failure to do so could result in an inflated assessment of the statistical significance of the association between one of the variables and the outcome of interest” (pp. 1176-1177).

This study does not use the NLAAS income variable in multivariate models. The NLAAS income variable is not a true continuous variable. For example, there are just 655 unique values for yearly income for the entire Latino/a sample ($n = 2,554$) because the data producers created this variable using hotdeck imputation before releasing the NLAAS to the public. Consequently, income caused instability in preliminary MICE models because it is an imputed variable, and Stata frequently produced an error message to that effect.

An ordinary least squares (OLS) regression was used to test hypothesis 1j. Psychological distress was regressed on the same set of IVs used in the CLL models for the Mexican immigrant subpopulation. For the MICE approach, diagnostic statistics of simulation error were calculated based on the results of the bivariate OLS regression.

All analyses for the Mexican immigrants in the NLAAS were conducted using unconditional subclass analyses. To account for the complex sample design in variance estimation, CLL models used pseudo-Maximum Likelihood estimation for model parameters and a sandwich-type estimator for standard errors. The OLS model used Taylor series linearization (Heeringa et al., 2010).

Aim 2

To test hypotheses 2a through 2f, I examined potential mediators of the relationship between an undocumented immigration status (IV) and the mental health dependent variables (DV) among Mexican immigrants. All models employed unconditional subclass analyses. The following variables were tested as possible mediators by estimating separate path models for each significant mental health DV in Aim 1: perceived discrimination, social isolation, traumatic events, food insecurity, neighborhood safety, and context-of-exit. Each model was estimated controlling for the following covariates: years in the US; English proficiency; gender; age; marital/partnership status; employment status; and years of education.

Aim 3

For the proxy approach, hypotheses 3a, 3b, 3c and 3e were tested using second-order F -transformed Rao-Scott chi-square statistics (Heeringa et al., 2010; Rao & Scott, 1984; Thomas & Rao, 1987) to provide an omnibus test for subsequent pairwise comparisons between individual groups. The Benjamini-Hochberg procedure was used to control for the false discovery rate in multiple comparisons (Benjamini & Hochberg, 1995; Thissen, Steinberg, & Kuang, 2002). A first-order Taylor series approximation was used to account for the complex survey design in the estimation of standard errors. To test hypothesis 3d, weighted mean scores on the K-10 psychological distress scale were calculated for LUMIs and the other Latino/a subgroups adjusting for the sampling design using Taylor series linearization. Adjusted Wald tests were used as the omnibus test for subsequent pairwise comparisons.

For the chained equations approach, Stata's *mi test* command provided an omnibus test for subsequent pairwise comparisons. The computational burden for conducting analyses across $m = 100$ imputations is severe and time consuming. Therefore, pairwise comparisons were only tested between LUMIs and the other Latino/a subgroups.

Chapter Five: Results

This chapter begins by presenting sociodemographic characteristics of Cubans, Puerto Ricans and Mexicans in the NLAAS sample. Results are then organized by the approach used to ascertain Mexican immigrants' likely documentation status. Within each approach, the results are presented according to each specific study aim. Because of this study's novel use of multiple imputation using chained equations to model documentation status and the statistical complexity associated with this approach, I calculated Monte Carlo error estimates to evaluate potential simulation error associated with parameter estimates and test statistics as recommended by White et al (2011). I also used recommended diagnostic tests to assess convergence of MICE models given the likelihood of convergence issues when using this method (StataCorp., 2011b).

Sociodemographic Characteristics of NLAAS Latino/as

The NLAAS Latino/a sample consists of Mexicans, Cubans, Puerto Ricans and "other" Latino/as. This study does not include "other Latino/as" in its analysis because researchers recommend against collapsing Latino/a ethnic and nationality groups into a single category on methodological grounds (Guarnaccia, 2009; Umaña-Taylor & Fine, 2001; Vega & Lopez, 2001). This study's exclusion of "other Latino/as" does not mean that these cases were dropped from the sample prior to analysis. Rather, I used unconditional subclass analyses and retained these cases in the NLAAS sample.

Mexicans differed from Cubans and Puerto Ricans across several sociodemographic indicators (see Table 5.1). First, Mexicans were notably younger compared to Cubans and Puerto Ricans. Over half of the Mexican sample (53%) fell between the ages of 18 and 34, compared to 39% of Puerto Ricans and 26% of Cubans. Next, Mexicans had a somewhat lower rate of U.S. citizenship compared to Cubans (55% vs. 61%, respectively) despite having a markedly higher rate of US nativity (43% vs. 14%). Finally, over half of the Mexican sample (53%) did not complete high school compared to 35% of Puerto Ricans and 30% of Cubans. This difference in educational attainment appears to be mirrored by the groups' annual incomes: Only 14% of Mexicans earned \$75,000 or more per year in comparison to 23% of Puerto Ricans and 25% of Cubans.

Table 5.1. Sociodemographic Characteristics of NLAAS Latino/as (Weighted Percent, SE)				
	Total (SE) (n = 1940)	Mexican (n = 868)	Puerto Rican (n = 495)	Cuban (n = 577)
Gender				
Female	46.93 (1.41)	46.11 (1.85)	51.32 (2.04)	47.41 (1.56)
Male	53.07 (1.41)	53.89 (1.85)	48.68 (2.04)	52.59 (1.56)
Age ^{***}				
18 to 34	49.29 (2.17)	53.01 (2.42)	39.15 (2.86)	25.70 (2.00)
35 to 49	29.69 (1.41)	29.48 (1.69)	32.50 (2.74)	26.15 (2.47)
50 to 64	13.32 (0.93)	11.35 (0.99)	18.92 (2.08)	25.31 (1.95)
65 and older	7.70 (0.92)	6.16 (0.99)	9.43 (3.53)	22.84 (2.32)
Nativity ^{***}				
US born	42.73 (2.97)	42.93 (3.67)	54.95 (3.02)	13.85 (1.66)
Foreign born	57.26 (2.97)	57.07 (3.67)	45.05 (3.02)	86.15 (1.66)
Citizenship ^{***}				
US citizen	61.45 (3.04)	54.81 (3.46)	98.92 (0.54)	60.82 (3.84)
Non-US citizen	38.55 (3.04)	45.19 (3.46)	1.08 (0.54)	39.18 (3.84)
Married/Partnered ^{***}				
No	32.69 (1.60)	30.18 (2.04)	44.95 (3.02)	36.79 (3.37)
Yes	67.31 (1.60)	69.82 (2.04)	55.05 (3.02)	63.21 (3.37)
Employed				
No	37.55 (2.15)	36.57 (2.68)	41.92 (3.50)	39.95 (2.38)
Yes	62.45 (2.15)	63.43 (2.68)	58.08 (3.50)	60.05 (2.38)
Years of Education ^{***}				
11 or less	48.69 (1.93)	52.71 (2.26)	34.45 (2.76)	30.37 (2.40)
12	24.87 (0.98)	24.32 (1.19)	28.17 (2.17)	24.51 (1.62)
13 to 15	17.65 (1.49)	15.92 (1.84)	25.76 (2.00)	21.23 (2.21)
16 or more	8.79 (0.91)	7.05 (1.01)	11.62 (1.64)	23.90 (2.77)
Income ^{***}				
0 to 14,999	28.65 (2.69)	29.06 (3.32)	26.68 (1.61)	27.83 (3.72)
15,000 to 34,999	29.53 (1.68)	31.34 (2.08)	22.30 (2.03)	23.25 (1.80)
35,000 to 74,999	26.28 (2.23)	26.00 (2.73)	28.60 (2.42)	24.61 (1.83)
75,000 or more	15.54 (1.06)	13.60 (1.19)	22.43 (2.33)	24.40 (3.93)
Years in US ^{***}				
< 5 years	9.45 (1.61)	10.12 (1.99)	2.40 (1.05)	16.57 (4.33)
5 to 10 years	8.79 (1.11)	9.40 (1.34)	3.54 (1.22)	12.80 (2.16)
11 to 20	17.04 (1.48)	19.11 (1.81)	9.43 (1.36)	8.54 (1.50)
≥ 21 years	21.73 (0.87)	18.16 (1.04)	29.56 (3.20)	48.22 (3.68)
US born	42.97 (2.97)	43.21 (3.66)	55.06 (3.09)	13.87 (1.67)
English Proficiency ^{***}	4.20 (0.23)	3.99 (0.27)	5.73 (0.17)	3.56 (0.32)

*p ≤ 0.05, ** p ≤ 0.01, *** p ≤ 0.001

Proxy Variable Approach

The proxy variable approach described in the previous chapter yielded 35 LUMIs and 443 “documented Mexican immigrants”. The LUMI proxy variable had ten missing values. Although this approach identified a suboptimal number of LUMIs, it was based on an empirically sound use of the immigration-related, sociodemographic, behavioral and attitudinal variables available in the NLAAS. While omitting one or more of these variables in the construction of the LUMI proxy (e.g., deportation anxiety) resulted in a larger number of “LUMIs”, doing so decreased the face validity of the proxy variable as an indicator of an undocumented immigration status. Further, results from analyses of

demographic and Americanization-related covariates using the current LUMI proxy were consistent with findings in the demography literature pertaining to UMIs vs. documented Mexican immigrants, thereby further buttressing its face validity (see Table 5.2).

Table 5.2. Americanization-Related and Demographic Covariates among Mexican Immigrants by Proxy Documentation Status (weighted means, percentages and 95% CI)

	LUMI (n = 35)	Documented (n = 443)
Americanization variables		
Years in the US ^{***}	8.62 (5.86, 11.39)	17.93 (15.82, 20.05)
English proficiency ^{**}	0.57 (0.04, 1.11)	1.80 (1.42, 2.19)
Demographic variables		
Female	54.54 (32.17, 75.21)	45.04 (38.93, 51.30)
Age ^{***}	30.49 (28.37, 32.61)	36.46 (34.89, 38.01)
Married	72.93 (60.30, 82.70)	76.03 (71.89, 79.72)
Years of education	8.69 (7.81, 9.58)	8.94 (8.59, 9.31)
Employed ⁺	73.64 (61.26, 83.14)	63.36 (54.20, 71.65)

⁺ $p \leq 0.10$, ^{*} $p \leq 0.05$, ^{**} $p \leq 0.01$, ^{***} $p \leq 0.001$

Aim 1 Results

The purpose of this aim was to examine the relationship between an undocumented immigration status and mental health indicators among Mexican immigrants in the US, both at the bivariate level and after adjusting for potential confounders. First, second-order Rao-Scott chi-squares were used to test for significant bivariate relationships between the LUMI proxy and the following lifetime and past 12 month composite DSM-IV-TR and ICD-10 diagnostic categories: any depressive disorder, any anxiety disorder, any substance use disorder, and any disorder. Next, second-order Rao-Scott chi-squares were used to examine the bivariate relationship between the LUMI proxy and self-rated mental health. Finally, I tested for significant differences in mean psychological distress scores between LUMIs and documented Mexican immigrants.

After identifying significant bivariate relationships between mental health dependent variables and the LUMI proxy, I determined if the relationship remained significant after adjusting for potential confounders by fitting sequential complementary log-log regression models. First, I estimated the unadjusted odds ratio for the mental health dependent variable. Next, I entered the Americanization-

related covariates into the model. Finally, I added demographic covariates to the model and assessed for changes in the target relationship between the LUMI proxy and the mental health dependent variable.

Lifetime DSM-IV-TR diagnoses. As shown in Table 5.3, there were no statistically significant bivariate associations between the lifetime composite DSM-IV-TR diagnostic categories and the LUMI proxy. Although not statistically significant, LUMIs had higher rates for any lifetime depressive disorder and any lifetime anxiety disorder. The prevalence rates for any lifetime depressive disorder were 14.34% for LUMIs and 10.23% for documented Mexican immigrants, $F(1, 28) = 0.33, p = 0.57$. The prevalence rates for any lifetime anxiety disorder were 23.79% for LUMIs and 19.27% for documented Mexican immigrants, $F(1, 28) = 0.46, p = 0.50$. Similarly, compared to LUMIs, documented Mexican immigrants had higher prevalence rates for any lifetime substance use disorder and any lifetime disorder compared to LUMIs, but these differences were also not statistically significant. The prevalence of any lifetime substance use disorder among documented Mexican immigrants was 5.83% compared to 2.98% among LUMIs, $F(1, 28) = 0.42, p = 0.52$. The rate of any lifetime disorder for documented Mexican immigrants was 26.67% compared to 25.67% for LUMIs, $F(1, 28) = 0.43, p = 0.52$.

To further explore how a likely undocumented status may relate to Mexican immigrant mental health, I conducted post-hoc analyses of the bivariate relationships between the specific lifetime DSM-IV-TR diagnoses comprising each diagnostic composite and the LUMI proxy. LUMIs had significantly greater rates of lifetime dysthymia (6.51%) compared to documented Mexican immigrants (1.49%), $F(1, 28) = 3.87, p = 0.05$. Finally, LUMIs had greater prevalence rates of lifetime panic disorder(6.39%) compared to documented Mexican immigrants (1.52%), $F(1, 28) = 3.10, p = 0.08$.

Disorder	LUMI Proxy		Documented		p
	Weighted %	95% CI	Weighted %	95% CI	
Any depressive disorder	14.34	4.61,36.70	10.23	7.96,13.05	0.57
Dysthymia	6.51	1.82,20.74	1.49	0.63, 3.50	0.05
Major depressive disorder	12.45	3.30, 37.26	10.71	8.67, 13.16	0.71
Any anxiety disorder	23.79	11.47,42.92	19.27	16.02,22.99	0.50
Panic disorder	6.39	1.12, 29.22	1.52	0.77 ,2.96	0.08
Panic attack	18.54	8.18,36.77	12.61	9.45,16.64	0.32
PTSD	5.77	1.37,21.25	2.75	1.44, 5.18	0.35
Generalized anxiety disorder	1.77	0.32, 9.12	2.97	2.07,4.26	0.52
Agoraphobia without panic disorder	0	----	3.53	2.28,5.44	0.20
Social phobia	2.45	0.44, 12.35	5.12	3.20, 8.06	0.43

Any substance use disorder	2.98	0.35, 21.03	5.83	3.75, 8.95	0.52
Drug abuse	2.98	0.35, 21.03	2.26	1.60, 3.17	0.79
Drug dependence	0	----	1.03	0.59, 1.78	0.38
Alcohol abuse	2.98	0.35, 21.03	5.58	3.61, 8.54	0.55
Alcohol dependence	0	----	2.87	1.16, 6.95	0.51
Any disorder	25.67	13.34, 43.66	26.67	23.63, 29.96	0.90

Past 12 month DSM-IV-TR diagnoses. There were no significant bivariate relationships between the past 12 month DSM-IV-TR diagnostic composites and the LUMI proxy (see Table 5.4). LUMIs had higher rates for any past 12 month depressive disorder, any past 12 month anxiety disorder, and any past 12 month disorder compared to documented Mexican immigrants, although the differences were not statistically significant. The prevalence rate of any past 12 month depressive disorder among LUMIs was 9.10% compared to 5.44% among documented Mexican immigrants, $F(1, 28) = 0.50, p = 0.49$. LUMIs also had a higher rate of any past 12 month anxiety disorder (12.40%) compared to documented Mexican immigrants (10.79%), $F(1, 28) = 0.07, p = 0.79$. Finally, 16.88% of LUMIs endorsed any past 12 month disorder compared to 13.95% of documented Mexican immigrants, $F(1, 28) = 0.15, p = 0.70$.

Post-hoc analyses identified two statistically significant relationships between the LUMI proxy and individual past 12 month DSM-IV-TR disorders. First, 6.51% of LUMIs endorsed past 12 month dysthymia compared to 1.49% of documented Mexican immigrants, $F(1, 28) = 3.87, p = 0.05$. Next, 6.39% of LUMIs endorsed past 12 month panic disorder compared to 1.09% of documented Mexican immigrants, $F(1, 28) = 6.14, p = 0.02$. Among LUMIs, the prevalence rates of lifetime and past 12 month dysthymia are identical as are rates for lifetime and past 12 month panic disorder (see Table 5.2).

Disorder	LUMI Proxy		Documented		p
	Weighted %	95% CI	Weighted %	95% CI	
Any depressive disorder	9.10	2.27, 30.12	5.44	4.05, 7.26	0.49
Dysthymia*	6.51	1.81, 6.51	1.49	0.63, 3.50	0.05
Major depressive disorder	7.21	1.25, 32.32	4.84	3.68, 6.35	0.67
Any anxiety disorder	12.40	4.32, 30.74	10.79	7.52, 15.25	0.79
Panic disorder*	6.39	1.12, 29.22	1.09	0.65, 1.80	0.02
Panic attack	9.42	2.61, 28.73	5.84	3.61, 9.31	0.36
PTSD	2.98	0.35, 21.03	1.48	0.58, 3.73	0.53
Generalized anxiety disorder	1.77	0.32, 9.12	1.67	1.04, 2.67	0.95
Agoraphobia, no panic disorder	0	----	1.97	0.90, 4.24	0.55
Social phobia	0	----	3.31	1.64, 6.56	0.51
Any substance use disorder	0	----	1.50	0.61, 3.63	0.45

Drug abuse	0	----	0.47	0.12, 1.90	0.63
Drug dependence	0	----	0.34	0.04, 2.55	0.73
Alcohol abuse	0	----	0.69	0.23, 2.01	0.66
Alcohol dependence	0	----	0.71	0.25, 2.04	0.61
Any disorder	16.88	6.23, 38.34	13.95	10.86, 17.75	0.70

Past 30 day DSM-IV-TR diagnoses. Although not specifically part of Aim 1, post hoc analyses were conducted to examine relationships between the LUMI proxy and each past 30 day diagnosis. The purpose of these analyses was to further elucidate the relationship between an undocumented immigration status and Mexican immigrant mental health. It was not possible to create diagnostic composite categories because the available past 30 day DSM-IV-TR diagnoses differed from the lifetime and past 12 month diagnoses. Table 5.5 presents results of the second-order Rao-Scott chi-square tests of the relationship between the LUMI proxy and each past 30 day diagnosis.

Results of bivariate analyses using past 30 day DSM-IV-TR diagnoses were consistent with prior results using lifetime and past 12 month DSM-IV-TR diagnoses. That is, dysthymia and panic disorder emerged again as significant bivariate correlates of the LUMI proxy. Prevalence rates for past 30 day dysthymia were 4.62% for LUMIs and 0.45% for documented Mexican immigrants, $F(1, 28) = 4.73, p = 0.04$. Further, prevalence rates for past 30 day panic disorder were 1.77% for LUMIs compared to 0.38% for documented Mexican immigrants, $F(1, 28) = 2.86, p = 0.10$. In addition, the prevalence rate of past 30 day major depressive episode for LUMIs was 7.21% compared to 1.42% for documented Mexican immigrants, $F(1, 28) = 3.22, p = 0.08$.

Disorder	LUMI Proxy		Documented		p
	Weighted %	95% CI	Weighted %	95% CI	
Dysthymia	4.62	0.82, 22.07	0.45	0.10, 2.09	0.04
Major depressive episode	7.21	0.82, 22.07	1.42	0.92, 2.19	0.08
Panic disorder	1.77	0.32, 9.12	0.38	0.21, 0.67	0.10
Panic attack	1.77	0.32, 9.12	1.86	1.23, 2.80	0.96
Generalized anxiety disorder	0	---	0.48	0.24, 0.83	0.44
Agoraphobia, no panic disorder	0	---	1.38	0.51, 3.69	0.61
Social phobia	0	---	1.70	0.58, 4.89	0.64
Drug abuse	0	---	0	---	---
Drug dependence	0	---	0	---	---
Alcohol abuse	0	---	0.21	0.03, 1.21	0.77
Alcohol dependence	0	---	0.21	0.03, 1.21	0.77

Lifetime ICD-10 diagnoses. Compared to documented Mexican immigrants, LUMIs had higher rates for any depressive disorder, any anxiety disorder, and any lifetime ICD-10 disorder. However, there were no statistically significant differences in the prevalence rates of lifetime ICD-10 diagnostic composites (see Table 5.6). The rates for any depressive disorder among LUMIs was 8.96% compared to 7.04% among documented Mexican immigrants, $F(1, 28) = 0.11, p = 0.74$. Rates of any anxiety disorder among LUMIs were 25.65% compared to 19.81% for documented Mexican immigrants, $F(1, 28) = 0.66, p = 0.42$. Rates of any lifetime disorder for LUMIs were 27.54% compared to 24.46% for documented Mexican immigrants, $F(1, 28) = 0.16, p = 0.70$.

Post hoc analyses again identified dysthymia and panic disorder as seemingly important diagnoses for LUMIs based on ICD-10 nosology as well. Differences in prevalence rates for LUMIs and other documented Mexican immigrants approached statistical significance for both disorders. The rate of lifetime dysthymia for LUMIs was 6.51% compared to 1.88% for documented Mexican immigrants, $F(1, 28) = 2.58, p = 0.10$. The rate of lifetime panic disorder for LUMIs was 6.39% compared to 1.52% for documented Mexican immigrants, $F(1, 28) = 3.10, p = 0.08$.

Table 5.6. Lifetime ICD-10 Disorder Prevalence among Mexican Immigrants by Proxy Documentation Status

Disorder	LUMI Proxy		Documented		p
	Weighted %	95% CI	Weighted %	95% CI	
Any depressive disorder	8.96	2.25, 29.59	7.04	4.58, 10.68	0.74
Dysthymia	6.51	1.82, 20.74	1.88	0.78, 4.49	0.10
Severe depressive episode	7.07	1.23, 31.77	6.35	4.52, 8.85	0.90
Any anxiety disorder	25.65	12.80, 44.77	19.81	16.88, 23.10	0.42
Panic disorder	6.39	1.12, 29.22	1.52	0.77, 2.96	0.08
Panic attack	18.54	8.18, 36.77	11.99	9.14, 15.56	0.29
PTSD	5.77	1.37, 21.25	3.08	1.69, 5.54	0.43
Generalized anxiety disorder	1.77	0.32, 9.12	3.03	2.12, 4.33	0.55
Social phobia	8.93	1.95, 32.66	6.54	4.19, 10.05	0.68
Any substance use disorder	2.98	0.35, 21.03	5.83	3.75, 8.95	0.52
Drug abuse	2.98	0.35, 21.03	2.26	1.60, 3.17	0.79
Drug dependence	0	---	1.03	0.59, 1.78	0.38
Alcohol abuse	2.98	0.35, 21.03	5.58	3.61, 8.54	0.55
Alcohol dependence	0	---	2.87	1.16, 6.95	0.51
Any disorder	27.54	14.56, 45.87	24.46	21.48, 27.70	0.70

Past 12 month ICD-10 diagnoses. Once again, there were no statistically significant differences in the rates of diagnostic composites between LUMIs and documented Mexican immigrants. Although not significant, LUMIs had higher rates of any depressive disorder, any anxiety disorder, and any past 12 month disorder (see Table 5.7). Post hoc analyses of individual past 12-month ICD-10 disorders yielded many results that were identical to the post hoc analyses of individual past 12 month DSM-IV-TR disorders (see Table 5.4). For example, past 12 month ICD-10 dysthymia and panic disorder have the same prevalence rates and statistical significance found in post hoc analyses of past 12 month DSM-IV-TR dysthymia and panic disorder. Indeed, based on past 12 month ICD-10 disorder prevalence rates, the ICD-10 psychiatric nosology only appeared to differ from DSM-IV-TR nosology for severe depressive episode (which is not part of the DSM-IV-TR nosological system) and social phobia. In addition, the NLAAS does not contain the ICD-10 diagnostic algorithm for agoraphobia without panic disorder, so it was not included in the analyses.

Table 5.7. Past 12 month ICD-10 Disorder Prevalence among Mexican Immigrants by Proxy Documentation Status

Disorder	LUMI Proxy		Documented		p
	Weighted %	95% CI	Weighted %	95% CI	
Any depressive disorder	6.51	1.82, 20.74	4.51	3.00, 6.73	0.58
Dysthymia	6.51	1.82, 20.74	1.49	0.63, 3.50	0.05
Severe depressive episode	4.62	0.82, 22.07	4.21	2.91, 6.06	0.91
Any anxiety disorder	14.26	4.92, 34.83	10.18	7.56, 13.57	0.52
Panic disorder	6.39	1.12, 29.22	1.09	0.65, 1.80	0.02
Panic attack	9.42	2.61, 28.73	5.84	3.61, 9.31	0.36
PTSD	2.98	0.35, 21.03	1.61	0.67,3.86	0.59
Generalized anxiety disorder	1.77	0.32, 9.12	1.67	0.89,3.10	0.95
Social phobia	1.86	0.16,18.86	2.84	1.77,4.51	0.74
Any substance use disorder	0	---	1.50	0.61,3.63	0.45
Drug abuse	0	---	0.47	0.12, 1.90	0.63
Drug dependence	0	---	0.34	0.04, 2.55	0.73
Alcohol abuse	0	---	0.69	0.23, 2.00	0.66
Alcohol dependence	0	---	0.71	0.25, 2.04	0.61
Any disorder	16.15	6.14,36.20	12.78	10.01,16.18	0.62

Past 30 day ICD-10 diagnoses. Post hoc analyses were also conducted on past 30 day ICD-10 psychiatric disorders (see Table 5.8). Results for dysthymia and panic disorder were identical to results from the post hoc analyses of past 30 day DSM-IV-TR disorders. Specifically, the dysthymia rate for LUMIs was 4.62% compared to 0.45% for documented Mexican immigrants, $F(1, 28) = 4.73$, $p = 0.04$. Also, LUMIs again had higher rates of panic disorder (1.77%) compared to documented Mexican immigrants (0.38%), $F(1, 28) = 2.86$, $p = 0.10$. In a unique result, LUMIs' rate of severe depressive episode (4.62%) was significantly higher compared to documented Mexican immigrants (0.43%), $F(1, 28) = 6.17$, $p = 0.02$.

Table 5.8. Past 30 Day ICD-10 Disorder Prevalence among Mexican Immigrants by Proxy Documentation Status

Disorder	LUMI Proxy		Documented		p
	Weighted %	95% CI	Weighted %	95% CI	
Dysthymia	4.62	0.82, 22.07	0.45	0.10, 2.09	0.04
Severe depressive episode	4.62	0.82, 22.07	0.43	0.14, 1.37	0.02
Panic disorder	1.77	0.32, 9.12	0.38	0.21, 0.67	0.10
Panic attack	1.77	0.32, 9.12	1.86	1.23, 2.80	0.96
Social phobia	0	---	1.31	0.57, 2.98	0.53
Drug abuse	0	---	0	---	-
Drug dependence	0	---	0	---	-
Alcohol abuse	0	---	0.21	0.03, 1.21	0.77
Alcohol dependence	0	---	0.21	0.03, 1.21	0.77

Self-rated mental health and psychological distress. Results from the second-order Rao-Scott chi-square test found that LUMIs had higher rates of poor self-reported mental health (25.64%) compared to documented Mexican immigrants (16.20%), $F(1, 28) = 2.18$, $p = 0.10$. However, there was no significant difference in mean psychological distress scores (see Table 5.9).

Table 5.9. Poor Self-Rated Mental Health (weighted %, 95% CI) and Psychological Distress (weighted mean, 95% CI) among Mexican Immigrants by Documentation Status

	LUMI Proxy	Documented	p
Self-rated mental health	25.64 (13.06, 44.17)	16.20 (12.70, 20.43)	0.10
Psychological distress	3.17 (0.73, 5.71)	3.15 (2.73, 3.56)	0.98

Gompit Regressions

Unadjusted and adjusted odds ratios were estimated for the mental health variables that had significant¹⁴ bivariate relationships with the LUMI proxy using gompit regressions. Complementary log-log models were estimated for the following mental health dependent variables: self-rated mental health, lifetime DSM-IV-TR dysthymia, past 12 month DSM-IV-TR dysthymia, lifetime ICD-10 dysthymia, past 12 month ICD-10 dysthymia, lifetime DSM-IV-TR panic disorder, lifetime ICD-10 panic disorder, past 12 month DSM-IV-TR panic disorder, past 12 month ICD-10 panic disorder, past 30 day DSM-IV-TR dysthymia, past 30 day ICD-10 dysthymia, past 30 day DSM-IV-TR dysthymia, past 30 day ICD-10 dysthymia, past 30 day DSM-IV-TR panic disorder, past 30 day ICD-10 panic disorder, and past 30 day DSM-IV-TR major depressive episode.

Self-rated mental health. Results of complementary log-log models for self-rated mental health are presented in Table 5.10. There was little change in the magnitude of the ORs for LUMIs across the three models. The unadjusted odds of LUMIs having poor self-rated mental health were 68% greater compared to documented Mexican immigrants. In model 1, increases in the Americanization factors were associated with decreases in the odds of poor self-rated mental health. After entering demographic covariates in the final model, the adjusted OR was statistically significant for LUMIs. In the final model, the odds of LUMIs having poor self-rated mental health were 73% greater compared to documented Mexican immigrants when controlling for Americanization and demographic covariates. Further, the odds of poor self-rated mental health were significantly lower for those with greater English proficiency, females, married/partnered persons, the employed, and those with more education when controlling for all other covariates in the model.

	Bivariate Regression ^a	Multivariate Regression ^b	
	OR (95% CI)	Model 1, OR (95% CI)	Model 2, OR (95% CI)
LUMI	1.68 ⁺ (0.83, 3.39)	1.53 (0.78, 2.98)	1.73 [*] (1.02, 2.92)
Years in US		1.01 ⁺ (1.00, 1.03)	1.02 (0.99, 1.05)

¹⁴ Mental health variables that approached significance (i.e., $p \leq 0.10$) in their association with the LUMI proxy were also included.

English proficiency	0.73 ^{***} (0.64, 0.84)	0.78 ^{**} (0.67, 0.92)
Female		0.44 ^{**} (0.26, 0.72)
Age		0.97 (0.95, 1.01)
Married		0.41 ^{**} (0.23, 0.72)
Years of education		0.89 [*] (0.79, 1.00)
Employed		0.40 ^{**} (0.23, 0.70)
^a n = 478. ^b n = 473		
⁺ p ≤ 0.10, [*] p ≤ 0.05, ^{**} p ≤ 0.01, ^{***} p ≤ 0.001		

Lifetime DSM-IV-TR and past 12 month DSM-IV-TR/ICD-10 dysthymia. Initial bivariate tests yielded identical estimates for lifetime DSM-IV-TR dysthymia, past 12 month DSM-IV-TR dysthymia, and past 12 month ICD-10 dysthymia. In the unadjusted model (see Table 5.11), the odds of LUMIs endorsing the aforementioned psychiatric diagnoses are 4.48 times greater compared to documented Mexican immigrants. In the first adjusted model, the magnitude and statistical significance of the OR for LUMIs increased when controlling for both Americanization covariates. Only years in the US was statistically significant such that the odds of endorsing these psychiatric diagnoses increased by 4% for each year spent in the United States. In the final model, the odds of LUMIs endorsing the mental health DV were greater by a factor of 8.04 in comparison to documented Mexican immigrants when controlling for Americanization and demographic covariates.

Table 5.11. Complementary Log-Log Models for DSM-IV-TR Lifetime/Past 12 Month Dysthymia and ICD-10 Past 12 Month Dysthymia

	Bivariate Regression ^a	Multivariate Regression ^b	
	OR (95% CI)	Model 1, OR (95% CI)	Model 2, OR (95% CI)
LUMI	4.48 ⁺ (0.82, 24.39)	7.09 [*] (1.25, 40.15)	8.04 ^{**} (1.68, 38.44)
Years in US		1.04 ^{***} (1.02, 1.06)	0.99 (0.91, 1.09)
English proficiency		1.02 (0.89, 1.16)	1.22 (0.89, 1.67)
Female			2.58 ⁺ (0.87, 7.70)
Age			1.05 (0.93, 1.18)
Married			0.76 (0.30, 1.92)
Years of education			0.91 (0.69, 1.20)
Employed			0.78 (0.22, 2.74)
^a n = 478. ^b n = 473			
⁺ p ≤ 0.10, [*] p ≤ 0.05, ^{**} p ≤ 0.01, ^{***} p ≤ 0.001			

Lifetime ICD-10 dysthymia. As shown in Table 5.12, LUMIs had greater odds of a lifetime ICD-10 diagnosis of dysthymia compared to documented Mexican immigrants at the $p \leq 0.10$ level across the unadjusted and adjusted models. In the first adjusted model, only one of the Americanization factors, years in the US, was significantly related to a lifetime ICD-10 diagnosis of dysthymia (OR = 1.04, 95% CI = 1.02, 1.06). In the final model, the Americanization factor “years in the US” was no longer significant when controlling for demographic covariates and all other independent variables. The odds of LUMIs endorsing lifetime ICD-10 dysthymia were greater in comparison to documented Mexican immigrants by a factor of 5.48 in the final model; the odds of females endorsing the diagnosis were 68% greater compared to males at the $p \leq 0.10$ level.

Table 5.12. Complementary Log-Log Models for Lifetime ICD-10 Dysthymia

	Bivariate Regression ^a	Multivariate Regression ^b	
	OR (95% CI)	Model 1, OR (95% CI)	Model 2, OR (95% CI)
LUMI	3.54 ⁺ (0.64, 19.54)	4.98 ⁺ (0.76, 32.44)	5.48 ⁺ (0.88, 34.16)
Years in US		1.04 ^{***} (1.02, 1.06)	0.98 (0.90, 1.07)
English proficiency		0.96 (0.78, 1.18)	1.15 (0.82, 1.60)
Female			1.68 ⁺ (0.92, 3.09)
Age			1.06 (0.95, 1.19)
Married			0.93 (0.33, 2.65)
Years of education			0.93 (0.75, 1.17)
Employed			1.19 (0.27, 5.32)

^an = 478. ^bn = 473

⁺ $p \leq 0.10$, * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Lifetime DSM-IV-TR and ICD-10 panic disorder. As shown in Table 5.13, LUMIs had greater odds of a lifetime DSM-IV-TR/ICD-10 diagnosis of panic disorder compared to documented Mexican immigrants at the $p \leq 0.10$ level across all models. Because the covariate “years in the US” was not linear in the logit, a quadratic term was entered to better model the relationship between this covariate and the dependent variable in the adjusted models. In model 1, years in the US was statistically significant and in the final model years in the US was the only significant Americanization factor. Age was the only significant demographic covariate. For every one year increase in age, the odds of a lifetime DSM-IV-TR/ICD-10 panic disorder diagnosis decreases by 11 percent.

Table 5.13. Complementary Log-Log Models for Lifetime DSM-IV-TR and ICD-10 Panic Disorder

	Bivariate Regression ^a	Multivariate Regression ^b	
	OR (95% CI)	Model 1, OR (95% CI)	Model 2, OR (95% CI)
LUMI	4.32 ⁺ (0.69, 26.99)	6.67 ⁺ (0.82, 54.08)	7.37 ⁺ (0.56, 96.50)

Years in US	1.48** (1.162, 1.85)	1.56*** (1.33, 1.84)
Years in US squared	0.99*** (0.98, 1.00)	0.99*** (0.98, 0.99)
English proficiency	1.20* (1.03, 1.40)	0.98 (0.73, 1.33)
Female		1.97 (0.32, 11.97)
Age		0.89** (0.81, 0.97)
Married		0.71 (1.40, 3.61)
Years of education		1.04 (0.87, 1.24)
Employed		0.92 (0.36, 2.39)

^an = 478. ^bn = 473
⁺ p ≤ 0.10, * p ≤ 0.05, ** p ≤ 0.01, *** p ≤ 0.001

Past 12 month DSM-IV-TR/ICD-10 panic disorder. As shown in Table 5.14, the unadjusted and adjusted odds of LUMIs endorsing past 12 month DSM-IV-TR/ICD-10 panic disorder are significantly greater compared to documented Mexican immigrants. Quadratic terms were entered for age and “years in the US” to model the curvilinear relationship between these variables and the dependent variable. Once again, “years in the US” was the only significant Americanization covariate in both adjusted models. In the final model, the significant demographic covariates included age and marital/partnership status. The odds of endorsing the diagnosis were 70% lower for married/partnered individuals compared to those who were not married/partnered. The employed had 39% lower odds of endorsing the diagnosis compared to the unemployed.

Table 5.14. Complementary Log-Log Models for Past 12 Month DSM-IV-TR and ICD-10 Panic Disorder

	Bivariate Regression ^a		Multivariate Regression ^b	
	OR (95% CI)		Model 1, OR (95% CI)	Model 2, OR (95% CI)
LUMI	6.04* (1.15, 31.82)		8.58* (1.10, 67.00)	13.94* (1.07, 180.99)
Years in US			1.35*** (1.25, 1.46)	1.45*** (1.29, 1.62)
Years in US squared			0.99*** (0.98, 0.99)	0.99*** (0.98, 0.99)
English proficiency			1.14 (0.90, 1.45)	1.01 (0.75, 1.36)
Female				5.58 (0.43, 71.93)
Age				1.98* (0.95, 4.14)
Age squared				0.99* (0.97, 0.99)
Married				0.30* (0.09, 1.03)
Years of education				0.96 (0.85, 1.09)
Employed				0.61 ⁺ (0.33, 1.12)

^an = 478. ^bn = 473
⁺ p ≤ 0.10, * p ≤ 0.05, ** p ≤ 0.01, *** p ≤ 0.001

Past 30 day DSM-IV-TR/ICD-10 dysthymia. The LUMI proxy remained significantly associated with past 30 day dysthymia across all models. In the adjusted models, especially the final model, the coefficients for the LUMI proxy had very wide confidence intervals, suggesting instability in the models. Results from these models are presented in Table 5.15, but they should be interpreted with extreme caution given the uncertainty of the findings.

	Bivariate Regression ^a		Multivariate Regression ^b	
	OR (95% CI)		Model 1, OR (95% CI)	Model 2, OR (95% CI)
LUMI	10.39 ⁺ (0.68, 157.99)		34.79 ^{**} (3.90, 310.13)	49.75 ^{**} (4.09, 604.95)
Years in US			1.03 (0.98, 1.10)	0.93 (0.77, 1.12)
English proficiency			1.36 ^{**} (1.13, 1.64)	1.98 [*] (1.04, 3.76)
Female				1.26 (0.09, 17.63)
Age				1.17 (0.90, 1.53)
Married				1.07 (0.10, 11.97)
Years of education				0.87 (0.69, 1.11)
Employed				3.34 (0.45, 24.90)

^an = 478. ^bn = 473
⁺ p ≤ 0.10, ^{*} p ≤ 0.05, ^{**} p ≤ 0.01, ^{***} p ≤ 0.001

Past 30 day DSM-IV-TR/ICD-10 panic disorder. In the unadjusted model, the relationship between the LUMI proxy and past 30 day panic disorder approached significance. However, this relationship was not evident in the adjusted models (see Table 5.16). In model 1, English proficiency was the only significant predictor of past 30 day panic disorder. There was a 21% increase in the odds of a diagnosis of past 30 day panic disorder for every one unit increase in the English proficiency scale. This relationship was not significant after entering demographic covariates in the final model. The only significant covariate in the final model was education. The odds of past 30 day panic disorder increased 37% for each additional year of education. Because the dependent variable represented a very rare event, zero cells were found for the dichotomous married/partnered covariate. It was therefore removed from the final model.

	Bivariate Regression ^a		Multivariate Regression ^b	
	OR (95% CI)		Model 1, OR (95% CI)	Model 2, OR (95% CI)
LUMI	4.73 ⁺ (0.60, 37.46)		6.19 (0.43, 89.60)	6.57 (.40, 106.66)
Years in US			0.99 (0.92, 1.07)	1.03 (0.88, 1.21)
English proficiency			1.21 [*] (1.0, 1.47)	0.97 (0.79, 1.20)
Female				1.24 (0.06, 27.57)
Age				0.96 (.80, 1.15)
Married (removed)				Omitted due to 0 cells
Years of education				1.37 ^{***} (1.19, 1.58)
Employed				1.18 (0.14, 10.07)

^an = 478. ^bn = 473
⁺ p ≤ 0.10, ^{*} p ≤ 0.05, ^{**} p ≤ 0.01, ^{***} p ≤ 0.001

Past 30 day DSM-IV-TR major depressive episode. As shown in table 5.17, the LUMI proxy is a significant predictor of past 30 day DSM-IV-TR major depressive episode in the adjusted models. The

magnitude of the OR for LUMIs increases after adjusting for Americanization factors, and it increases even more after entering demographic covariates in the final model. The only other significant covariate in either model is English proficiency in the final model.

Table 5.17. Complementary Log-Log Models for Past 30 Day DSM-IV-TR Major Depressive Episode

	Bivariate Regression ^a	Multivariate Regression ^b	
	OR (95% CI)	Model 1, OR (95% CI)	Model 2, OR (95% CI)
LUMI	5.22 ⁺ (0.66, 41.59)	6.52* (1.01, 41.99)	8.10* (1.06, 61.75)
Years in US		1.01 (0.97, 1.06)	0.96 (0.92, 1.01)
English proficiency		1.08 (0.95, 1.23)	1.45*** (1.19, 1.76)
Female			1.36 (0.52, 3.53)
Age			1.05 (0.98, 1.13)
Married			1.12 (0.40, 3.19)
Years of education			0.79 (0.56, 1.13)
Employed			0.96 (0.51, 1.81)

^an = 478. ^bn = 473
⁺ p ≤ 0.10, * p ≤ 0.05, ** p ≤ 0.01, *** p ≤ 0.001

Summary of Aim 1 results. Undocumented immigration status as identified by the proxy variable approach was significantly¹⁵ associated with the following mental health dependent variables at the bivariate level and after adjusting for Americanization and demographic covariates: self-rated mental health, lifetime DSM-IV-TR dysthymia, past 12 month DSM-IV dysthymia, past 12 month ICD-10 dysthymia, lifetime ICD-10 dysthymia, lifetime DSM-IV-TR panic disorder, lifetime ICD-10 panic disorder, past 12 month DSM-IV-TR panic disorder, past 12 month ICD-10 panic disorder, past 30 day DSM-IV-TR dysthymia, past 30 day ICD-10 dysthymia, and past 30 day DSM-IV-TR major depressive episode.

Results provided support for the hypothesis that an undocumented status is associated with worse self-rated mental health at the bivariate level and after controlling for Americanization and demographic confounders (hypothesis 1i). The results did not support the hypothesis that an undocumented status is associated with psychological distress as measured by the K10 (hypothesis 1j). In addition, this study’s findings did not directly support hypotheses 1a – 1h. None of the 12 month or lifetime DSM-IV-TR/ICD-

¹⁵ Includes significance at p ≤ 0.10

10 diagnostic composite categories were significantly associated with an undocumented immigration status at the bivariate level.

Despite these results, post hoc analyses of individual DSM-IV-TR and ICD-10 disorders subsumed under the “any depressive disorder” and “any anxiety disorder” diagnostic composite categories reveal more nuanced findings. For example, this study found that LUMIs had significantly higher rates of specific lifetime, past 12 month and past 30 day depressive and anxiety disorders compared to documented Mexican immigrants, namely dysthymia and panic disorder. These relationships generally persisted even after adjusting for Americanization and demographic confounders.

Furthermore, while not statistically significant, LUMIs had higher prevalence rates compared to documented Mexican immigrants for any lifetime and past 12 month DSM-IV-TR/ICD-10 depressive disorders. The “any lifetime DSM-IV-TR depressive disorder” composite consisted of major depressive disorder and dysthymia, and LUMIs had a significantly higher rate for dysthymia and a higher yet non-significant rate for major depression compared to documented Mexican immigrants. This pattern was also true for past 12 month DSM-IV-TR depressive disorders as well as lifetime and past 12 month ICD-10 depressive disorders. Consequently, this study’s results provided limited support for hypotheses 1c and 1d.

Similarly, LUMIs had higher yet non-significant rates for any lifetime/past 12 month DSM-IV-TR and ICD-10 anxiety disorder. In the case of the DSM-IV-TR, the anxiety disorder diagnostic composite consisted of panic disorder, panic attack, PTSD, generalized anxiety disorder, agoraphobia without panic disorder and social phobia. Compared to documented Mexican immigrants, LUMIs had significantly higher rates of lifetime and past 12 month panic disorder. They also had higher yet non-significant rates for lifetime and past 12 month panic attack, lifetime and past 12 month PTSD, and past 12 month generalized anxiety disorder. Other Mexican immigrants had a higher yet non-significant rate for lifetime GAD and lifetime social phobia. For lifetime and 12 month agoraphobia without panic disorder, the LUMI proxy detected 0 cases for LUMIs. It also identified no cases for LUMIs for past 12 month social phobia. In the case of the ICD-10, the anxiety disorder diagnostic composite consisted of

panic disorder, panic attack, PTSD, GAD and social phobia. Compared to documented Mexican immigrants, LUMIs had significantly higher rates of lifetime and past 12 month panic disorder. They also had higher yet non-significant rates for lifetime and past 12 month panic attack and PTSD as well as lifetime social phobia and past 12 month GAD. Other Mexican immigrants had higher yet non-significant rates for lifetime GAD and past 12 month social phobia. These findings may provide limited support for hypotheses 1a and 1b.

Aim 2 Results

The purpose of this aim was to examine potential mediators of the relationship between and undocumented immigration status and poor mental health outcomes. Specifically, I tested whether or not perceived discrimination, social isolation, food insecurity, number of potentially immigration-related traumatic events experienced, neighborhood safety, and context-of-exit mediated the relationship between an undocumented immigration status and the mental health outcomes that remained significant after adjusting for Americanization and demographic covariates in the previous section. For each of these mental health outcomes, I estimated separate path models for each hypothesized mediator and examined indirect effects from the LUMI proxy to the mental health dependent variable while controlling for Americanization and demographic covariates. Results of these analyses are presented below by each mediating variable. Path coefficients for control variables (i.e., Americanization and demographic covariates) are omitted from figures and tables.

Traumatic events. Traumatic events partially mediated the relationship between an undocumented immigration status and lifetime DSM-IV-TR/ICD-10 panic disorder (see Table 5.18). This mediational model is depicted in Figure 5.1. The total direct effect is $\beta = 0.49, p < 0.05$, while the indirect effect is $\beta = 0.04, p < 0.05$. In addition, there was a significant indirect effect from an undocumented immigration status and past 30 day DSM-IV-TR dysthymia through traumatic events (see table 5.19) as depicted in figure 5.2.

Figure 5.1. Path Model of Effects of Undocumented Status and Traumatic Events on Lifetime DSM-IV-TR/ICD-10 Panic Disorder

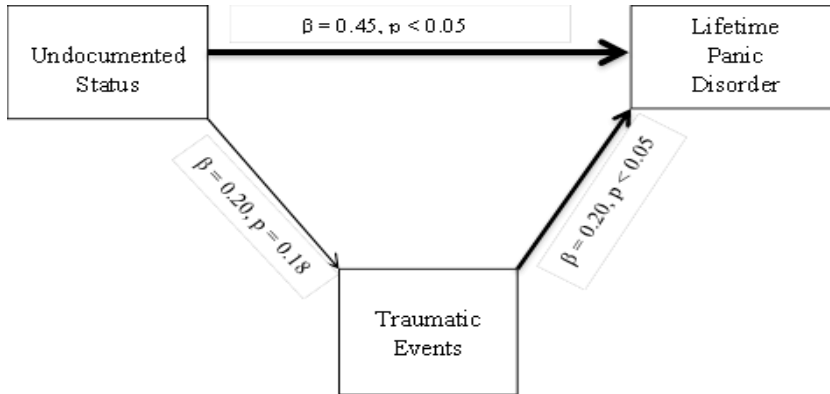


Table 5.18. Effects of Undocumented Status and Traumatic Events on Lifetime DSM-IV-TR/ICD-10 Panic Disorder: Path Model Parameter Estimates and Effect Decomposition

	b	SE	β
Direct Effects			
Undocumented Status→Lifetime Panic Disorder*	0.43	0.20	0.45
Undocumented Status→Traumatic Events	0.15	0.11	0.20
Traumatic Events→Lifetime Panic Disorder *	0.23	0.09	0.20
Total Direct Effect*	0.46	0.21	0.49
Indirect Effect			
Undocumented Status→Traumatic Events→Lifetime Panic Disorder*	0.03	0.02	0.04

Note. Controlling for English proficiency, years in the US, sex, age, education, marital/partnership status, and employment status (coefficients not shown).

+ $p \leq 0.10$, * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Figure 5.2. Path Model of the Effects of Undocumented Status and Traumatic Events on Past 30 Day DSM-IV-TR/ICD-10 Dysthymia

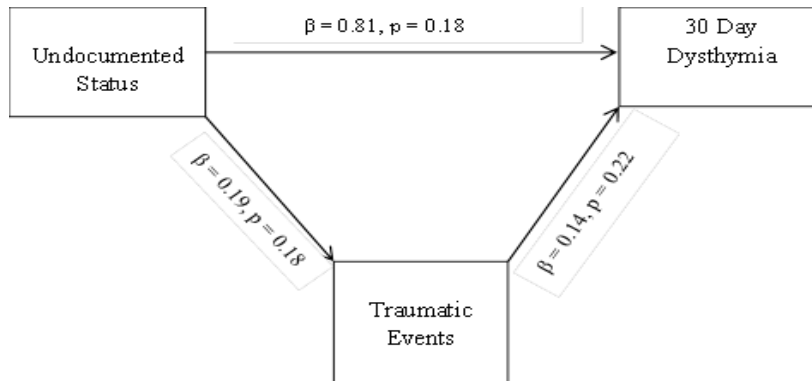


Table 5.19. Effects of Undocumented Status and Traumatic Events on Past 30 Day DSM-IV-TR/ICD-10 Dysthymia: Path Model Parameter Estimates and Effect Decomposition

	b	SE	β
Direct Effects			
Undocumented Status→30 Day Dysthymia	0.74	0.55	0.81
Undocumented Status→ Traumatic Events	0.15	0.11	0.19
Traumatic Events→ 30 Day Dysthymia	0.16	0.13	0.14
Total Direct Effect	0.77	0.54	0.84
Indirect Effect			
Undocumented Status→Traumatic Events→30 Day Dysthymia*	0.02	0.01	0.03

Note. Controlling for English proficiency, years in the US, sex, age, education, marital/partnership status, and employment status (coefficients not shown).

+ $p \leq 0.10$, * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Food insecurity. Food insecurity mediated the relationship between an undocumented immigration status and the following dependent variables: lifetime DSM-IV-TR/ICD-10 panic disorder, past 12 month DSM-IV-TR/ICD-10 panic disorder and past 30 day DSM-IV-TR major depressive episode.

Figure 5.3 depicts the path model for the relationship among an undocumented immigration status, food insecurity, and lifetime DSM-IV-TR/ICD-10 panic disorder (excluding the paths and parameter estimates for the Americanization and demographic controls). Table 5.20 details how food insecurity partially mediated the relationship between an undocumented immigration status and lifetime DSM-IV-TR/ICD-10 panic disorder. The indirect effect of the relationship through food insecurity was $\beta = -0.06, p \leq 0.05$.

Figure 5.3. Path Model of the Effects of Undocumented Status and Food Insecurity on Lifetime DSM-IV-TR/ICD-10 Panic Disorder

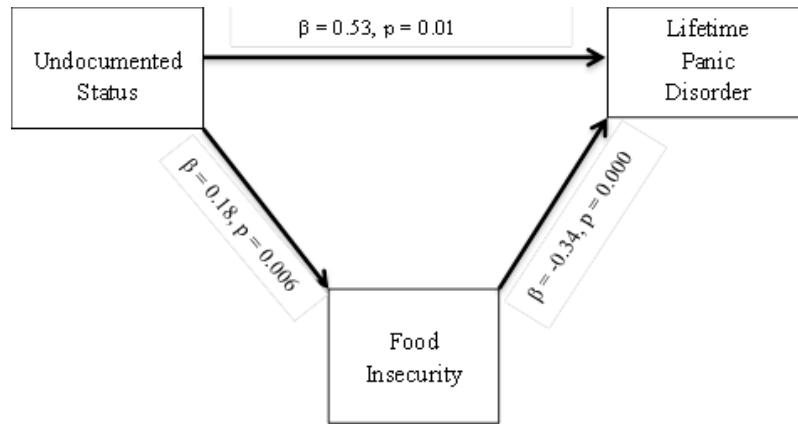


Table 5.20. Effects of Undocumented Status and Food Insecurity on Lifetime DSM-IV-TR/ICD-10 Panic Disorder: Path Model Parameter Estimates and Effect Decomposition

Direct Effects	b	SE	β
Undocumented Status→Lifetime Panic Disorder**	0.50	0.20	0.53
Undocumented Status→ Food Insecurity***	0.25	0.09	0.18
Food Insecurity→Lifetime Panic Disorder***	-0.23	0.06	-0.34
Total Direct Effect*	0.45	0.21	0.47
Indirect Effect			
Undocumented Status→Food Insecurity→Lifetime Panic Disorder*	-0.06	0.03	-0.06

Note. Controlling for English proficiency, years in the US, sex, age, education, marital/partnership status, and employment status (coefficients not shown).

+ $p \leq 0.10$, * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Food insecurity partially mediated the relationship between an undocumented status and past 12 month DSM-IV-TR/ICD-10 panic disorder. Figure 5.4 depicts the path model for the relationship among an undocumented immigration status, food insecurity, and past 12 month DSM-IV-TR/ICD-10 panic disorder (excluding the paths and parameter estimates for the Americanization and demographic controls). Table 5.21 provides detailed results of the parameter estimates for this mediational model. The indirect effect of the relationship through food insecurity was $\beta = -0.06$, $p \leq 0.05$.

Figure 5.4. Path Model of the Effects of Undocumented Status and Food Insecurity on Past 12 month DSM-IV-TR/ICD-10 Panic Disorder

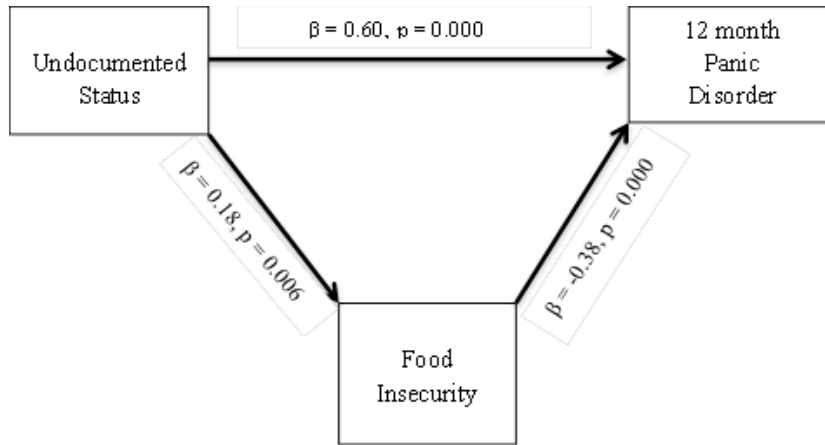


Table 5.21. Effects of Undocumented Status and Food Insecurity on Past 12 month DSM-IV-TR/ICD-10 Panic Disorder: Path Model Parameter Estimates and Effect Decomposition

	b	SE	β
Direct Effects			
Undocumented Status→12 Month Panic Disorder***	0.52	0.13	0.60
Undocumented Status→ Food Insecurity**	0.25	0.09	0.18
Food Insecurity→ 12 Month Panic Disorder***	-0.24	0.05	-0.38
Total Direct Effect**	0.46	0.15	0.53
Indirect Effect			
Undocumented Status→Food Insecurity→Lifetime Panic Disorder*	-0.06	0.03	-0.07

Note. Controlling for English proficiency, years in the US, sex, age, education, marital/partnership status, and employment status (coefficients not shown).

+ $p \leq 0.10$, * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Food insecurity was also found to partially mediate the relationship between an undocumented immigration status and past 30 day DSM-IV-TR major depressive episode. Figure 5.5 shows the path model for the relationships among an undocumented immigration status, food insecurity, and past 30 day DSM-IV-TR major depressive episode (excluding the paths and parameter estimates for the Americanization and demographic controls). The indirect effect of the relationship through food insecurity was $\beta = -0.05$, $p \leq 0.05$. Table 5.22 presents detailed results of this mediational model.

Figure 5.5. Path Model of the Effects of Undocumented Status and Food Insecurity on Past 30 Day DSM-IV-TR Major Depressive Episode

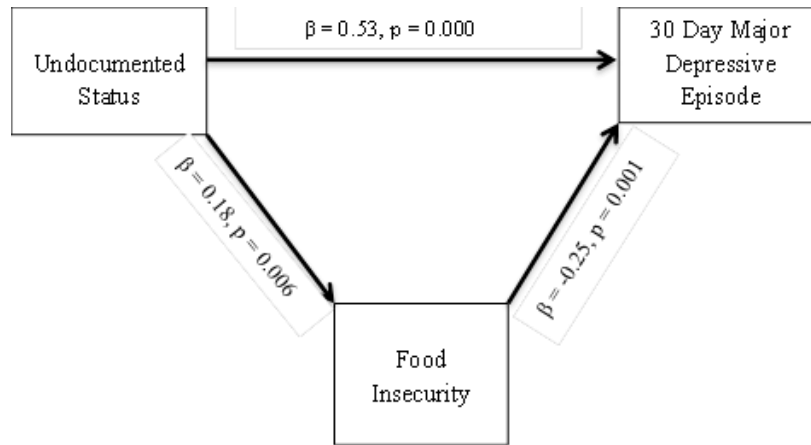


Table 5.22. Effects of Undocumented Status and Food Insecurity on Past 30 Day DSM-IV-TR Major Depressive Episode: Path Model Parameter Estimates and Effect Decomposition

	b	SE	β
Direct Effects			
Undocumented Status→30 Day MDE***	0.46	0.12	0.53
Undocumented Status→ Food Insecurity**	0.25	0.09	0.18
Food Insecurity→ 30 Day MDE***	-0.16	0.05	-0.26
Total Direct Effect***	0.42	0.11	0.48
Indirect Effect			
Undocumented Status→Food Insecurity→30 Day MDE*	-0.04	0.02	-0.05

Note. Controlling for English proficiency, years in the US, sex, age, education, marital/partnership status, and employment status (coefficients not shown).
 + $p \leq 0.10$, * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Context of exit. The context of exit variable assessed whether or not respondents’ believed their decision to migrate to the US was voluntary. They were asked if they migrated to the US because they “wanted to” or because they “had to”

Context of exit mediated the relationship between undocumented status and lifetime DSM-IV-TR panic disorder. This relationship is shown in figure 5.6, and table 5.23 provides details of the path model parameter estimates and the indirect effect from undocumented status to lifetime panic disorder through context of exit.

Figure 5.6. Path Model of the Effects of Undocumented Status and Context of Exit on Lifetime DSM-IV-TR/ICD-10 Panic Disorder

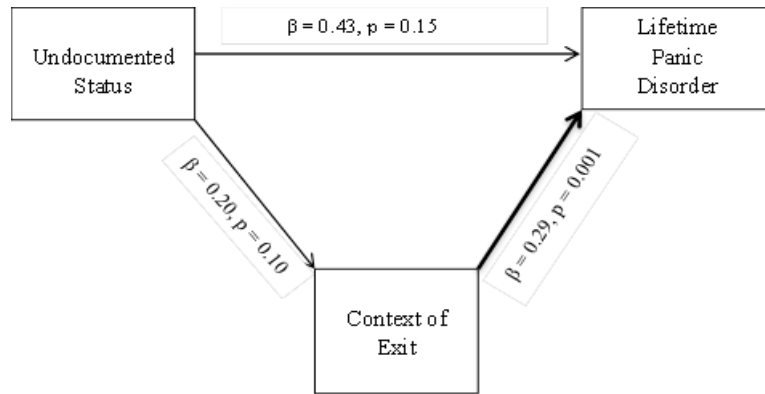


Table 5.23. Effects of Undocumented Status and Context of Exit on Lifetime DSM-IV-TR/ICD-10 Panic Disorder: Path Model Parameter Estimates and Effect Decomposition

	b	SE	β
Direct Effects			
Undocumented Status → Lifetime Panic Disorder	0.48	0.34	0.43
Undocumented Status → Context of Exit ⁺	0.16	0.10	0.20
Context of Exit → Lifetime Panic Disorder ^{**}	0.40	0.12	0.29
Total Direct Effect ⁺	0.55	0.32	0.48
Indirect Effect			
Undocumented Status → Context of Exit → Lifetime Panic Disorder [*]	0.07	0.03	0.06

Note. Controlling for English proficiency, years in the US, sex, age, education, marital/partnership status, and employment status (coefficients not shown).

+ $p \leq 0.10$, * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Context of exit also mediated the relationship between an undocumented status and past 12 month DSM-IV-TR/ICD-10 panic disorder. The relationships among these variables are visually depicted in figure 5.7. The parameter estimates for this path model, as well as the decomposed effects, are presented in table 5.24.

Figure 5.7. Path Model of the Effects of Undocumented Status and Context of Exit on Past 12 month DSM-IV-TR/ICD-10 Panic Disorder

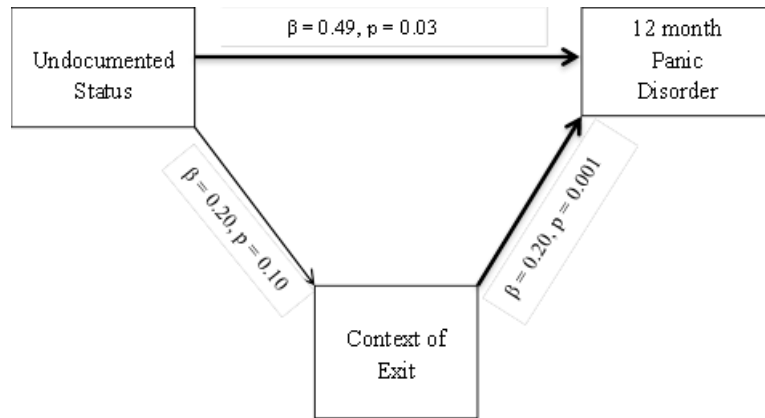


Table 5.24. Effects of Undocumented Status and Context of Exit on Past 12 month DSM-IV-TR/ICD-10 Panic Disorder: Path Model Parameter Estimates and Effect Decomposition

	b	SE	β
Direct Effects			
Undocumented Status → 12 Month Panic Disorder*	0.49	0.23	0.49
Undocumented Status → Context of Exit ⁺	0.16	0.09	0.20
Context of Exit → 12 Month Panic Disorder**	0.25	0.08	0.20
Total Direct Effect*	0.53	0.21	0.53
Indirect Effect			
Undocumented Status → Context of Exit → Lifetime Panic Disorder*	0.04	0.02	0.04

Note. Controlling for English proficiency, years in the US, sex, age, education, marital/partnership status, and employment status (coefficients not shown).

+ $p \leq 0.10$, * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Summary of Aim 2 results. The results of this study did not support any of the hypotheses in Aim 2 about mediators of the relationship between an undocumented status and self-rated mental health. In addition, there was no support for hypotheses 2a, 2b, or 2e which proposed perceived discrimination, social isolation and neighborhood safety as mediators of relationships between an undocumented status and mental health outcomes.

As with Aim 1, the results of this study did not directly support hypotheses 2a – 2f, which mostly posited DSM-IV-TR/ICD-10 diagnostic composite categories as the dependent variables. However, post hoc analyses revealed that traumatic events, food insecurity and context of exit did mediate the relationship between an undocumented immigration status and certain DSM-IV-TR/ICD-10 disorders. For example, traumatic events, context of exit and food insecurity were all mediators of the relationship between undocumented status and lifetime DSM-IV-TR/ICD-10 panic disorder. Also, context of exit and

food insecurity mediated the relationship between undocumented status and past 12 month panic disorder. Finally, traumatic events mediated the relationship between undocumented status and past 30 day DSM-IV-TR/ICD-10 dysthymia, and food insecurity mediated the relationship between undocumented status and past 30 day DSM-IV-TR major depressive episode. These findings provided limited support for hypotheses 2c, 2d and 2f.

Aim 3 Results

The purpose of this aim was to examine differences in mental health among LUMIs, documented Mexican immigrants, US-born Mexicans, Cuban immigrants, US-born Cubans, Puerto Rican immigrants, and US-born Puerto Ricans. I estimated the prevalence rates of each lifetime and past 12 month DSM-IV-TR and ICD-10 diagnostic composite category for these groups. In addition, I estimated lifetime, past 12 month and past 30 day individual DSM-IV-TR/ICD-10 psychiatric disorders for these groups. Next, I estimated the rate of poor self-rated mental health and mean psychological distress scores for each group. Finally, I identified significant differences in prevalence rates among the groups for every mental health variable by conducting omnibus tests followed by pairwise comparisons as appropriate. Results of these analyses are presented in Tables 5.25 through 5.31.

The results did not support hypotheses 3a – 3c, which posited that LUMIs would have higher rates for each DSM-IV-TR/ICD-10 diagnostic composite category compared to other groups. The results also did not support hypothesis 3d which posited that LUMIs would have higher mean psychological distress scores compared to all of the other groups. However, this study's findings did provide support for hypothesis 3e, which stated that LUMIs would have higher rates of poor self-rated mental health compared to the other groups.

Table 5.25. Lifetime DSM-IV-TR Rates for Cubans and Puerto Ricans by Nativity; Mexicans by Nativity and Proxy Documentation Status (Weighted %, 95% CI)

Disorder	Cuban		Puerto Rican	
	US Born (<i>n</i> = 76)	Immigrant (<i>n</i> = 501)	US Born (<i>n</i> = 278)	Immigrant (<i>n</i> = 217)
Any depressive disorder	15.37 (8.94, 25.15)	16.64 ^a (14.23, 19.36)	19.05 ^b (14.75, 24.24)	21.17 ^c (15.30, 28.55)
Dysthymia	1.67 ^a (0.40, 6.68)	4.65 ^b (2.96, 7.21)	4.28 ^c (2.64, 6.85)	7.65 ^{ade} (4.44, 12.88)
Major depressive disorder	15.37 ^a (8.94, 25.15)	15.43 (13.22, 17.94)	18.29 ^b (14.30, 23.10)	19.02 ^c (13.32, 26.41)
Any anxiety disorder	42.97 ^{abc} (32.87, 53.70)	24.63 ^{adef} (21.20, 28.42)	37.44 ^{dg} (30.26, 45.21)	39.45 ^{ehi} (32.67, 46.66)
Panic disorder	0.91 (0.12, 6.35)	3.61 ^a (2.48, 5.22)	4.95 ^b (2.43, 9.85)	6.09 ^c (3.21, 11.24)
Panic attack	35.63 ^{abc} (24.79, 48.18)	17.01 ^{adef} (13.61, 21.05)	29.34 ^{dgh} (23.74, 35.64)	32.54 ^{ejj} (26.54, 39.17)
PTSD	7.45 ^a (2.73, 18.76)	4.65 (2.97, 7.21)	7.65 ^b (4.40, 13.00)	7.59 ^c (4.16, 13.43)
Generalized anxiety disorder	5.42 (1.56, 17.15)	7.16 ^a (5.83, 8.77)	8.93 ^b (5.63, 13.87)	4.98 (2.88, 8.47)
Agoraphobia without panic disorder	3.54 (0.85, 13.57)	3.39 (2.11, 5.42)	4.83 (2.59, 8.84)	6.41 (2.94, 13.41)
Social Phobia	9.61 (4.22, 20.42)	6.24 ^a (4.67, 8.28)	9.71 (5.92, 15.52)	11.22 ^b (6.31, 19.19)
Any substance use disorder	13.00 ^{ab} (7.85, 20.76)	4.51 ^{acde} (2.61, 7.69)	16.72 ^{cf} (11.88, 23.02)	13.79 ^{dg} (8.28, 22.10)
Drug abuse	7.27 ^{ab} (3.16, 15.86)	1.52 ^{acde} (0.77, 2.99)	9.05 ^{cf} (5.93, 13.57)	8.08 ^{dg} (4.34, 14.57)
Drug dependence	7.27 ^{ab} (3.16, 15.86)	0.77 ^{acd} (0.28, 2.14)	4.88 ^{ce} (2.36, 9.81)	2.91 (1.07, 7.66)
Alcohol abuse	13.00 ^{ab} (7.85, 20.76)	3.91 ^{acde} (2.12, 7.11)	16.00 ^{cf} (11.32, 22.12)	12.68 ^{dg} (7.30, 21.12)
Alcohol dependence	8.96 ^{ab} (4.61, 16.69)	0.90 ^{acde} (0.37, 2.20)	6.11 ^c (3.83, 9.64)	5.44 ^d (2.54, 11.27)
Any disorder	50.54 ^{abc} (39.09, 61.94)	33.00 ^{adefg} (29.01, 37.25)	48.90 ^{dhi} (40.57, 57.28)	49.40 ^{ejk} (43.05, 55.76)

Note: Values in each row that share the same superscript letter are significant at the $p \leq 0.05$ level. The *n*'s for each group remain constant across tables.

Table 5.25. (continued)

US Born (<i>n</i> = 380)	Mexican		Omnibus test
	Documented (<i>n</i> = 443)	LUMI (<i>n</i> = 35)	
17.00 ^d (13.81, 20.75)	10.23 ^{abcd} (8.01, 12.98)	14.34 (4.73, 36.07)	F (6, 51) = 3.41, $p = 0.01$
3.16 ^d (2.05, 4.84)	1.49 ^{bce} (0.64, 3.43)	6.51 (1.87, 20.26)	F (6, 51) = 2.32, $p = 0.05$
16.33 ^d (13.50, 19.62)	9.64 ^{abcd} (7.65, 12.08)	12.45 (3.40, 36.52)	F (6, 51) = 3.66, $p = 0.00$
30.20 ^{bhj} (25.92, 34.85)	19.27 ^{cfij} (16.09, 22.90)	23.79 (11.67, 42.44)	F (6, 51) = 9.09, $p = 0.00$
3.88 ^d (2.75, 5.43)	1.52 ^{abcd} (0.78, 2.92)	6.39 (1.16, 28.41)	F (6, 51) = 2.21, $p = 0.05$
21.63 ^{bfjik} (19.18, 24.31)	12.61 ^{chjk} (9.51, 16.54)	18.54 (8.34, 36.29)	F (6, 51) = 10.30, $p = 0.00$
6.17 (3.59, 10.41)	2.75 ^{abc} (1.46, 5.11)	5.77 (1.42, 20.70)	F (6, 51) = 2.31, $p = 0.05$
4.11 (2.02, 8.16)	2.97 ^{ab} (2.08, 4.23)	1.77 (0.34, 8.81)	F (6, 51) = 3.69, $p = 0.004$
3.51 (1.57, 7.63)	3.53 (2.30, 5.39)	0	F (5, 52) = 0.41, $p = 0.84$
10.67 ^{ac} (8.75, 12.95)	5.11 ^{bc} (3.23, 7.98)	2.45 (0.46, 11.95)	F (6, 51) = 4.46, $p = 0.001$
19.40 ^{eh} (14.69, 25.16)	5.83 ^{bfigh} (3.79, 8.86)	2.98 (0.37, 20.25)	F (6, 51) = 5.93, $p = 0.0001$

11.19 ^{eh} (8.13, 15.21)	2.26 ^{bigh} (1.62, 3.15)	2.98 (0.37, 20.25)	F (6, 51) = 7.22, p = 0.00
3.83 ^{df} (2.00, 7.21)	1.03 ^{bef} (0.61, 1.76)	0	F (5, 52) = 4.96, p = 0.0009
18.45 ^{eh} (14.39, 23.33)	5.58 ^{bigh} (3.64, 8.46)	2.98 (0.37, 20.25)	F (6, 51) = 5.59, p = 0.0002
7.44 ^e (5.15, 10.64)	2.87 ^b (1.18, 6.82)	0	F (5, 52) = 3.96, p = 0.004
44.05 ^{nm} (39.11, 49.12)	26.67 ^{bghjl} (23.69, 29.88)	25.67 ^{cikm} (13.55, 43.22)	F (6, 51) = 13.39, p = 0.00

Table 5.26. Past 12 Month DSM-IV-TR Rates for Cubans and Puerto Ricans by Nativity; Mexicans by Nativity and Proxy Documentation Status (Weighted %, 95% CI)

Disorder	Cuban		Puerto Rican	
	US Born	Immigrant	US Born	Immigrant
Any depressive disorder	5.16 (1.76, 14.16)	7.63 ^a (5.89, 9.83)	8.60 ^b (6.06, 12.08)	12.65 ^{ac} (8.91, 17.65)
Dysthymia	0	3.30 (1.83, 5.89)	2.43 ^a (1.23, 4.76)	5.08 ^{abc} (3.01, 8.47)
Major depressive disorder	5.16 (1.76, 14.16)	7.02 ^{ab} (5.69, 8.64)	8.04 ^c (5.75, 11.13)	10.5 ^d (7.12, 15.22)
Any anxiety disorder	21.54 ^a (12.95, 33.62)	13.60 ^{bc} (11.27, 16.33)	21.21 ^{bd} (15.00, 29.13)	21.74 ^{ce} (15.75, 29.23)
Panic disorder	0	2.68 ^a (1.73, 4.12)	2.77 (1.14, 6.55)	4.37 ^b (2.07, 8.99)
Panic attack	11.44 (4.82, 24.78)	7.58 ^a (5.50, 10.37)	10.75 (6.31, 17.70)	15.06 ^{ab} (10.58, 21.00)
PTSD	5.19 (1.66, 15.13)	2.58 (1.51, 4.38)	2.97 (1.35, 6.43)	3.88 (1.69, 8.66)
Generalized anxiety disorder	4.51 (1.07, 17.15)	3.49 ^{ab} (2.41, 5.02)	7.44 ^{acde} (4.48, 12.12)	2.83 ^c (1.32, 5.96)
Agoraphobia without panic disorder	2.34 (0.33, 14.66)	2.79 (1.41, 5.48)	2.60 (1.08, 6.11)	5.11 (2.04, 12.22)
Social phobia	8.70 (3.56, 19.76)	5.80 (4.18, 7.98)	8.45 (4.84, 14.34)	8.73 (4.66, 15.75)
Any substance use disorder	6.69 ^{ab} (3.22, 13.39)	0.95 ^{acd} (0.38, 2.36)	4.60 ^c (2.23, 9.28)	1.83 ^c (0.53, 6.18)
Drug abuse	3.04 (0.89, 9.84)	0.22 (0.03, 1.61)	2.00 (0.60, 6.43)	0
Drug dependence	2.28 (0.52, 9.38)	0.22 (0.03, 1.61)	0.97 (0.30, 3.09)	0
Alcohol abuse	4.99 ^{ab} (1.70, 13.81)	0.60 ^{acd} (0.19, 1.91)	3.57 ^{ce} (1.74, 7.17)	1.43 (0.32, 6.13)
Alcohol dependence	0.85 (0.12, 5.86)	0.13 (0.02, 0.98)	2.42 (0.90, 6.33)	1.35 (0.29, 6.01)
Any disorder	24.58 ^a (15.05, 37.48)	17.49 ^{bcd} (14.76, 20.60)	27.49 ^{be} (22.21, 33.49)	28.79 ^{cf} (22.56, 35.95)

Note: Values in each row that share the same superscript letter are significant at the $p \leq 0.05$ level.

Table 5.26. (continued)

US Born	Mexican		Omnibus Test
	Documented	LUMI	
10.51 ^d (7.93, 13.80)	5.44 ^{bcd} (4.08, 7.21)	9.10 (2.35, 29.44)	F (6, 51) = 3.21, p = 0.009
1.79 ^{bd} (0.74, 4.28)	1.49 ^c (0.64, 3.43)	6.51 ^d (1.87, 20.26)	F (5, 52) = 4.62, p = 0.001
9.84 ^{ae} (7.65, 12.56)	4.84 ^{bcd} (3.70, 6.31)	7.21 (1.30, 31.45)	F (6, 51) = 4.19, p = 0.002
17.34 ^f (13.78, 21.59)	10.79 ^{adef} (7.58, 15.13)	12.4 (4.42, 30.21)	F (6, 51) = 2.69, p = 0.02

2.91 ^c (1.89, 4.72)	1.09 ^{abcd} (0.66, 1.78)	6.39 ^d (1.16, 28.41)	F (5, 52) = 7.00, p = 0.000
10.70 ^c (7.71, 14.67)	5.84 ^{bc} (3.65, 9.22)	9.42 (2.69, 28.12)	F (6, 51) = 2.92, p = 0.02
4.03 (1.93, 8.23)	1.48 (0.59, 3.65)	2.98 (0.37, 20.25)	F (6, 51) = 0.63, p = 0.71
1.66 ^d (0.81, 3.37)	1.67 ^{be} (1.05, 2.64)	1.77 (0.34, 8.81)	F (6, 51) = 4.16, p = 0.002
3.08 (1.26, 7.33)	1.97 (0.92, 4.17)	0	F (5, 52) = 0.70, p = 0.63
5.69 (3.76, 8.53)	3.31 (1.67, 6.46)	0	F (5, 52) = 1.62, p = 0.17
4.86 ^d (3.08, 7.59)	1.50 ^{be} (0.62, 3.57)	0	F (5, 52) = 2.80, p = 0.03
1.63 (0.69, 3.78)	0.47 (0.12, 1.85)	0	F (4, 52) = 1.92, p = 0.12
0.44 (0.12, 1.61)	0.34 (0.05, 2.44)	0	F (4, 52) = 1.65, p = 0.17
2.92 ^{df} (1.53, 5.49)	0.69 ^{bef} (0.24, 1.96)	0	F (5, 52) = 2.51, p = 0.04
1.66 (0.82, 3.33)	0.71 (0.25, 1.99)	0	F (5, 52) = 1.66, p = 0.16
23.58 ^{de} (20.72, 26.72)	13.95 ^{aefg} (10.92, 17.66)	16.88 (6.36, 37.76)	F (6, 51) = 7.20, p = 0.00

Table 5.27. Past 30 Day DSM-IV-TR Rates for Cubans and Puerto Ricans by Nativity; Mexicans by Nativity and Proxy Documentation Status (Weighted %, 95% CI)

Disorder	Cuban		Puerto Rican	
	US Born	Immigrant	US Born	Immigrant
Dysthymia	0	1.29 (0.37, 4.42)	1.36 (0.55, 3.36)	1.34 (0.70, 2.56)
Major depressive episode	2.41 (0.58, 9.47)	2.39 (1.21, 4.65)	3.76 ^a (2.04, 6.84)	4.67 ^b (1.91, 10.96)
Panic disorder	0	0.98 (0.39, 2.46)	1.62 (0.66, 3.90)	2.12 (0.73, 6.03)
Panic attack	0	3.00 (1.86, 4.81)	3.82 (2.27, 6.36)	5.90 (2.83, 11.92)
Generalized anxiety disorder	0	1.25 ^a (0.66, 2.35)	2.00 ^b (0.77, 5.12)	1.04 (0.37, 2.88)
Agoraphobia without panic disorder	0	1.91 (0.94, 4.03)	0.70 ^a (0.18, 2.76)	3.78 ^a (1.38, 9.95)
Social phobia	0	3.86 (2.35, 6.27)	4.62 (1.97, 10.44)	5.58 (2.32, 12.79)
Drug abuse	1.34 (0.18, 9.46)	0.22 (0.03, 1.61)	2.00 (0.60, 6.43)	0
Drug dependence	0	0.22 (0.03, 1.61)	0.68 (0.16, 2.86)	0
Alcohol abuse	1.34 (0.18, 9.46)	0.43 (0.10, 1.74)	1.41 (0.35, 5.45)	0.48 (0.06, 3.49)
Alcohol dependence	0	0.13 (0.02, 0.98)	1.65 (0.47, 5.65)	0

Note: Values in each row that share the same superscript letter are significant at the $p \leq 0.05$ level.

Table 5.27. (continued)

US Born	Mexican		Omnibus Test
	Documented	LUMI	
0.67 (0.23, 1.97)	0.45 (0.10, 2.02)	4.62 (0.85, 21.41)	F (5, 52) = 1.70, p = 0.15
3.31 ^{ac} (2.34, 4.66)	1.42 ^{bc} (0.93, 2.17)	7.21 (1.30, 31.45)	F (6, 51) = 2.44, p = 0.04
0.42 (0.09, 1.87)	0.38 (0.22, 0.66)	1.77 (0.34, 8.81)	F (5, 52) = 2.14, p = 0.07
2.76 (1.54, 4.89)	1.86 (1.24, 2.77)	1.77 (0.34, 8.81)	F (5, 52) = 2.03, p = 0.09
0.45 (0.12, 1.61)	0.48 ^{ab} (0.26, 0.88)	0	F (4, 53) = 2.95, p = 0.03

1.59 (0.71, 3.51)	1.38 (0.52, 3.61)	0	F (4, 53) = 2.52, p = 0.05
3.99 (2.38, 6.62)	1.70 (0.59, 4.78)	0	F (4, 53) = 0.82, p = 0.52
0.95 (0.39, 2.29)	0	0	F (3, 53) = 1.18, p = 0.33
0.44 (0.12, 1.61)	0	0	F (2, 54) = 0.40, p = 0.67
0.56 (0.12, 2.47)	0.21 (0.04, 1.17)	0	F (5, 52) = 0.75, p = 0.59
0.59 (0.15, 2.34)	0.21 (0.04, 1.17)	0	F (3, 53) = 2.05, p = 0.12

Table 5.28. Lifetime ICD-10 Rates for Cubans and Puerto Ricans by Nativity; Mexicans by Nativity and Proxy Documentation Status (Weighted %, 95% CI)

Disorder	Cuban		Puerto Rican	
	US Born	Immigrant	US Born	Immigrant
Any depressive disorder	7.50 (3.13, 16.89)	10.11 (7.71, 13.14)	13.64 (9.76, 18.74)	14.01 (9.70, 19.82)
Dysthymia	2.61 (0.58, 10.94)	4.65 (2.96, 7.21)	4.72 (2.97, 7.42)	7.97 (4.65, 13.32)
Severe depressive episode	6.55 (2.74, 14.86)	7.83 (5.87, 10.38)	10.13 (6.86, 14.72)	9.62 (6.12, 14.80)
Any anxiety disorder	46.88 ^{abc} (36.28, 57.78)	26.96 ^{adefg} (22.58, 31.84)	40.74 ^{dhi} (33.42, 48.49)	42.66 ^{ej} (36.17, 49.40)
Panic disorder	3.73 (1.02, 12.68)	4.57 ^a (3.13, 6.63)	6.23 ^b (3.44, 11.02)	7.56 ^c (4.41, 12.66)
Panic attack	35.63 ^{abc} (24.79, 48.18)	16.64 ^{ade} (13.10, 20.91)	29.57 ^{dfg} (23.88, 35.98)	32.54 ^{ehi} (26.54, 39.17)
PTSD	6.86 (2.77, 16.02)	8.19 ^a (5.53, 11.97)	9.50 ^b (5.91, 14.93)	11.97 ^c (7.64, 18.27)
Generalized anxiety disorder	4.51 (1.07, 17.15)	7.32 ^a (5.94, 8.99)	8.23 ^b (5.04, 13.17)	6.35 ^c (4.18, 9.54)
Social phobia	16.61 ^a (8.05, 31.16)	8.78 ^{bc} (6.74, 11.36)	15.20 ^{bcd} (10.83, 20.91)	14.26 ^e (10.16, 19.66)
Any substance use disorder	13.00 ^{ab} (7.85, 20.76)	4.51 ^{acde} (2.61, 7.69)	17.15 ^{cf} (12.47, 23.13)	13.79 ^{dg} (8.28, 22.10)
Drug abuse	7.27 ^{ab} (3.16, 15.86)	1.52 ^{acde} (0.77, 2.99)	9.05 ^{cf} (5.23, 13.57)	8.08 ^{dg} (4.34, 14.57)
Drug dependence	7.27 ^{ab} (3.16, 15.86)	0.77 ^{acde} (0.28, 2.14)	4.88 ^{cf} (2.36, 9.81)	3.68 ^{dg} (1.50, 8.77)
Alcohol abuse	13.00 ^{ab} (7.85, 20.76)	3.91 ^{acde} (2.12, 7.11)	16.62 ^{cf} (12.01, 22.54)	13.09 ^{dg} (7.59, 21.65)
Alcohol dependence	8.96 ^{ab} (4.61, 16.69)	0.90 ^{acde} (0.37, 2.20)	6.86 ^c (4.42, 10.48)	5.44 ^d (2.54, 11.27)
Any disorder	54.87 ^{abc} (43.13, 66.09)	32.10 ^{adefg} (27.24, 37.38)	49.13 ^{dhi} (40.42, 57.90)	50.83 ^{ejk} (45.24, 56.40)

Note: Values in each row that share the same superscript letter are significant at the $p \leq 0.05$ level.

Table 5.28. (continued)

US Born	Mexican		Omnibus Test
	Documented	LUMI	
12.33 (9.47, 15.91)	7.04 (4.62, 10.58)	8.96 (2.32, 28.93)	F (6, 51) = 1.74, p = 0.13
3.16 (2.05, 4.84)	1.88 (0.79, 4.40)	6.51 (1.87, 20.26)	F (6, 51) = 2.01, p = 0.08
11.22 (8.18, 15.21)	6.35 (4.55, 8.79)	7.07 (1.28, 30.91)	F (6, 51) = 1.58, p = 0.17
32.74 ^{bik} (28.51, 37.27)	19.81 ^{ceghjk} (16.94, 23.02)	25.65 (13.01, 44.31)	F (6, 51) = 15.77, p = 0.00

4.44 ^d (3.06, 6.39)	1.52 ^{abcd} (0.78, 2.92)	6.39 (1.16, 28.41)	F (6, 51) = 2.50, p= 0.03
21.03 ^{bhij} (18.60, 23.68)	11.99 ^{cgij} (9.20, 15.47)	18.54 (8.34, 36.29)	F (6, 51) = 11.24, p = 0.00
9.90 ^d (6.75, 14.29)	3.08 ^{abcd} (1.71, 5.47)	5.77 (1.42, 20.70)	F (6, 51) = 2.59, p = 0.03
4.36 (2.18, 8.52)	3.03 ^{abc} (2.13, 4.30)	1.77 (0.34, 8.81)	F (6, 51) = 4.77, p=0.00
12.61 ^f (9.33, 16.84)	6.54 ^{adef} (4.24, 9.96)	8.93 (2.01, 31.89)	F (6, 51) = 2.56, p = 0.03
19.66 ^{eh} (14.89, 25.52)	5.83 ^{bfigh} (3.79, 8.86)	2.98 (0.37, 20.25)	F (6, 51) = 6.15, p=0.0001
11.19 ^{eh} (8.13, 15.21)	2.26 ^{bfigh} (1.62, 3.15)	2.98 (0.37, 20.25)	F (6, 51) = 7.26, p=0.00
4.03 ^{eh} (2.15, 7.42)	1.03 ^{bfigh} (0.60, 1.76)	0	F (5, 52) = 5.21, p=0.00
18.71^{eh} (14.56, 23.72)	5.58^{bfigh} (3.64, 8.46)	2.98 (0.37, 20.25)	F (6, 51) = 5.80, p=0.0001
7.44 ^e (5.15, 10.64)	2.87 ^b (1.18, 6.82)	0	F (5, 52) = 4.07, p = 0.003
44.29 ^{nl} (39.77, 48.91)	24.46 ^{bghjl} (21.55, 27.63)	27.54 ^{cik} (14.78, 45.43)	F (6, 51) = 20.49, p=0.00

Table 5.29. Past 12 Month ICD-10 Rates for Cubans and Puerto Ricans by Nativity; Mexicans by Nativity and Proxy Documentation Status (Weighted %, 95% CI)

Disorder	Cuban		Puerto Rican	
	US Born	Immigrant	US Born	Immigrant
Any depressive disorder	2.28 (0.54, 9.07)	5.41 (3.62, 8.00)	7.03 (4.06, 11.91)	10.02 (6.53, 15.08)
Dysthymia	0.94 (0.12, 6.80)	3.23 (1.83, 5.89)	2.43 ^a (1.23, 4.76)	5.40 ^{abc} (3.17, 9.05)
Severe depressive episode	1.34 (0.18, 9.08)	4.12 (2.80, 6.03)	5.55 (3.07, 9.82)	7.10 (3.91, 12.53)
Any anxiety disorder	22.68 ^a (12.11, 38.43)	14.07 ^b (11.78, 16.71)	18.50 ^c (12.73, 26.10)	23.58 ^{bd} (17.98, 30.28)
Panic disorder	2.01 (0.26, 13.89)	2.83 ^a (1.85, 4.30)	2.89 ^b (1.22, 6.70)	4.67 ^c (2.27, 9.36)
Panic attack	11.44 (4.82, 24.78)	7.58 ^a (5.50, 10.37)	10.75 (6.31, 17.70)	15.06 ^{ab} (10.58, 21.00)
PTSD	5.73 (2.03, 15.10)	3.60 (2.01, 6.33)	3.34 (1.75, 6.28)	4.32 (2.08, 8.76)
Generalized anxiety disorder	4.51 (1.07, 17.15)	3.83 (2.91, 5.02)	5.55 (3.05, 9.90)	3.36 (1.84, 6.06)
Social phobia	9.31 ^a (3.71, 21.45)	6.26 ^b (4.66, 8.35)	8.95 ^c (5.50, 14.22)	8.94 ^d (5.48, 14.26)
Any substance use disorder	6.69 ^{ab} (3.22, 13.39)	0.95 ^{acd} (0.38, 2.36)	4.60 ^{ce} (2.23, 9.28)	1.83 (0.53, 6.18)
Drug abuse	3.04 (0.89, 9.84)	0.22 (0.03, 1.61)	2.00 (0.60, 6.43)	0
Drug dependence	2.28 (0.52, 9.38)	0.23 (0.03, 1.61)	0.97 (0.30, 3.09)	0
Alcohol abuse	4.99 ^{ab} (1.70, 13.81)	0.60 ^{acd} (0.19, 1.91)	3.57 ^{ce} (1.74, 7.17)	1.43 (0.32, 6.13)
Alcohol dependence	0.85 (0.12, 5.86)	0.13 (0.02, 0.98)	2.42 (0.90, 6.33)	1.35 (0.29, 6.01)
Any disorder	24.87 ^a (13.56, 41.11)	16.55 ^{bcd} (13.84, 19.67)	23.75 ^{bc} (18.31, 30.21)	28.62 ^{cfe} (23.13, 34.81)

Note: Values in each row that share the same superscript letter are significant at the $p \leq 0.05$ level.

Table 5.29. (continued)

US Born	Mexican		
	Documented	LUMI	Omnibus Test
7.71 (5.14, 11.39)	4.51 (3.03, 6.67)	6.51 (1.87, 20.26)	F (6, 51) = 1.66, p = 0.15
1.79 ^{bd} (0.74, 4.28)	1.49 ^c (0.64, 3.43)	6.51 ^d (1.87, 20.26)	F (6, 51) = 4.45, p = 0.001
6.89 (4.65, 10.09)	4.21 (2.93, 6.01)	4.62 (0.85, 21.41)	F (6, 51) = 1.47, p = 0.21
17.30 ^e (14.07, 21.09)	10.18 ^{acde} (7.61, 13.48)	14.26 (5.04, 34.25)	F (6, 51) = 4.14, p = 0.002
3.23 ^d (1.92, 5.39)	1.09 ^{abcde} (0.66, 1.78)	6.39 ^c (1.16, 28.41)	F (6, 51) = 5.34, p = 0.002
10.23 ^c (7.30, 14.15)	5.84 ^{bc} (3.65, 9.22)	9.42 (2.69, 28.12)	F (6, 51) = 2.83, p = 0.02
5.14 (2.75, 9.42)	1.61 (0.68, 3.79)	2.98 (0.37, 20.25)	F (6, 51) = 0.71, p = 0.64
2.10 (0.98, 4.43)	1.67 (0.91, 3.06)	1.77 (0.34, 8.81)	F (6, 51) = 1.60, p = 0.17
5.71 (3.64, 8.83)	2.84 ^{abcd} (1.79, 4.46)	1.86 (0.16, 18.03)	F (6, 51) = 2.88, p = 0.02
4.86 ^d (3.08, 7.59)	1.50 ^{bc} (0.62, 3.57)	0	F (5, 52) = 2.79, p = 0.03
1.63 (0.69, 3.78)	0.47 (0.12, 1.85)	0	F (4, 52) = 1.93, p = 0.12
0.44 (0.12, 1.61)	0.34 (0.05, 2.44)	0	F (4, 52) = 1.67, p = 0.17
2.92 ^{df} (1.53, 5.49)	0.69 ^{bef} (0.24, 1.96)	0	F (5, 52) = 2.51, p = 0.04

1.66 (0.82, 3.33)	0.71 (0.25, 1.99)	0	F (5, 52) = 1.65, p = 0.16
21.65 ^{dth} (18.54, 25.13)	12.78 ^{aegh} (10.07, 16.10)	16.15 (6.27, 35.65)	F (6, 51) = 6.28, p= 0.00

Table 5.30. Past 30 Day ICD-10 Rates for Cubans and Puerto Ricans by Nativity; Mexicans by Nativity and Proxy Documentation Status (Weighted %, 95% CI)

Disorder	Cuban		Puerto Rican	
	US Born	Immigrant	US Born	Immigrant
Dysthymia	0	1.29 (0.37, 4.42)	1.36 (0.55, 3.36)	1.34 (0.70, 2.56)
Severe depressive episode	1.34 (0.18, 9.08)	1.38 (0.57, 3.29)	2.05 (0.77, 5.31)	2.75 (0.92, 7.95)
Panic disorder	0	0.98 ^a (0.39, 2.46)	1.74 (0.72, 4.14)	2.42 ^b (0.91, 6.29)
Panic attack	0	3.00 (1.86, 4.81)	3.82 (2.27, 6.36)	5.90 (2.83, 11.92)
Social phobia	0	3.84 (2.39, 6.12)	4.60 (1.85, 10.99)	4.67 (2.13, 9.93)
Drug abuse	1.34 (0.18, 9.46)	0.22 (0.3, 1.61)	2.00 (0.60, 6.43)	0
Drug dependence	0	0.22 (0.03, 1.61)	0.68 (0.16, 2.86)	0
Alcohol abuse	1.34 (0.18, 9.46)	0.43 (0.10, 1.74)	1.41 (0.35, 5.45)	0.48 (0.06, 3.49)
Alcohol dependence	0	0.13 (0.02, 0.98)	1.65 (0.47, 5.65)	0

Note: Values in each row that share the same superscript letter are significant at the $p \leq 0.05$ level.

Table 5.30. (continued)

US Born	Mexican		Omnibus Test
	Documented	LUMI	
0.67 (0.23, 1.97)	0.45 (0.10, 2.02)	4.62 (0.85, 21.41)	F (5, 52) = 1.70, p = 0.15
2.55 (1.40, 4.59)	0.43 (0.14, 1.34)	4.62 (0.85, 21.41)	F(6, 51) = 1.76, p=0.13
0.73 (0.22, 2.47)	0.38 ^{ab} (0.22, 0.66)	1.77 (0.34, 8.81)	F (5, 52) = 2.68, p = 0.03
2.76 (1.54, 4.89)	1.86 (1.24, 2.77)	1.77 (0.34, 8.81)	F (5, 52) = 2.03, p = 0.09
3.52 (1.87, 6.54)	1.31 (0.58, 2.93)	0	F(4, 53) = 1.76, p = 0.15
0.95 (0.39, 2.29)	0	0	F (3, 53) = 1.18, p = 0.33
0.44 (0.12, 1.61)	0	0	F (2, 54) = 0.40, p = 0.67
0.56 (0.12, 2.47)	0.21 (0.04, 1.17)	0	F (5, 52) = 0.75, p = 0.60
0.59 (0.15, 2.34)	0.21 (0.04, 1.17)	0	F (3, 53) = 2.05, p = 0.12

Table 5.31. Poor Self-Rated Mental Health (weighted %, 95% CI) and Weighted Mean Psychological Distress Scores (95% CI) for Cubans and Puerto Ricans by Nativity; Mexicans by Nativity and Documentation Status

Self-rated mental health	Cuban		Puerto Rican	
	US Born	Immigrant	US Born	Immigrant
	5.31 ^a (1.54, 16.80)	13.67 ^{be} (10.27, 17.96)	8.74 ^{cd} (5.95, 12.67)	15.82 ^{efg} (10.76, 22.66)

Psychological distress	2.76 ^{abc} (1.64, 3.87)	4.46 ^{ade} (3.68, 5.23)	4.62 ^{bghi} (3.91, 5.33)	6.01 ^{cdtghkl} (5.19, 6.83)
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Note: Values in each row that share the same superscript letter are significant at the $p \leq 0.05$ level.

Table 5.31. (continued)

US Born	Mexican Documented	LUMI	Omnibus Test
8.47 ^{bfg} (6.59, 10.81)	16.20 ^d (12.77, 20.33)	25.64 ^{ae} (13.27, 43.72)	F(6, 51) = 4.72, p = 0.0007
3.61 ^{hjm} (3.08, 4.15)	3.15 ^{eikm} (2.74, 3.55)	3.17 ^l (0.79, 5.55)	F(6, 51) = 9.29, p = 0.000

MICE Approach

The MICE approach was described in the previous chapter. Because MICE is an iterative procedure, it is important to assess convergence as well as simulation error¹⁶. White et al. (2011) recommend using Monte Carlo error (MCE) estimates of simulation error to determine whether or not the number of imputations is sufficient. They provide the following guidelines for acceptable ranges of MCE: (1) MCE of a regression coefficient should be less than 10% of its standard error; (2) MCE of t statistics should be less than or equal to 0.1; (3) MCE of the P-value should be less than or equal to 0.01 if the true P-value is 0.05, or 0.02 if the true P-value is 0.10.

For the dichotomous LUMI indicator imputed to address Aims 1 and 2, I calculated MCE estimates of the results of the bivariate gompit regressions I used to obtain statistical significance tests of the difference between prevalence rates of mental disorders and poor self-rated mental health for LUMIs and documented Mexican immigrants. Likewise, I also obtained MCE estimates for the bivariate OLS regression of undocumented status on psychological distress. I report all MCE estimates and relevant test statistics in the regression tables for Aims 1 and 2. In addition, Appendix B reports MCE estimates and relevant test statistics from regressing polychotomous nominal variable W —it enabled me to specify MICE models that were appropriate for imputing documentation status of Mexican immigrants to address Aim 3—on every mental health dependent variable.

To assess convergence of MICE models, experts recommend generating and visually examining trace plots of summaries of imputed values with respect to iteration number for each imputed variable in the model. A lack of an apparent trend in the summaries of imputed values provides evidence that an adequate number of burn-in iterations were specified to achieve convergence (StataCorp., 2011b; White et al., 2011). My visual inspection of hundreds of trace plots for the imputed variables in the 39 MICE models used in this study suggested successful convergence of all models.

¹⁶ Psychiatric disorders with a prevalence rate of zero for LUMIs in the proxy approach were not included in the MICE models because they cause instability and non-convergence.

Analyses of demographic and Americanization-related covariates based on the MICE approach were consistent with findings in the demography literature pertaining to UMIIs vs. documented Mexican immigrants (see table 5.32). Moreover, the same variables were statistically significant in the proxy approach and in the same direction with similar values for most point estimates (see table 5.2).

Table 5.32. Americanization-Related and Demographic Covariates among Mexican Immigrants by MICE Documentation Status (weighted means, percentages and 95% CI)

	LUMI	Documented
Americanization variables		
Years in the US***	9.88 (7.16, 12.59)	18.71 (16.20, 21.21)
English proficiency**	0.77 (0.22, 1.32)	1.90 (1.47, 2.33)
Demographic variables		
Female	42.28 (25.91, 58.66)	46.14 (39.12, 53.17)
Age*	32.09 (29.13, 35.04)	36.74 (34.87, 38.62)
Married	74.65 (62.06, 87.24)	75.98 (71.46, 80.50)
Years of education	8.91 (7.92, 9.89)	8.90 (8.48, 9.32)
Employed ⁺	76.52 (64.87, 88.17)	61.95 (52.20, 71.72)

Note. All 39 MICE models imputed nearly identical percentages of LUMIs and documented Mexican immigrants (83% vs. 17%).

⁺ $p \leq 0.10$, * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

Aim 1 Results

The first aim was to examine the relationship between an undocumented immigration status and mental health indicators among Mexican immigrants in the US, both at the bivariate level and after adjusting for potential confounders. After specifying the imputation models and generating the imputations, I calculated prevalence rates of DSM-IV-TR and ICD-10 composite and individual diagnoses as well as poor self-rated mental health for LUMIs and documented Mexican immigrants. Rao Scott chi-square tests cannot be used with imputed data; bivariate gompit regressions were therefore used to calculate statistical significance and generate diagnostic statistics of simulation error. Next, I tested for significant differences in mean psychological distress scores between LUMIs and documented Mexican immigrants and conducted an OLS regression of psychological distress on documentation status. I calculated recommended diagnostic statistics for the bivariate regressions to evaluate simulation error in the MICE model associated with each mental health dependent variable in order to ensure the number of imputations was sufficient.

Lifetime DSM-IV-TR diagnoses. Table 5.33 reports prevalence rates of lifetime DSM-IV-TR disorders among Mexican immigrants by documentation status. Table 5.34 reports results of the bivariate gompit regressions used to determine if the difference in prevalence rates presented in Table 5.33 was statistically significant. It also reports the diagnostic statistics for evaluating simulation error to ascertain if the MICE model associated with the independent variable produced an adequate number of imputations.

Table 5.33. Lifetime DSM-IV-TR Disorder Prevalence among Mexican Immigrants by Documentation Status: MICE Approach

Disorder	LUMI		Documented	
	Weighted %	95% CI	Weighted %	95% CI
Any depressive disorder	9.00	7.84, 14.73	11.28	7.83, 14.73
Dysthymia	2.86	-0.44, 6.16	1.61	0.18, 3.05
Major depressive disorder	7.86	0.27, 15.44	10.69	7.63, 13.76
Any anxiety disorder	17.96	7.52, 28.40	19.89	15.36, 24.43
Panic disorder	1.63	0.48, 2.78	2.92	-1.55, 7.39
Panic attack	9.39	1.50, 17.26	13.69	9.33, 18.05
PTSD	4.38	0.33, 8.42	2.61	0.98, 4.24
Generalized anxiety disorder	3.01	-0.52, 6.54	2.79	1.59, 3.99
Social phobia	4.37	-1.81, 10.55	5.14	2.41, 7.89
Any substance use disorder	2.81	-2.09, 7.71	6.27	3.59, 8.95
Drug abuse	4.51	-2.33, 11.35	1.79	0.60, 2.99
Alcohol abuse	4.74	-2.91, 12.38	5.60	2.83, 8.37
Any disorder	19.96	9.51, 30.39	28.39	24.20, 32.58

Table 5.34. Bivariate Gompit Regressions of Imputed Documentation Status on Lifetime DSM-IV-TR Diagnoses among Mexican Immigrants

Dependent Variable	OR (95% CI)	MCE for OR	SE	p	MCE for p	MCE for t
Any depressive disorder	0.77 (0.27, 2.23)	0.01	0.39	0.62	0.03	0.04
Dysthymia	1.76 (0.37, 8.22)	0.03	1.31	0.45	0.01	0.03
Major depressive disorder	0.71 (0.21, 2.41)	0.02	0.42	0.56	0.03	0.04
Any anxiety disorder	0.88 (0.44, 1.77)	0.02	0.29	0.71	0.04	0.06
Panic disorder	1.79 (0.33, 9.63)	0.03	1.46	0.48	0.02	0.03
Panic attack	0.66 (0.27, 1.64)	0.01	0.28	0.35	0.03	0.05
PTSD	1.67 (0.58, 4.67)	0.04	0.84	0.32	0.03	0.07
Generalized anxiety disorder	1.04 (0.25, 4.40)	0.04	0.72	0.96	0.04	0.06
Social phobia	0.77 (0.11, 5.48)	0.04	0.70	0.77	0.04	0.05
Any substance use disorder	0.40 (0.05, 2.96)	0.02	0.38	0.35	0.02	0.04
Drug abuse	2.34 (0.25, 22.30)	0.17	2.42	0.42	0.04	0.08
Alcohol abuse	0.74 (0.08, 6.12)	0.05	0.73	0.76	0.05	0.06
Any disorder	0.66 (0.34, 1.29)	0.01	0.21	0.21	0.02	0.06

There were no statistically significant differences in the prevalence rates of composite lifetime DSM-IV-TR diagnostic categories. In addition, post-hoc analyses revealed no significant differences in

the prevalence rates of individual diagnoses. Diagnostic tests of simulation error found that all MICE models produced a sufficient number of imputations.

Past 12 month DSM-IV-TR diagnoses. Table 5.35 reports prevalence rates of past 12 month DSM-IV-TR disorders among Mexican immigrants by documentation status. Table 5.36 reports results of the bivariate gompit regressions used to determine if the differences in prevalence rates presented in Table 5.35 were statistically significant. It also reports the diagnostic statistics for evaluating simulation error to ascertain if the MICE model associated with the independent variable produced an adequate number of imputations.

Table 5.35. Past 12 Month DSM-IV-TR Disorder Prevalence among Mexican Immigrants by Documentation Status: MICE Approach

Disorder	Weighted %	LUMI		Documented	
		95% CI	Weighted %	95% CI	
Any depressive disorder	4.74	-0.63, 10.10	6.02	4.18, 7.86	
Dysthymia	3.01	-0.22, 6.23	1.59	0.14, 3.04	
Major depressive disorder	3.42	-1.82, 8.65	5.49	3.94, 7.04	
Any anxiety disorder	10.80	1.84, 19.70	11.10	6.69, 15.50	
Panic disorder	2.94	-1.31, 7.19	1.14	0.45, 1.84	
Panic attack	4.67	-1.11, 10.44	6.42	3.00, 9.86	
PTSD	2.14	-1.44, 5.72	1.44	0.15, 2.73	
Generalized anxiety disorder	2.04	-0.78, 4.87	1.57	0.68, 2.46	
Any disorder	11.56	2.97, 20.14	14.78	10.80, 18.76	

Table 5.36. Bivariate Gompit Regressions of Imputed Documentation Status on Past 12 Month DSM-IV-TR Diagnoses among Mexican Immigrants

Dependent Variable	OR (95% CI)	MCE for OR	SE	p	MCE for p	MCE for t
Any depressive disorder	0.77 (0.20, 3.00)	0.02	0.51	0.69	0.02	0.03
Dysthymia	1.89 (0.41, 8.66)	0.03	1.40	0.39	0.02	0.03
Major depressive disorder	0.61 (0.10, 3.60)	0.01	0.52	0.56	0.01	0.02
Any anxiety disorder	0.95 (0.33, 2.68)	0.03	0.47	0.91	0.04	0.06
Panic disorder	2.56 (0.62, 10.52)	0.05	1.75	0.18	0.02	0.05
Panic attack	0.71 (0.24, 2.09)	0.02	0.37	0.52	0.03	0.05
PTSD	1.43 (0.21, 9.28)	0.06	1.29	0.70	0.04	0.06
Generalized anxiety disorder	1.21 (0.19, 7.67)	0.06	1.05	0.83	0.05	0.07
Any disorder	0.75 (0.32, 1.80)	0.02	0.31	0.51	0.04	0.06

There were no statistically significant differences in the prevalence rates of composite past 12 month DSM-IV-TR diagnostic categories. In addition, post-hoc analyses revealed no significant differences in the prevalence rates of individual diagnoses. Diagnostic tests of simulation error found that all MICE models produced a sufficient number of imputations.

Past 30 day DSM-IV-TR diagnoses. Table 5.37 presents post-hoc analyses of prevalence rates of past 30 day DSM-IV-TR disorders among Mexican immigrants by documentation status. Table 5.38 reports the results of bivariate gompit regressions used to determine if the difference between prevalence rates in Table 5.37 were statistically significant and presents diagnostic statistics to assess simulation error.

Table 5.37. Past 30 Day DSM-IV-TR Disorder Prevalence among Mexican Immigrants: MICE Approach

Disorder	LUMI		Documented	
	Weighted %	95% CI	Weighted %	95% CI
Dysthymia	2.00	-1.39, 5.38	0.49	-0.26, 1.26
Major depressive episode	3.88	-1.50, 9.27	1.39	0.69, 2.09
Panic disorder	0.42	0.19, 0.65	0.74	-0.51, 1.99
Panic attack	1.61	-1.86, 5.09	2.01	0.99, 3.04

Table 5.38. Bivariate Gompit Regressions of Imputed Documentation Status on Past 30 Day DSM-IV-TR Diagnoses among Mexican Immigrants

Dependent Variable	OR (95% CI)	MCE for OR	SE	p	MCE for p	MCE for t
Dysthymia	4.03 (0.30, 54.02)	0.05	5.08	0.28	0.01	0.01
Major depressive episode	2.80 (0.46, 17.09)	0.05	2.45	0.25	0.01	0.03
Panic disorder	1.78 (0.24, 13.42)	0.02	1.75	0.56	0.01	0.01
Panic attack	0.69 (0.08, 6.28)	0.04	0.71	0.72	0.05	0.07

There were no statistically significant differences in the prevalence rates of past 30 day DSM-IV-TR disorders. Diagnostic tests of simulation error found that all MICE models produced a sufficient number of imputations.

Lifetime ICD-10 diagnoses. Table 5.39 presents prevalence rates of lifetime ICD-10 disorders among Mexican immigrants by documentation status. Table 5.40 reports the results of bivariate gompit regressions used to determine if the difference between prevalence rates in Table 5.39 were statistically significant and presents diagnostic statistics to assess simulation error.

Table 5.39. Lifetime ICD-10 Disorder Prevalence among Mexican Immigrants by Documentation Status: MICE Approach

Disorder	LUMI		Documented	
	Weighted %	95% CI	Weighted %	95% CI
Any depressive disorder	4.78	-0.68, 10.24	7.73	4.13, 11.33
Dysthymia	2.96	-0.32, 6.24	2.03	0.18, 3.87
Major depressive disorder	4.38	-1.52, 10.28	6.87	4.23, 9.52
Any anxiety disorder	19.56	8.78, 30.33	20.08	16.41, 23.76
Panic disorder	3.19	-1.46, 7.84	1.56	0.41, 2.72
Panic attack	9.04	1.74, 16.34	13.07	9.27, 16.86

PTSD	4.65	0.26, 9.03	2.91	1.12, 4.70
Generalized anxiety disorder	3.70	-0.39, 7.71	2.73	1.57, 3.88
Social phobia	7.50	-0.55, 15.52	6.39	3.15, 9.64
Any substance use disorder	5.97	-2.72, 14.66	5.60	2.62, 8.59
Drug abuse	5.32	-2.08, 12.71	1.64	0.47, 2.80
Alcohol abuse	5.89	-2.82, 14.60	5.35	2.55, 8.15
Any disorder	24.03	11.56, 36.50	24.83	20.71, 28.95

Table 5.40. Bivariate Gompit Regressions of Imputed Documentation Status on Lifetime ICD-10 Diagnoses among Mexican Immigrants

Dependent Variable	OR (95% CI)	MCE for OR	SE	p	MCE for p	MCE for t
Any depressive disorder	0.59 (0.16, 2.26)	0.02	0.38	0.43	0.02	0.04
Dysthymia	1.45 (0.31, 6.82)	0.03	1.09	0.63	0.02	0.03
Severe depressive episode	0.61 (0.13, 2.83)	0.02	0.45	0.50	0.02	0.04
Any anxiety disorder	0.96 (0.49, 1.85)	0.02	0.30	0.90	0.04	0.05
Panic disorder	2.02 (0.38, 10.68)	0.06	1.62	0.39	0.02	0.04
Panic attack	0.67 (0.27, 1.66)	0.01	0.29	0.37	0.02	0.04
PTSD	1.57 (0.48, 5.13)	0.04	0.89	0.43	0.04	0.08
Generalized anxiety disorder	1.31 (0.33, 5.16)	0.04	0.85	0.68	0.04	0.06
Social phobia	1.15 (0.30, 4.42)	0.03	0.75	0.83	0.03	0.04
Any substance use disorder	0.97 (0.14, 6.51)	0.05	0.86	0.97	0.05	0.06
Drug abuse	3.12 (0.37, 26.58)	0.21	3.08	0.26	0.03	0.09
Alcohol abuse	0.98 (0.13, 7.41)	0.06	0.92	0.98	0.05	0.07
Any disorder	0.95 (0.46, 1.93)	0.02	0.02	0.88	0.05	0.06

There were no statistically significant differences in the prevalence rates of composite lifetime ICD-10 diagnostic categories. In addition, post-hoc analyses revealed no significant differences in the prevalence rates of individual diagnoses. Diagnostic tests of simulation error found that all MICE models produced a sufficient number of imputations.

Past 12 month ICD-10 diagnoses. Table 5.41 presents prevalence rates of past 12 month ICD-10 disorders among Mexican immigrants by documentation status. Table 5.42 reports the results of bivariate gompit regressions used to determine if the difference between prevalence rates in Table 5.41 are statistically significant and presents diagnostic statistics to assess **simulation error**.

Table 5.41. Past 12 Month ICD-10 Disorder Prevalence among Mexican Immigrants by Documentation Status: MICE Approach

Disorder	LUMI		Documented	
	Weighted %	95% CI	Weighted %	95% CI
Any depressive disorder	3.13	-0.32, 6.57	4.87	2.80, 6.95
Dysthymia	3.10	0.05, 6.15	1.57	0.10, 3.03
Severe depressive episode	3.06	-2.62, 8.73	4.38	2.45, 6.30
Any anxiety disorder	8.48	1.61, 15.35	10.83	7.07, 14.58
Panic disorder	3.12	-0.75, 0.70	1.11	0.35, 1.87
Panic attack	4.46	-1.01, 9.95	6.47	3.03, 9.91
PTSD	2.23	-1.34, 5.82	1.56	0.86, 2.86
Generalized anxiety disorder	2.66	-0.36, 5.67	1.44	0.32, 2.55

Social phobia	1.61	-1.98, 5.20	2.93	1.40, 4.46
Any disorder	11.14	2.68, 19.59	13.28	9.30, 17.26

Table 5.42. Bivariate Gompit Regressions of Imputed Documentation Status on Past 12 Month ICD-10 Diagnoses among Mexican Immigrants

Dependent Variable	OR (95% CI)	MCE for OR	SE	p	MCE for p	MCE for t
Any depressive disorder	0.62 (0.18, 2.17)	0.01	0.37	0.44	0.02	0.04
Dysthymia	1.97 (0.44, 8.68)	0.04	1.42	0.35	0.02	0.04
Severe depressive episode	0.61 (0.09, 4.05)	0.03	0.54	0.59	0.05	0.08
Any anxiety disorder	0.76 (0.29, 1.97)	0.02	0.35	0.56	0.03	0.05
Panic disorder	2.81 (0.83, 9.58)	0.05	1.67	0.13	0.01	0.08
Panic attack	0.67 (0.23, 1.94)	0.01	0.34	0.45	0.02	0.05
PTSD	1.38 (0.24, 7.98)	0.05	1.17	0.70	0.04	0.06
Generalized anxiety disorder	1.79 (0.33, 9.47)	0.07	1.42	0.47	0.05	0.08
Social phobia	0.46 (0.04, 5.68)	0.03	0.55	0.52	0.04	0.06
Any disorder	0.81 (0.32, 2.04)	0.02	0.35	0.64	0.04	0.06

There were no statistically significant differences in the prevalence rates of composite past 12 month ICD-10 diagnostic categories. In addition, post-hoc analyses revealed no significant differences in the prevalence rates of individual diagnoses. Diagnostic tests of simulation error found that all MICE models produced a sufficient number of imputations.

Past 30 day ICD-10 diagnoses. Table 5.43 presents prevalence rates of past 30 day ICD-10 disorders among Mexican immigrants by documentation status. Table 5.44 reports the results of the bivariate gompit regressions used to determine if the difference between prevalence rates in Table 5.43 are statistically significant and presents diagnostic statistics to assess simulation error.

Table 5.43. Past 30 Day ICD-10 Disorder Prevalence among Mexican Immigrants by Documentation Status: MICE Approach

Disorder	LUMI		Documented	
	Weighted %	95% CI	Weighted %	95% CI
Dysthymia	1.98	-1.37, 5.33	0.49	-0.27, 1.26
Severe depressive episode	2.31	-1.05, 5.67	0.40	-0.12, 0.93
Panic disorder	0.74	-0.52, 2.02	0.41	0.18, 0.65
Panic attack	1.53	-2.04, 5.10	2.03	0.97, 3.08

Table 5.44. Bivariate Gompit Regressions of Imputed Documentation Status on Past 30 Day ICD-10 Diagnoses among Mexican Immigrants

Dependent Variable	OR (95% CI)	MCE for OR	SE	p	MCE for p	MCE for t
Dysthymia	3.99 (0.30, 53.64)	0.04	5.04	0.28	0.00	0.01
Severe depressive episode	5.76 (0.59, 56.85)	0.19	6.38	0.13	0.01	0.04
Panic disorder	1.79 (0.23, 13.81)	0.02	1.78	0.56	0.01	0.01
Panic attack	0.62 (0.06, 6.19)	0.04	0.66	0.66	0.05	0.08

There were no statistically significant differences in the prevalence rates of past 30 day ICD-10 disorders. Diagnostic tests of simulation error found that all MICE models produced a sufficient number of imputations.

Self-rated mental health and psychological distress. Table 5.45 reports the prevalence rates of poor self-rated mental health and mean psychological distress scores among Mexican immigrants by documentation status. Table 5.46 presents results of the bivariate gompit regression used to determine if the difference between prevalence rates of poor self-rated mental health is significant. It also presents the results of the bivariate OLS regression used to determine if the difference in mean psychological distress scores is significant and reports diagnostic statistics to assess simulation error.

Table 5.45. Poor Self-Rated Mental Health (weighted %, 95% CI) and Psychological Distress (weighted mean, 95% CI) among Mexican Immigrants by Documentation Status: MICE Approach

Dependent Variable	LUMI	Documented
Self-rated mental health	20.70 (7.91, 33.47)	16.51 (12.00, 21.01)
Psychological distress	2.92 (1.15, 4.67)	3.18 (2.71, 3.65)

Table 5.46. Bivariate Gompit Regression of Imputed Documentation Status on Self-Rated Mental Health (OR, 95% CI) and Bivariate OLS Regression (b, 95% CI) of Imputed Documentation Status on Psychological Distress among Mexican immigrants

Dependent Variable	Coefficient	MCE for Coefficient	SE	p	MCE for p	MCE for t
Self-rated mental health	1.26 (0.57, 2.83)	0.03	0.48	0.54	0.05	0.07
Psychological distress	-0.27 (-1.98, 1.45)	0.04	0.81	0.75	0.05	0.06

Summary of Aim 1 results. Results of bivariate analyses based on the MICE approach did not support hypotheses 1a – 1j. Furthermore, post hoc analyses of individual lifetime, past 12 month, and past 30 day DSM-IV-TR and ICD-10 diagnoses failed to find a statistically significant relationship between documentation status and any individual diagnosis. While non-significant, the rates for LUMIs are higher in comparison to documented Mexican immigrants for the following disorders that were significantly greater among LUMIs in the proxy approach: lifetime and past 12 month DSM-IV-TR dysthymia, past 12 month DSM-IV-TR panic disorder, past 30 day DSM-IV-TR dysthymia, lifetime and past 12 month ICD-10 dysthymia, lifetime and past 12 month ICD-10 panic disorder, and past 30 day ICD-10 dysthymia. Similarly, rates of poor self-rated mental health are higher yet non-significant for LUMIs

compared to documented Mexican immigrants in the MICE approach but significant in the proxy approach.

Aim 2 Results

The purpose of this aim was to examine potential mediators of the relationship between and undocumented immigration status and poor mental health outcomes. I did not test potential mediators because the MICE approach did not identify statistically significant relationships between an undocumented immigration status and any of the mental health dependent variables among Mexican immigrants.

Aim 3 Results

The purpose of this aim was to examine differences in mental health among LUMIs, documented Mexican immigrants, US-born Mexicans, Cuban immigrants, US-born Cubans, Puerto Rican immigrants, and US-born Puerto Ricans. I estimated the prevalence rates of lifetime and past 12 month DSM-IV-TR and ICD-10 diagnostic composite categories for these groups. In addition, I estimated lifetime, past 12 month and past 30 day individual DSM-IV-TR/ICD-10 psychiatric disorders. Next, I estimated the rates of poor self-rated mental health and mean psychological distress scores for each group. Finally, I tested for significant differences in prevalence rates between LUMIs and the other groups for every mental health variable by conducting omnibus tests followed by pairwise comparisons between LUMIs and other Latino/a groups as appropriate to test hypotheses 3a – 3e.

Lifetime DSM-IV-TR diagnoses across Latino/a subgroups. Table 5.47 presents the omnibus tests for each lifetime DSM-IV-TR diagnosis. For the variables with significant omnibus tests, I conducted pairwise comparisons between LUMIs and the other Latino/a groups. Results of these analyses failed to support hypotheses 3a – 3c. In addition, there were no significant differences in the rates of individual lifetime DSM-IV-TR disorders between LUMIs and the other Latino/a groups.

Table 5.47. Omnibus Tests of Lifetime DSM-IV-TR Diagnoses across Latino/a Groups using MICE Approach

Diagnosis	Omnibus test	P
Any depressive disorder	F(6, 53.7) = 7.60	< 0.001
Dysthymia	F(6, 54.1) = 2.29	0.05

Major depressive disorder	F(6, 53.9) = 3.16	0.01
Any anxiety disorder	F(6, 53.7) = 7.60	< 0.001
Panic disorder	F(6, 53.8) = 2.56	0.03
Panic attack	F(6, 53.8) = 9.41	< 0.001
PTSD	F(6, 53.8) = 2.56	0.03
Generalized anxiety disorder	F(6, 53.7) = 3.77	0.003
Social phobia	F(6, 53.4) = 3.35	0.007
Any substance abuse disorder	F(6, 53.3) = 5.69	< 0.001
Drug abuse	F(6, 52.1) = 7.63	< 0.001
Alcohol abuse	F(6, 53.3) = 5.47	< 0.001
Any disorder	F(6, 53.6) = 13.17	< 0.001

Past 12 month DSM-IV-TR diagnoses across Latino/a subgroups. Table 5.48 reports the omnibus tests for each past 12 month DSM-IV-TR diagnosis. I conducted pairwise comparisons between LUMIs and the other Latino/a groups for the diagnoses with significant omnibus tests. Results of these analyses failed to support hypotheses 3a – 3c. In addition, there were no significant differences between LUMIs and the other Latino/a groups in the rates of individual past 12 month DSM-IV-TR disorders.

Table 5.48. Omnibus Tests of Past 12 Month DSM-IV-TR Diagnoses across Latino/a Groups using MICE Approach

Diagnosis	Omnibus test	P
Any depressive disorder	F(6, 53.9) = 3.59	0.005
Dysthymia	F(5, 54.0) = 2.93	0.02
Major depressive disorder	F(6, 54.0) = 4.19	0.002
Any anxiety disorder	F(6, 53.7) = 2.63	0.03
Panic disorder	F(5, 53.9) = 3.72	0.01
Panic attack	F(6, 53.8) = 1.96	0.12
PTSD	F(6, 53.9) = 0.75	0.61
Generalized anxiety disorder	F(6, 53.6) = 3.73	0.003
Any disorder	F(6, 53.7) = 6.78	< 0.001

Past 30 day DSM-IV-TR diagnoses across Latino/a subgroups. Table 5.49 reports the omnibus tests for each past 30 day DSM-IV-TR diagnosis. I conducted pairwise comparisons between LUMIs and the other Latino/a groups for diagnoses with significant omnibus tests. There were no significant differences between LUMIs and the other Latino/a groups in the rates of past 30 day DSM-IV-TR disorders.

Table 5.49. Omnibus Tests of Past 30 Day DSM-IV-TR Diagnoses across Latino/a Groups using MICE Approach

Diagnosis	Omnibus test	P
Dysthymia	F(5, 54.1) = 0.89	0.49

Major depressive episode	F(6, 54.0) = 2.93	0.02
Panic disorder	F(5, 54.1) = 2.16	0.07
Panic attack	F(5,53.2) = 1.43	0.23

Lifetime ICD-10 diagnoses across Latino/a subgroups. Table 5.50 presents the omnibus tests for each lifetime ICD-10 diagnosis. For the variables with significant omnibus tests, I conducted pairwise comparisons between LUMIs and the other Latino/a groups. Results of these analyses failed to support hypotheses 3a – 3c. In addition, there were no significant differences in the rates of individual lifetime ICD-10 disorders between LUMIs and the other Latino/a groups.

Table 5.50. Omnibus Tests of Lifetime ICD-10 Diagnoses across Latino/a Groups using MICE

Diagnosis	Omnibus test	P
Any depressive disorder	F(6, 53.9) = 2.05	0.09
Dysthymia	F(6, 54.1) = 1.92	0.12
Severe depressive episode	F(6, 53.9) = 1.72	0.13
Any anxiety disorder	F(6, 53.6) = 13.50	< 0.001
Panic disorder	F(6, 54.0) = 2.20	0.07
Panic attack	F(6, 53.9) = 11.07	< 0.001
PTSD	F(6, 53.8) = 2.86	0.02
Generalized anxiety disorder	F(6, 53.4) = 4.27	0.001
Social phobia	F(6, 53.8) = 2.60	0.03
Any substance use disorder	F(6, 53.5) = 6.12	< 0.001
Drug abuse	F(6, 52.4) = 7.88	< 0.001
Alcohol abuse	F(6, 53.4) = 5.62	< 0.001
Any disorder	F(6, 53.6) = 20.63	0.001

Past 12 month ICD-10 diagnoses across Latino/a subgroups. Table 5.51 presents the omnibus tests for each past 12 month ICD-10 diagnosis. I conducted pairwise comparisons between LUMIs and the other Latino/a groups for the variables with significant omnibus tests. Results of these analyses failed to support hypotheses 3a – 3c. In addition, there were no significant differences in the rates of past 12 month ICD-10 disorders between LUMIs and the other Latino/a groups.

Table 5.51. Omnibus Tests of Past 12 Month ICD-10 Diagnoses across Latino/a Groups using MICE

Diagnosis	Omnibus test	P
Any depressive disorder	F(6, 53.9) = 2.08	0.07
Dysthymia	F(6, 54.0) = 3.04	0.01
Severe depressive episode	F(6, 53.9) = 1.81	0.12
Any anxiety disorder	F(6, 53.7) = 3.93	0.003
Panic disorder	F(6, 54.0) = 3.12	0.01
Panic attack	F(6, 53.8) = 1.99	0.08
PTSD	F(6, 53.9) = 0.81	0.56
Generalized anxiety disorder	F(6, 53.9) = 1.65	0.15
Social phobia	F(6, 53.6) = 2.84	0.02
Any disorder	F(6, 53.7) = 6.15	< 0.001

Past 30 day ICD-10 diagnoses across Latino/a subgroups. Table 5.52 reports the omnibus tests for each past 30 day ICD-10 diagnosis. I conducted pairwise comparisons between LUMIs and the other Latino/a groups for rates of past 30 day severe depressive episode because it was the only variable with a significant omnibus test. There were no significant differences in the rates of severe depressive episode between LUMIs and the other Latino/a groups.

Table 5.52. Omnibus Tests of Past 30 Day ICD-10 Diagnoses across Latino/a Groups using MICE Approach

Diagnosis	Omnibus test	P
Dysthymia	$F(5, 54.1) = 0.87$	0.51
Severe depressive episode	$F(6, 54.0) = 2.23$	0.05
Panic disorder	$F(6, 53.9) = 1.65$	0.16
Panic attack	$F(5, 52.5) = 1.27$	0.29

Psychological distress and self-rated mental health across Latino/a subgroups. I calculated mean psychological distress scores for each Latino/a subgroup. The omnibus test was significant, $F(6, 53.5) = 8.38, p < 0.001$, so I performed pairwise comparisons of LUMIs' mean score with the mean scores of the other Latino/a subgroups. There were no significant differences between LUMI mean scores and the mean scores of the other groups. Hypothesis 3e was therefore not supported.

The omnibus test for rates of poor self-rated mental health across the Latino/a groups was significant, $F(6, 53.6) = 4.45, p = 0.001$. LUMIs had the highest rate of poor self-reported mental health (20.52%) compared to all other Latino/a subgroups. I therefore conducted pairwise comparisons between LUMIs poor self-reported mental health rates and the rates for every other Latino/a subgroup. LUMIs had significantly higher rates of poor self-reported mental health compared to US-born Mexicans (8.46%), $F(1, 39.0) = 7.71, p = 0.008$; US-born Puerto Ricans (8.74%), $F(1, 43.3) = 5.18, p = 0.03$; and US-born Cubans (5.31%), $F(1, 49.8) = 5.17, p = 0.03$.

Summary of Aim 3 results. The MICE approach to addressing Aim 3 only provided support for hypothesis 3e, which posited that LUMIs would have a higher rate of poor self-reported mental health compared to US-born Cubans, Cuban immigrants, US-born Puerto Ricans, Puerto Rican immigrants, US-born Mexicans, and documented Mexican immigrants. The results did not support hypotheses 3a -3d.

Conclusion

In this chapter, I reported the results from two approaches for estimating models involving LUMI mental health using the NLAAS. The proxy approach and the MICE approach produced different results primarily in terms of statistical significance. Many relationships were statistically significant only in the proxy approach. However, the relationships between variables often went in the same direction for both approaches despite the lack of statistical significance in the MICE approach.

Chapter 6 provides a discussion of how this study's findings relate to the existing literature pertaining to UMI mental health. It also discusses the implications of this study's results for UMI mental health and provides recommendations for future research, practice and policy. Finally, it concludes with a review of the study's limitations.

Chapter Six: Discussion and Implications

Psychiatric disorders and mental health problems are among the most disabling conditions in the US and around the world. Epidemiologists predict that by 2030 they will rank first among all health conditions in terms of global disease burden in high income countries (Cuijpers, Beekman, & Reynolds, 2012; Eaton et al., 2008; Gonzalez, Tarraf, Whitfield, & Vega, 2010). Moreover, it has been established that psychiatric disorders and mental health problems cause a greater disability burden for racial and ethnic minorities in the US compared to whites (United States Department of Health and Human Services, 2001). Given that (a) Latino/as are the largest minority group in the US; (b) they are one of the fastest-growing sectors of the population; and (c) Mexican immigrants, the majority of whom are undocumented (Massey, 2010; PHC, 2013a, 2013b), account for 22% of all self-identified Latino/as, it is vital to develop a foundation of basic knowledge regarding the prevalence and correlates of mental illness among UMIs. This foundation will permit subsequent research on how best to design and implement effective interventions targeting UMIs, thereby ameliorating to some extent the public health consequences of the growing disease burden associated with mental illness in the United States.

For over a decade, scholars have tried to convey a sense of urgency about the public health consequences of failing to address known methodological deficiencies and entrenched academic biases vis-à-vis minority mental health research generally and Latino/a mental health research in particular (Bernal & Scharró-del-Río, 2001; Okazaki & Sue, 1995; Rogler, 1999; Sue, 1999; Sue & Chu, 2003; Vega & Rumbaut, 1991; Vega & Lopez, 2001). In the case of UMIs, these warnings have largely been ignored as evidenced by the continued dearth of research specifically targeting UMI mental health and the failure of researchers to include documentation status as a variable in studies of Mexican immigrant mental health. According to Sullivan and Rehm (2005), one consequence of this methodological oversight is that it is difficult to make any definitive conclusions about Mexican immigrant mental health in general based on existing research. This criticism remains true today, as demonstrated in my earlier review of UMI mental health studies.

Sue (1999) addressed the issue of entrenched academic bias by castigating researchers for their “scientific racism” manifested as selective enforcement of scientific principles in regards to minority mental health research. Some academics dismiss much of minority mental health research because they perceive it as being largely descriptive in nature, theoretically unsophisticated, and simplistic in terms of study designs (Sue, 1999). Sue emphasized that structural factors have impeded the development of minority mental health research, and as a result it “has a weaker substantive base on which to demonstrate internal validity. Consequently, much effort has to be expended in discovering basic relationships between variables, developing measures, and so on. For example, ethnic researchers cannot simply assume that Minnesota Multiphasic Personality Inventory–2 is a valid instrument for, say, Cambodian Americans” (p. 1074). In addition, Sue noted that journal reviewers tend to challenge the external validity of findings only when a study involves mental health research specific to a minority group. He demonstrated, for example, that reviewers will cite the absence of a white comparison group as a fatal methodological flaw, yet they will not demand, say, a Vietnamese comparison group for a study based on a sample of overwhelmingly white participants as a method for bolstering external validity.

This dissertation sought to redress the aforementioned public health concern and social injustice caused by mental health researchers’ neglect of UMIs. First, it focused entirely on understanding the prevalence and correlates of UMI mental health within the context of the pan-ethnic US “Latino/a” population. Next, it endeavored to study psychiatric disorders and mental health problems among UMIs using a nationally representative sample, which represents a novel contribution to the scant literature on UMI mental health. In addition, it also made a preliminary effort to identify potential mechanisms of the relationships between documentation status and indicators of poor mental health, which represents another unique contribution to the literature.

The remainder of this chapter provides a summary and discussion of the findings associated with each aim. Next, it notes the study’s limitations and discusses the strengths and weaknesses of each

approach used to study LUMI mental health. It then examines implications for future research, practice and policy related to UMI mental health.

Discussion

Aim 1 Results

The first aim was to examine the relationship between an undocumented immigration status and mental health indicators among Mexican immigrants in the US, both at the bivariate level and after adjusting for potential confounders. The proxy approach found that LUMIs generally had greater rates of dysthymia, panic disorder and poor self-rated mental health in comparison to documented Mexican immigrants, even after adjusting for Americanization and demographic covariates. Further, the results based on the proxy approach did not support the hypotheses that an undocumented status is associated with any past 12 month and lifetime DSM-IV-TR/ICD-10 substance use disorder, any past 12 month and lifetime rates of “any DSM-IV-TR/ICD-10 disorder”, or general psychological distress. Results based on the MICE approach did not support any of the hypotheses associated with Aim 1, and this finding is addressed later in the chapter.

The proxy approach findings provide very limited and tentative support for the hypotheses that an undocumented immigration status is associated with lifetime and past 12 month depressive and anxiety disorders. These results are consistent with previous findings that undocumented Latino/a immigrants had greater anxiety compared to documented Latino/as (Arbona et al., 2010). They are also similar to Pérez and Fortuna’s (2005) findings that, compared to documented Latino/as, undocumented Latino/a immigrants had higher rates of anxiety disorders (17% vs. 11%) and depressive disorders (72% vs. 60%).

Although not statistically significant, the proxy approach found that LUMIs had lower rates of any past 12 month and lifetime DSM-IV-TR and ICD-10 substance use disorders in comparison to documented Mexican immigrants. These findings conflict with Pérez and Fortuna’s study, which found that undocumented Latino/as had higher rates of substance use disorders compared to documented Latino/a immigrants (21% vs. 6%). They are, however, consistent with previous reports suggesting low

rates of substance abuse among undocumented Latino/a immigrants as part of a larger and empirically established tendency to avoid engaging in criminal behavior (J. Hagan & Palloni, 1999; M. T. Lee & Martinez, 2009; Rumbaut, 2008). This discrepancy may be due to Pérez and Fortuna's reliance on a clinical convenience sample from a single urban outpatient mental health treatment facility.

In addition, this study found that LUMIs had a higher rate of "any past 12 month DSM-IV-TR disorder" compared to documented Mexican immigrants (16.88% vs. 13.95%). While not statistically significant, this finding is noteworthy because LUMIs did not endorse half of the diagnoses including agoraphobia without panic disorder, social phobia, or any of the substance use disorders. Conversely, there were no zero cells for any of the diagnoses among documented Mexican immigrants. One possible implication of this finding is that a reliance on composite diagnostic categories may obfuscate the differences in psychopathology between LUMIs and documented Mexican immigrants. Consequently, this finding may highlight the importance of examining individual diagnoses to obtain a more nuanced understanding of the role of documentation status in Mexican immigrant mental health.

This study also found identical prevalence rates of lifetime and past 12 month DSM-IV-TR/ICD-10 dysthymia and panic disorder among LUMIs. One plausible explanation for this finding is that UMIIs are more likely to be recent arrivals in the US compared to documented immigrants (Bustamante et al., 2010; Kochhar, 2005). As shown in Tables 5.2 and 5.29, this study's findings based on the proxy approach and the MICE approach are consistent with this explanation.

Finally, a prominent study conducted by NLAAS researchers found that after disaggregating the Latino/a sample by ethnic/national origin group, the so-called "Latino paradox" was only observed consistently among the Mexican sample. They also found that the paradox applied only to depressive and anxiety disorders among Mexicans such that immigrants had lower rates of composite depressive and anxiety disorders compared to US-born Mexicans (Alegría et al., 2008). The present study's findings that certain anxiety and depressive disorders are more prevalent among proxy-identified LUMIs may provide the first documented empirical evidence in support of the notion that an undocumented status may be one

plausible explanation for the consistent and as yet unexplained finding of a Latino/a mental health paradox.

Aim 2 Results

The purpose of this aim was to examine potential mediators of the relationship between an undocumented immigration status and poor mental health outcomes. The MICE approach did not support any of the hypotheses associated with Aim 2, and this finding is addressed later in this chapter. As with Aim 1, the results of this study based on the proxy approach did not directly support hypotheses 2a – 2f which mostly posited DSM-IV-TR/ICD-10 diagnostic composite categories as the dependent variables. However, post hoc analyses revealed that traumatic events, context of exit and food insecurity did mediate the relationship between an undocumented immigration status and certain DSM-IV-TR/ICD-10 disorders. In addition, the results of this study did not identify mediators of the relationship between an undocumented status and self-rated mental health. Finally, there was no support for hypotheses 2a, 2b, or 2e which proposed perceived discrimination, social isolation and neighborhood safety as mediators of relationships between an undocumented status and mental health outcomes.

This study identified the number of potentially immigration-related traumatic events as a partial mediator of the relationship between an undocumented status and indicators of poor mental health (i.e., lifetime DSM-IV-TR/ICD-10 panic disorder and past 30 day DSM-IV-TR/ICD-10 dysthymia). This finding is consistent with a multitude of prior studies and reports which enumerate these traumas and identify them as potentially pathogenic stressors (e.g., Andrews et al., 2002; L. R. Chavez, 1998; DeLuca et al., 2010; S. McGuire & Georges, 2003; Sullivan & Rehm, 2005; Vargas, 2001; Zuniga, 2004). However, the effect sizes of the indirect effects through traumatic events are incongruously small given the emphasis placed on such stressors in the literature.

Context of exit, specifically whether migration to the US was chosen or forced upon the migrant, also emerged as a partial mediator of the relationship between an undocumented status and indicators of poor mental health (i.e., lifetime and past 12 month DSM-IV-TR/ICD-10 panic disorder). This finding is consistent with other studies and reports which have identified context of exit as a predictor of mental

health outcomes among Latino/a immigrants generally, although not specific to undocumented Latino/as (Alegría & Woo, 2009; Lueck & Wilson, 2011; Torres & Wallace, 2013).

This study also identified food insecurity as a partial mediator of the relationship between an undocumented status and past 12 month DSM-IV-TR/ICD-10 panic disorder, lifetime DSM-IV-TR/ICD-10 panic disorder and past 30 day DSM-IV-TR major depressive episode. This finding is consistent with a prior study that identified food insecurity as a correlate of poor mental health among UMIs (Hadley et al., 2008). It is also consistent with a study that found food insecurity was a correlate of variables such as English language proficiency known to be inversely associated with mental health among Mexican immigrants (Standish et al., 2010).

This study did not identify perceived discrimination, neighborhood safety and social isolation as mediators of the relationship between an undocumented immigration status and poor mental health outcomes. These results are not consistent with previous research. First, numerous studies have found perceived discrimination to be a correlate of poor mental health outcomes for minority groups including Latino/a immigrants in the United States (Alamilla et al., 2010; Araújo & Borrell, 2006; Finch et al., 2000; Gee et al., 2006; Pascoe & Smart-Richman, 2009; Williams & Mohammed, 2009). Some studies have suggested that Latino/a immigrants become more likely to report perceived discrimination as time in the US and other “acculturation” factors (e.g., English proficiency) increase thereby placing them at greater risk of poor mental health (Finch et al., 2000; Gee et al., 2006). These findings may explain why the present study did not identify perceived discrimination as a mediator, because UMIs are generally less “Americanized” as defined by years in the US and English proficiency compared to their documented counterparts. This explanation seems less likely in the present study because I controlled for these factors when testing all mediation models. Moreover, in contrast to this study’s results, prior studies have consistently identified neighborhood safety and social isolation as stressors and correlates of poor mental health among Latino/a immigrants (Alegría, Shrout et al., 2007; Hiott et al., 2008; Hovey & Magaña, 2003; Negi, 2011; Ornelas & Perreira, 2011; Pérez & Fortuna, 2005).

Aim 3 Results

The purpose of this aim was to examine differences in mental health among LUMIs, documented Mexican immigrants, US-born Mexicans, Cuban immigrants, US-born Cubans, Puerto Rican immigrants, and US-born Puerto Ricans. Results based on the proxy approach and the MICE approach only provided support for hypothesis 3e, which posited that LUMIs would have higher rates of poor self-reported mental health compared to all other Latino/a subgroups. For the proxy approach, LUMIs had the highest rate of poor self-reported mental health compared to all other Latino/a subgroups. Rates were significantly higher compared to US-born and Cuban immigrants; Puerto Rican immigrants; and US-born Mexicans. Similarly, the MICE approach found that LUMIs had the highest rates of poor self-reported mental health compared to all other Latino/a subgroups. Rates were significantly higher compared to US-born Mexicans, US-born Puerto Ricans, and US-born Cubans.

Results pertaining to self-reported mental health from both approaches stand in stark contrast to findings related to composite and specific DSM-IV-TR/ICD-10 diagnoses. These findings paint very different pictures regarding the magnitude of the difference in UMI mental health compared to the other Latino/a subgroups. One possible explanation for this finding is that Spanish-language respondents may be more likely in comparison to English-language respondents to report poorer health on self-rated health questions like the NLAAS self-reported mental health indicator (Bzostek, Goldman, & Pebley, 2007; Viruell-Fuentes, Morenoff, Williams, & House, 2011). Some researchers contend that the Spanish translation of the English response option “fair” as *regular* may downwardly bias self-rated health estimates among Spanish-language respondents because *regular* has a more positive connotation in Spanish than “fair” does in English (Viruell-Fuentes et al., 2011). Indeed, a recent empirical test of this hypothesis found that Latino/as interviewed in Spanish reported worse self-rated health compared to Latino/as interviewed in English (Viruell-Fuentes et al., 2011). However, another recent study of self-

reported physical health¹⁷ among NLAAS Latino/as found no differences by interview language (Torres & Wallace, 2013). Nevertheless, it is possible that language of interview may have impacted the present study's findings regarding rates of poor self-reported mental health.

An additional plausible explanation for this finding is that UMIs may have been less forthcoming on certain NLAAS screener questions compared to the other Latino/a subgroups due to immigration status-related fears. This systematic measurement error would have resulted in biased (i.e., lower) estimates of prevalence rates of psychiatric disorders. In this case perhaps the comparably and decidedly higher rate of poor self-reported mental health was simply indicative of the systematic measurement error vis-à-vis psychiatric diagnoses.

The emic-etic paradigm (Alegría, Vila et al., 2004) provides another potential explanation for this finding. Perhaps UMIs' higher rates of poor self-reported mental health versus their rates of psychiatric disorders are due to the etic perspective that forms the foundation of Western psychiatric nosology. This result could suggest that the greater reliability of the etic perspective was achieved at the expense of the greater diagnostic validity afforded by the emic perspective (Alegría, Vila et al., 2004; Weiss, 2001).

Study Limitations

General

There are a number of general limitations to the present study related specifically to the NLAAS data. These limitations involve the NLAAS design, study procedures, measurement issues and possible history effects. First, the NLAAS used a cross-sectional design which prevents analyses conducive to causal inferences. Second and relatedly, the cross-sectional design may in some cases violate an assumption of path modeling, namely that constructs are organized in a temporal manner. Additionally, the NLAAS relied on participant self-report thereby introducing possible issues related to recall bias and social desirability. Recall bias may have been somewhat mitigated by NLAAS methodological

¹⁷ Response options for self-reported physical health are identical to self-reported mental health, and the variable was dichotomized in the same way as I dichotomized self-reported mental health in this study.

innovations which included extensive memory cues to improve reliability of self-report estimates in comparison to prior epidemiology studies (Cook, Carson, & Alegría, 2010), although this threat may not be discounted entirely. Similarly, the aforementioned NLAAS participant recruitment procedures specific to Latino/as may have mitigated the social desirability threat somewhat. Nevertheless, this threat may be especially salient among UMIs vis-à-vis any NLAAS questions perceived to be related to documentation status (although there were no direct questions about documentation status).

There are also threats to the internal validity of two measures used in the present study. First, although the NLAAS contained several items related to the construct of “food insecurity”, there remains considerable debate in the literature regarding its proper measurement (Hadley et al., 2008; Wunderlich & Norwood, 2006). This study’s use of an NLAAS item asking participants to identify the number of months they experienced food insecurity-related issues over the past year was chosen because (a) the majority of UMIs are newly-arrived to the United States and those that are not are nevertheless subject to wage stagnation and exploitation; and (b) the response options range from 0 to 12 and more closely approximate continuous data thereby making it more congenial for use in path modeling. Second, this study’s use of NLAAS items to construct an indicator of the “number of potentially immigration-related traumatic events” is problematic because the NLAAS data do not permit one to obtain a sum of all traumatic events experienced; rather, it only permits a sum of the types of traumas experienced. Further, while the traumatic events measured in this study are widely documented in the UMI literature as being “immigration-related”, one cannot necessarily assume that these experiences were in fact immigration-related. An additional problem with this indicator is that it is a count variable. Count variables cannot be tested as mediators—at least, not using Mplus—so it was treated as an approximately continuous variable in mediation analyses thereby introducing known biases to parameter estimates.

History effects may present a final limitation associated specifically with this dissertation’s use of the NLAAS data (Torres & Wallace, 2013). The NLAAS was conducted over a decade ago, from 2002 to 2003. Anti-immigrant hysteria and deportations increased dramatically following the events of September

11, 2001 and the presence of UMIs in the US was portrayed as evidence of a perceived national security failure (Oliviero, 2013; Romero & Williams, 2013; Salas, Ayón, & Gurrola, 2013). The consequences of this scapegoating may have had a deleterious impact on UMI mental health, although the nature and extent of this impact is unknown. Over a decade later, however, the situation for UMIs has deteriorated dramatically under the Obama administration. President Obama has achieved the dubious distinction of presiding over and enforcing the highest rates of workplace raids and UMI deportations in US history (Lopez, Gonzalez-Barrera, & Motel, 2011; Romero & Williams, 2013), his relatively accommodating rhetoric concerning UMIs notwithstanding. This increase in UMI persecution has almost certainly had a detrimental mental health impact, because deportation anxiety is known to be a major stressor for UMIs (L. R. Chavez, 1998; S. McGuire & Georges, 2003; Salas et al., 2013).

Limitations of the Proxy Approach

The present study's use of the proxy approach to studying LUMIs has two main limitations. First, there are potential threats to the internal validity of the proxy variable as a measure of an undocumented status among Mexican immigrants. As previously mentioned, it may be overly restrictive and conservative because it required imposition of exact response options for cases to be assigned as LUMIs. In conjunction with aforementioned issues, especially those pertaining to available occupational data, it is possible that the LUMI group contains documented Mexican immigrants and vice versa. Relatedly, the group I labeled "documented Mexican immigrants" may be more aptly described as "other Mexican immigrants" because they included all non-citizen Mexican immigrants who did not meet the exact criteria for inclusion in LUMI group¹⁸ which does not necessarily mean they are indeed documented. This threat may be mitigated somewhat by this study's finding that the demographic and Americanization characteristics of participants identified by the proxy variable as LUMIs and "documented" immigrants

¹⁸ Excluding those who had missing values for the variables required by the proxy variable which were coded as missing ($n = 10$).

mirror those reported in the existing demography literature on Mexican immigrants, which support the proxy variable's face validity.

Low power is another limitation of the proxy approach that may present several related problems. First, low statistical power increases the likelihood of Type II error (Hancock & Mueller, 2010); it is possible that this study failed to identify existing relationships between an undocumented status and mental health among Mexican immigrants. Next, many researchers unfortunately make the fallacious assumption that low power also leads to a higher likelihood of Type I error compared to studies with larger samples (Gill, 1999; Nickerson, 2000). According to Gill (1999), "The...misinterpretation is that for a given p-value in a study which rejects the null hypothesis, larger sample sizes imply more reliable results. This is false: two studies that reject the null with the same p-value are equally likely to make a Type I error even if they have dramatically different sample sizes" (p. 658). Similarly, Nickerson (2000) noted

Recognition of the often overlooked cost of Type II errors would seem to dictate the use of criteria that are not so extremely protective against errors of Type I. More generally, decision criteria should be set so as to take into account the consequences of the various possible ways of being wrong and with recognition that the relative costs of Type I and Type II errors can vary considerably from situation to situation (p. 273).

In the case of a researcher who is interested in identifying large and robust effect sizes, "which is to say, an effect that would be likely to be detected even with a relatively small sample...high power is not a requirement *and could even be undesirable*" (Nickerson, 2000, p. 282, emphasis added). Consequently, this study did not strictly adhere to the vestigial and arbitrary dictate of the traditional null hypothesis significance testing (NHST) practice that requires rejecting the null hypothesis where $p \leq 0.05$ (Gill, 1999; Nickerson, 2000) and extended it to $p \leq 0.10$.

The aforementioned critiques of low power vis-à-vis NHST is not to imply that low power is never problematic. In the present study, dichotomous dependent variables with rare outcomes, that is, low prevalence rates of certain individual diagnoses and diagnostic composites among Mexican immigrants (e.g., substance use disorders, social phobia, past 30 day MDE and dysthymia) combined with low power

underscores the need for viewing these findings as highly preliminary and exploratory. For example, the CLL regression of Americanization and demographic covariates on past 30 day dysthymia presented in table 5.15 produced an OR for the LUMI coefficient of 49.75 with extremely wide confidence intervals (4.09, 604.95) due to low power and a dichotomous dependent variable that captured a rare event. I reported the findings from this model as simply preliminary and exploratory results in order to encourage future research into a possible relationship between LUMI status and past 30 day dysthymia, not to suggest that the target relationship was actually found in this study—I even emphasized that the results should be interpreted with extreme caution. The extremely wide confidence intervals suggest a strong possibility that this finding represents a Type I error. Other models in the present study have narrower albeit still wide confidence intervals (see LUMI coefficient in tables 5.13 and 5.14). In these models, the width of the confidence intervals may be less problematic.

Perhaps because of arguments regarding the subjective nature and popular misunderstanding of confidence intervals, results of analyses based on NLAAS Latino/as reporting similarly wide and even wider confidence intervals as those in tables 5.13 and 5.14 were published in a highly regarded peer-reviewed academic journal (see Fortuna, Porche, & Alegría, 2008). Indeed, recommendations of the APA publication manual notwithstanding, some scholars have criticized the use of confidence intervals as being plagued by many of the issues related to NHST (Nickerson, 2000)¹⁹. In an exhaustive review of NHST literature, Nickerson noted that most applied researchers share the misconception that a 95% confidence interval means that there is a 95% chance that the parameter estimate falls within the specified range. However, Nickerson points out that

“Essential to an understanding of confidence intervals is the distinction between an interval around a population parameter and one around a sample statistic. These do not have the same meaning... The theory underlying the use of confidence intervals is based on repeated random sampling from a known population and supports conclusions about confidence intervals drawn around that

¹⁹I am not arguing that low power is entirely unproblematic. Instead, I am suggesting that low power does not necessarily represent the commonly presumed death knell in terms of the validity and practical significance of a study's findings.

population's parameters. However, with rare exceptions, population parameters are not known in empirical research—the point of the research generally is to provide a basis for estimating them—and confidence intervals are drawn around the sample statistics...[I]t is correct to say that one is x% confident that the parameter of interest lies within the interval, but it is not correct to say that the probability is x that the parameter lies within the interval. The statement of confidence, in this view, rests on the expectation that for 95% of the samples of the same size drawn at random from the same population, confidence intervals computed in the same way will contain the value of the parameter, which is different from the belief that the probability is .95 that the parameter lies within the particular interval computed.”

Low power is almost certainly the cause of another limitation associated with the proxy approach. Because of this approach’s conservative and restrictive nature and the small sample size of Mexican immigrant non-citizens in the NLAAS, some psychiatric disorders were not endorsed at all among LUMIs identified by this approach. It is of course highly unlikely that UMIs have a prevalence rate of zero for these psychiatric disorders. This issue in turn impacts the MICE approach since the proxy variable was used to identify pre-imputation LUMIs and therefore precluded creating MICE models containing a mental health dependent variable with a prevalence rate of zero among LUMIs.

Finally, the increased likelihood in Type II error associated with low power may explain findings in this study that are inconsistent with prior research. For example, the lack of an identifiable mediational effect for known robust predictors of poor mental health such as perceived discrimination, neighborhood safety and social isolation may be likely indicative of Type II error. I now turn to a discussion of the limitations associated with the MICE approach.

Limitations of the Chained Equations Approach

The MICE approach in the present study suffered from limitations associated with computational burden and low power. First, the severity of the computational burden associated with this approach imposed a major limitation on the present study. For example, using MICE to generate $m=100$ imputations required between 4 and 5 hours, sometimes longer. For the present study, I produced 39 difference MICE models, each generating $m=100$ imputations. Substantial additional time was required to handle frequent problems related to non-convergence and incompatibility of conditionals in many of the

models. Additionally, analyses based on $m=100$ imputations was computationally intensive and slow even for basic calculations such as means²⁰.

Low power also presented problems for the MICE approach. First, while all 39 MICE models increased power by assigning 17% of all noncitizen Mexican immigrants to the LUMI category, the sample of Mexican immigrants ($n=488$) may still have been too small to overcome associated power issues that increase the likelihood of Type II error. In addition, the small sample size of non-citizen Mexican immigrants necessitated a parsimonious selection of auxiliary variables. Thus, while the models used the recommended inclusive approach by including auxiliary variables, low power unfortunately necessitated using fewer auxiliary variables than I would have deemed ideal. Finally, numerous iterations were required—this entailed a major investment of time—to achieve parsimony when selecting the best auxiliary variables to avoid a host of potential problems such as issues related to model identification at each iteration. This requirement may have been obvious in advance to a trained methodologist, but it proved to be a rewarding and invaluable learning experience for this applied researcher. Relatedly, while the MICE approach yielded findings regarding Americanization factors and demographics by documentation status similar to the proxy approach which bolster its face validity (see Table 5.32), it failed to identify any significant bivariate relationships between an undocumented status and mental health outcome variables among Mexican immigrants. One explanation for this finding is that low power which, as noted earlier, necessitated a suboptimal inclusive approach when specifying auxiliary variables may have resulted in de facto yet unrecognized model misspecification. Another possible explanation is that by stochastically modeling documentation status instead of just requiring a pre-determined set of specific item responses to “measure” documentation status, the MICE approach may have had greater

²⁰ Another limitation I encountered was the unanticipated yet necessarily steep learning curve required for an applied social science researcher to properly use the chained equations method of multiple imputation. Further, since multiple imputation using complex survey data is an ongoing area of research among survey statisticians, there is very little practical guidance in the literature or the Stata manual.

reliability and validity in comparison to the proxy approach and that documentation status does not, in fact, demarcate intragroup differences in mental health among Mexican immigrants.

Implications

Despite its limitations, this study nevertheless has certain strengths. These strengths include (a) the use of a national probability sample to study UMIs; (b) the use of a standardized psychodiagnostic interview to assess psychiatric disorders; (c) its exploratory and descriptive approach to provide a preliminary foundation for eventual intervention research with UMIs, thereby addressing a poorly understood and largely unrecognized public health concern with national implications; (d) its contribution to the current and severely inadequate number of studies of UMI mental health; and (e) its use of two distinct approaches to “measuring” documentation status among Mexican immigrants. The remainder of this section will describe the implications of this study’s findings for future research, policy and practice involving UMIs.

Research

This study has a number of implications for future mental health research with UMIs in terms of methodology and targeted constructs. As with most research based on cross-sectional designs, it of course demonstrates the need for longitudinal designs that can facilitate causal inferences and thereby help illuminate potential mechanisms of mental illness among UMIs. In addition, its findings also provide some guidance regarding specific targets for future research when considered within the context of existing studies. Specifically, in light of (a) Alegría et al’s (2008) findings that the “Latino paradox” was limited to Mexicans and applied specifically to anxiety and depressive disorders and (b) the present study’s finding of higher prevalence rates for specific anxiety and depressive disorders among UMIs compared to documented Mexican immigrants, future researcher should target depression and anxiety disorders among UMIs, ideally in studies with a documented comparison group. Finally, this dissertation’s findings underscore the need for more studies aimed at improving measurement of constructs that are particularly germane to UMI mental health research. Indeed, improved measurement may be the key to better enabling applied researchers to conduct increasingly valid and reliable

population-based studies of UMI mental health and, by extension, Mexican immigrant mental health in general (Sullivan & Rehm, 2005).

Measurement. Measuring certain constructs in UMI mental health research presents specific challenges for researchers. Specifically, this study has identified a need for improvements in the measurement of risk factors, mental health –related constructs, and documentation status in Mexican immigrant mental health research.

This dissertation identified certain stressors in its synthesis of the relevant literature as well as in its mediation analyses that cumulatively may contribute to increased risk for psychiatric morbidity among UMIs. Researchers should therefore endeavor to improve the validity of measures of cumulative stress by conducting more qualitative studies aimed at better incorporating the emic perspective in the development of such scales which, because they will ostensibly be measuring the subjective experience of stress among members of a minority group with a distinct culture and external circumstances, practically demand greater attention to the emic approach to measurement. In addition, researchers should include an objective measure of cumulative stress such as allostatic load and incorporate this objective measure into validation studies of the psychometric properties of self-report measures of cumulative stress. The addition of allostatic load as an objective measure of cumulative stress may have the added benefit of improving our understanding of its role as a risk factor for psychiatric morbidity and, by extension, its utility as an objective measure of cumulative stress in the context of UMI mental health research. Moreover, these recommendations should occur in conjunction with validity studies related to using existing measures of specific risk factors including perceived discrimination, social isolation, perceived neighborhood safety and poverty with the UMI population. Researchers must move beyond standard translation procedures in cases where there is reason to believe that correct translation alone is not sufficient to establish the instrument’s construct validity when used with monolingual Spanish-speaking UMIs, and they should rely more on an emic approach to develop instruments with greater validity that still enable intergroup comparisons to the greatest extent possible. Finally, there is a need for validated

instruments to measure aspects of the UMI experience that have been identified as potential risk factors by UMIs in the literature including measures of (a) immigration-related traumatic events; (b) exploitation and victimization by employers, US Border Patrol agents and other criminals; (c) family separation; and (d) pre-migration context-of-exit.

Because it is imperative that mental health researchers be able to compare findings across different studies, researchers studying UMI mental health are also encouraged to evaluate and use validated measures of mental health problems and psychiatric disorders. In addition, the formation of an interest group in UMI mental health research within an existing academic professional organization is recommended to enable researchers to strive for greater consensus regarding the measurement of these constructs. The objective of this recommendation is to achieve a more standardized and systematic approach to UMI mental health research that will eventually provide a bedrock of descriptive empirical data that is conducive to comparing findings across studies. This recommendation would allow researchers to move beyond descriptive epidemiology and exploratory research and apply this descriptive knowledge to achieving the goal of developing empirically-supported interventions.

The final and perhaps most daunting recommendations involve improving the measurement of documentation status. Many UMIs will be unwilling to explicitly identify themselves as such in research studies for reasons discussed previously. While the NLAAS collected a significant amount of immigration-related information (e.g., citizenship status, nativity status, etc.), it was not designed with the intention of examining the relationship between documentation status and mental health.

Future psychiatric epidemiology studies targeting Latino/as may enable researchers to improve estimation of the prevalence and correlates of psychiatric disorders and mental health problems among UMIs in two ways. First, researchers should endeavor to reach out to UMIs and establish trust before entering their communities and barraging them with intensely personal questions regarding their mental health and documentation status. Strategies for gaining access to and the trust of this hidden population have been detailed elsewhere and remain relevant today. Interested readers are referred to the seminal

article on this subject by Cornelius (1982). Second, future national psychiatric epidemiology studies could dramatically improve researchers' ability to make population-based estimates of UMI mental health by adding a few additional immigration status-related questions without asking directly if a participant is undocumented. One model for doing so is the validated "two-card" approach described by Judson and Swanson (2011) which could be integrated into population-based studies with little difficulty (interested readers are referred to pp 31-33 of their article for a detailed description of this method). Briefly, this approach involves listing a set of mutually exclusive immigration statuses (e.g., legal permanent resident; approved refugee; naturalized US citizen; temporary protected status; student, work, business or tourist visa; some other category, etc.) in separate boxes and asking the respondent to indicate the box that includes her or his immigration status. Another approach could be to simply include a few additional items to those already in the NLAAS that directly ask whether the respondent falls within any of the specific aforementioned immigration statuses. Indeed, even the National Survey of American Life, one of the three CPES studies, asked participants whether or not they possessed a green card. In conjunction with an adequate sample size and a set of suitable auxiliary variables such as those contained in the NLAAS, this small changes could strengthen the validity of model-based approaches to estimating the prevalence and correlates of mental health problems and psychiatric disorders among UMIs such as the MICE approach used in this dissertation. Researchers are also encouraged to use these items to develop measurement models for documentation status using latent class analysis (Judson, 2012a), a method for modeling categorical latent variables which in this case would be documentation status. Finally, collaboration with quantitative methodologists in conducting simulation studies would allow a more empirically based assessment of the respective accuracy of the two model-based approaches to "measuring" documentation status among UMIs. This type of study could yield potentially invaluable results with possible implications for improving the measurement of this difficult-to-assess construct.

Policy

This dissertation's synthesis of the literature relevant to UMI mental health in conjunction with its findings regarding UMI mental health has several policy related implications. Specifically, this study's

most policy-relevant empirical findings include those which suggest (a) potentially immigration-related traumas may mediate the relationship between an undocumented status and poor mental health among UMIs and (b) pre-migration circumstances that compel migration among Mexicans who do not wish to migrate may mediate the relationship between an undocumented status and poor mental health among UMIs.

In light of these findings and the preceding literature review, it is recommended that the US government (a) take concrete efforts to end the demonstrably ineffective (in terms of preventing unauthorized migration) yet deadly militarization of the border by halting the currently unprecedented level of spending to increase border militarization; (b) take immediate steps to reduce and perhaps even end the currently unprecedented rate of immigration-related raids and deportations; (c) implement a process whereby UMIs are correctly categorized as “forced migrants” or “involuntary migrants” according to previously discussed theories of undocumented Mexican migration (Boehm, 2011; Cornelius & Rosenblum, 2005; Massey et al., 2003; S. McGuire & Georges, 2003) and create a new category of refugee based on forced migration due to extreme poverty and grant refugee status in cases where UMIs can be reasonably deemed “economic refugees” as described by McGuire and Georges (2003); and (d) engage in bi-national collaboration with the Mexican government to ameliorate the economic devastation caused by corporatist “free trade” policies like NAFTA, which has caused economic conditions for average Mexicans to deteriorate to the extent that they willingly undertake life-threatening unauthorized migrations to the United States despite their desire to remain in their home country.

Clearly, these recommendations will almost certainly never be actualized, and they will continue to represent a “fringe” view for the foreseeable future. Indeed, the current President of the United States’ reputation for being “soft on immigration” is a sobering indictment of the disconnect between immigration policy related to UMIs and empirical data regarding the ineffectiveness of these deadly and inhumane policies as well as the insidious psychological sequelae to which they contribute. Contrary to public perception, even among many Latino/as, that President Barack Obama is friendlier and less hostile

towards UMIs compared to his predecessors, his administration has in fact escalated the government's persecution of undocumented immigrants in the US to an historically unprecedented level (Coutin, 2013; Furman, Ackerman, Loya, & Jones, 2012; Lopez et al., 2011; Romero & Williams, 2013). For instance, the highest deportation rate in US history occurred during Obama's first term, surpassing the annual average deportation rate of George W. Bush's first term (which followed the events of September 11, 2001) by 30% and the annual average of Bush's second term by 50 percent (Lopez et al., 2011). In 2010 alone, the Obama administration authorized \$17.1 billion on border militarization that actually included the deployment of the US military along the US-Mexico border (Slack, Martinez, Whiteford, & Lee, 2013). By 2012, the Obama administration had enforced the deportation of approximately 1.4 million undocumented immigrants, the vast majority of whom were UMIs (Lopez et al., 2011; Romero & Williams, 2013). Despite token changes to immigration enforcement that may provide a small proportion of UMIs with a reprieve from the current administration's unprecedented "deportation regime" (De Genova & Peutz, 2010), it is hard to imagine that the administration's remarkable surge in raids, detentions and deportations has had no effect whatsoever on UMI mental health. Given this president's demonstrably inaccurate reputation for being "soft" on undocumented immigration, it is even more difficult to envision a day in which the US will implement sensible immigration policies informed by empirical data instead of allowing public policy to continue being hijacked by the deafening shrieks of nativist skills and their politically effective theatrics.

Practice

Based on this dissertation's empirical findings as well as its synthesis of the literature, I propose several recommendations related to social work and public health practice involving UMIs. These recommendations fall under three categories: (1) graduate education of practitioners; (2) recommended practices for targeting UMI mental health problems; and (3) recommendations for practice within the context of a government or non-profit agency.

The first recommendation for improving professional practice with UMIs begins with suggested changes in professional education of practitioners. The need for such change is highlighted by recent

studies which have found that due to the failure of graduate social work programs to require coursework in US immigration policies, many social work practitioners share the general public's inaccurate views about the ostensible generosity of US policies towards UMIs as well as their negative attitudes towards UMIs. Perhaps the most unsettling finding in recent research is that practicing social workers have been complicit in perpetuating misinformation regarding UMIs (Bhuyan, Park, & Rundle, 2012; Park & Bhuyan, 2012).

It is therefore imperative that graduate education in social work and other human service professions require coursework in US immigration policy as part of the core curriculum. Social work in particular has an obligation to provide a generalist foundation to produce practitioners who are competent to practice and deliver services to diverse client populations. Given recent and ongoing seismic demographic shifts in the US, requiring coursework in US immigration policy as part of graduate social work education is hardly an unreasonable recommendation; what would be unreasonable and possibly unethical by the profession's own standards would be educators' refusal or failure to adopt such a requirement in light of demographic realities and the profession's stated commitment to social justice and anti-oppressive practice.

The next implication for practice is based on findings from this and other studies regarding what is known about UMI mental health. Specifically, it is recommended that practitioners routinely assess UMIs for anxiety and depressive disorders (Pérez & Fortuna, 2005; Salas et al., 2013; Zuniga, 2004). Given the absence in the literature of empirically supported treatments specific to UMIs, practitioners are obligated to select interventions that have been shown to be effective in studies with samples derived from other populations, ideally studies based on samples that are sociodemographically similar as possible to UMIs, if such studies in fact exist. In addition, findings from this study and other studies (Hadley et al., 2008) suggest that practitioners should routinely assess for food insecurity and address this problem via appropriate referrals to agencies and programs that usually do not use documentation status to determine eligibility, such as food banks operated by religious and humanist organizations.

An additional recommendation for improving direct practice with UMIs stems from this dissertation's extensive literature review. It is self-evident that one cannot engage in direct practice with individuals who are either unaware of available services or too frightened to seek out such services. One suggestion for improving awareness and decreasing fear of receiving services is for practitioners of social work to launch public information campaigns targeting UMIs with the goal of earning the trust of this especially marginalized population in order to fulfill their professional ethical obligations to serve those persons described by the NASW in its code of ethics as being poor, oppressed and vulnerable. As Cleveland (2010) aptly notes,

The Code of Ethics does not distinguish according to residency or citizenship status, calling instead for social workers to "to enhance human well-being and help meet the basic human needs of all people, with particular attention to the needs and empowerment of people who are vulnerable, oppressed, and living in poverty". Social workers are thus implicitly mandated to promote policies that guarantee social justice and confirm equity for unauthorized migrant workers... [and to understand that] the enactment of punitive immigration policies violates social work ethics (p. 79).

A final and related recommendation is to make sure that social work practitioners, especially those who practice in the context of a government-funded or non-profit agency, avoid being co-opted into enforcing government immigration policies that are exclusionary and discriminatory (Cleveland, 2010). In other words, any public information campaign intended to gain the trust of UMIs must be followed up with consistent behavior that demonstrates practitioners' sensitivity and discretion in regard to documentation status and their commitment to being advocates for UMIs' needs and interests. It is thus critical to ensure that social work practitioners are aware that they are not obligated to inform immigration authorities about a client's undocumented status. On the contrary, the social work profession's ethical guidelines expressly prohibit social workers from doing so, even in the event that state or federal legislation is passed requiring social workers practicing in certain contexts to report suspected or known undocumented immigrants (Zuniga, 2004). The profession's code of ethics is clear that when a conflict arises between the needs of a client and the demands of an agency or the state, the social worker's ethical responsibility to serve the client supersedes all other demands (Mullaly, 1997).

Conclusion

The dearth of research on the relationship between an undocumented status and Mexican immigrant mental health has long been identified as a gap in the literature with potentially deleterious public health consequences (Sullivan & Rehm, 2005). Yet, little research has been conducted over the past decade to enhance the substandard quality of the existing scientific knowledge base and address the social injustice it represents. This dissertation represents a small effort to add to the knowledge base on UMI mental health, such as it is, and to make a minor dent in one facet of the structurally embedded and codified set of social injustices that plague UMIs in the United States.

This dissertation represents the first attempt to study the prevalence and correlates of UMI mental health using a nationally representative sample. It studied UMI mental health by addressing three specific aims: (1) examining the relationship between an undocumented immigration status and mental health indicators among Mexican immigrants in the US, both at the bivariate level and after adjusting for potential confounders; (2) identifying potential mediators of the relationship between undocumented immigration status and poor mental health outcomes among Mexican immigrants; and (3) examining differences in mental health among LUMIs, documented Mexican immigrants, US-born Mexicans, Cuban immigrants, US-born Cubans, Puerto Rican immigrants, and US-born Puerto Ricans. Furthermore, despite little in the way of statistically significant results, this study also represents the first attempt to take Judson's (2012) recommendation for using multiple imputation modeling to estimate population parameters by immigrant documentation status in a national probability sample (i.e., census data) and apply it to a nationally representative psychiatric epidemiology study. While many of the hypotheses were not supported by either approach, this study still represents an important albeit small step towards better understanding and ultimately addressing the mental health needs of the extremely marginalized and inherently difficult-to-study UMI population in the United States.

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Appendix A

Table A.1. Variables Used in Imputation Models for Nominal Variable V		
Variable	Label	Imputation Method
varv	LUMI Proxy	logit
ce6	Difficulty visiting friends/family in country of origin	logit
ce5	If deciding today, would still move to US	logit
ce3	Move carefully/somewhat/poorly planned (dichotomized)	logit
perdisc	Perceived discrimination scale	pmm
nsafety	Neighborhood safety scale	pmm
da37	Rank how well off now relative to US people	pmm
yrsinus	Years lived in the US	pmm
engprof	English proficiency scale	pmm
fn20	In past yr-cut/skip meal cause not enough money to buy food	pmm
accstrss	Acculturative distress scale	pmm
dm1_5h	Citizenship in another country	logit
age	age	N/A
female	female	N/A
vishome	Frequently returned to country of origin	N/A
employed	employed	N/A
married	married or living in marriage-like relationship	N/A
dm1_14	education	N/A
povindex	Census 2001 income-to-needs ratio	N/A
seclustr	Sampling error cluster	N/A
sestrat	Sampling error stratum	N/A
<i>Note.</i> All MICE models incorporated sample weight. Augmented regressions were specified to handle perfect prediction. Pmm = predictive mean matching		

Table A.2. Variables Used in Imputation Models for Nominal Variable W		
Variable	Label	Imputation Method
vishome	Frequently returned to country of origin	logit
accstrss	Acculturative distress scale	pmm
fn20	In past yr-cut/skip meal cause not enough money to buy food	pmm
engprof	English proficiency scale	pmm
yrsinus	Years lived in the US	pmm
da37	Rank how well off now relative to US people	pmm
perdisc	Perceived discrimination scale	pmm
nsafety	Neighborhood safety scale	pmm
ce3	Move carefully/somewhat/poorly planned (dichotomized)	logit
ce6	Difficulty visiting friends/family in country of origin	logit
ce5	If deciding today, would still move to US	logit
dm1_5h	Citizenship in another country	logit
varw	Latino/a ethnic by nativity groups; Mexicans: US-born, documented, LUMI	mlogit
forborn	foreign born?	N/A
dm1_14	education	N/A
rancest	Race/Ancestry	N/A
age	age	N/A
povindex	Census 2001 income-to-needs ratio	N/A
female	female	N/A
employed	employed	N/A
married	married or living in marriage-like relationship	N/A
seclustr	Sampling error cluster	N/A
sestrat	Sampling error stratum	
<i>Note.</i> Augmented regressions were specified to handle perfect prediction. Pmm = predictive mean matching		

Appendix B

Appendix B. Monte Carlo Error Estimates for LUMI Coefficient in Bivariate Regressions (Gompit and OLS) of Nominal Variable *W* on Mental Health Dependent Variables

Dependent Variable	Coefficient	MCE for Coefficient	SE	<i>p</i>	MCE for <i>p</i>	MCE for T
12 mo. ICD panic attack	0.96	0.01	0.85	0.97	0.01	0.02
Any 12 mo. DSM depressive disorder	0.51	0.01	0.30	0.26	0.01	0.04
Self-rated mental health	2.48	0.04	0.99	0.03	0.004	0.07
Any lifetime DSM anxiety disorder	0.43	0.006	0.14	0.01	0.002	0.05
Any lifetime DSM depressive disorder	0.42	0.009	0.20	0.08	0.01	0.04
Any lifetime DSM substance disorder	0.27	0.01	0.24	0.15	0.01	0.05
Lifetime ICD PTSD	0.70	0.01	0.47	0.60	0.02	0.03
12 mo. DSM dysthymia	1.57	0.02	0.82	0.39	0.02	0.03
Psychological distress	0.19	0.03	1.12	0.86	0.02	0.03
Past 30 day ICD SDE	1.72	0.03	2.11	0.66	0.01	0.02
Any 12 mo. DSM anxiety disorder	0.54	0.01	0.24	0.18	0.02	0.05
12 mo. DSM MDD	0.35	0.01	0.25	0.14	0.01	0.03
Any 12 mo. ICD disorder	0.53	0.01	0.22	0.13	0.01	0.07
12 mo. DSM panic disorder	1.03	0.01	0.76	0.97	0.02	0.02
Any lifetime ICD anxiety disorder	0.52	0.001	0.16	0.04	0.005	0.05
Lifetime ICD dysthymia	0.89	0.01	0.49	0.84	0.01	0.02
12 mo. ICD panic attack	0.47	0.01	0.32	0.27	0.01	0.03
12 mo. ICD dysthymia	1.66	0.02	0.85	0.32	0.02	0.04
12 mo. DSM PTSD	0.51	0.02	0.54	0.53	0.02	0.03
Past 30 day DSM MDE	1.02	0.02	0.76	0.97	0.02	0.02
Any 12 mo. ICD anxiety disorder	0.51	0.01	0.23	0.14	0.01	0.05
Any 12 mo. ICD depressive disorder	0.43	0.01	0.27	0.19	0.01	0.04
Lifetime DSM alcohol abuse	0.27	0.01	0.03	0.15	0.01	0.06
Past 30 day DSM panic attack	0.39	0.02	0.40	0.36	0.02	0.06
Past 30 day DSM dysthymia	1.43	0.02	1.37	0.71	0.01	0.01
Lifetime DSM MDD	0.40	0.01	0.20	0.08	0.01	0.04
Lifetime DSM dysthymia	0.66	0.01	0.43	0.51	0.01	0.02
Lifetime DSM PTSD	0.55	0.01	0.30	0.29	0.01	0.02
Lifetime ICD panic attack	0.28	0.004	0.12	0.004	0.001	0.04
Lifetime ICD social phobia	0.43	0.01	0.26	0.18	0.01	0.04
Lifetime ICD MDE	0.39	0.01	0.28	0.21	0.009	0.03
Lifetime DSM GAD	0.26	0.009	0.18	0.07	0.007	0.05
Past 30 day ICD dysthymia	1.42	0.01	1.36	0.72	0.01	0.01
Any lifetime ICD disorder	0.39	0.006	0.11	0.003	0.001	0.08
Any lifetime DSM disorder	0.33	0.005	0.09	0.001	0.00	0.09
Lifetime DSM social phobia	0.39	0.02	0.33	0.29	0.02	0.03
12 mo. ICD PTSD	0.53	0.01	0.53	0.53	0.01	0.03
12 mo. ICD GAD	0.42	0.01	0.28	0.21	0.01	0.03
Lifetime DSM panic attack	0.27	0.004	0.12	0.004	0.001	0.06
12 mo. ICD SDE	0.41	0.01	0.34	0.29	0.01	0.03
Any 12 mo. DSM disorder	0.42	0.008	0.16	0.03	0.005	0.06
Lifetime ICD alcohol abuse	0.26	0.01	0.28	0.23	0.001	0.03
Lifetime ICD GAD	.37	0.01	0.26	0.17	0.01	0.04
12 mo. DSM GAD	0.24	0.009	0.17	0.06	0.005	0.04
Past 30 day DSM panic disorder	0.41	0.004	0.40	0.36	0.006	0.01
Past 30 day ICD panic attack	0.27	0.01	0.28	0.23	0.03	0.08