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Kristen Yee Date

Migrant Mental Health
A look at the relationship between the migration journey and mental health among new legal permanent residents in the United States

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By

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Honours Bachelor of Arts with High Distinction
University of Toronto
2008

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An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
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Abstract

Migrant Mental Health
A look at the relationship between the migration journey and mental health among new permanent residents in the United States

By Kristen Yee

Background: Migration theory and research have long ignored the role of the migration journey in influencing the health of international migrants.

Objective: This study aims to examine the relationship between the context of the migration journey and migrant mental health among new legal permanent residents in the United States.

Methods: The NIS-2003-1 dataset contains information on a nationally representative sample of newly admitted to Legal Permanent Residents in the U.S. from 2003. The data collected include information on background characteristics; migration histories; health status, behaviors and practices; economic profile; family life; and living conditions of new legal permanent residents. The dataset is publically available through Princeton University. The adult sample from the NIS-2003-1 (N=8573) was analyzed using logistic and linear regression to examine the relationship between factors in the migration journey and mental health, while controlling for individual background, pre-migration, and post-migration characteristics.

Results: Age at first migration and the time elapsed between first applied for and gained permanent residency were significant predictors of experience of sadness in this cohort. Older age at first migration was protective: with every year increase in age, the odds of experience of sadness lasting two weeks or more decrease by 1.0%. Relative to those who waited two years or less, those having to wait six to nine years between the time they first applied for and received permanent residency were significantly more likely to report sadness related to receipt of permanent residency (OR: 2.43, 95% CI: 1.46, 4.04). When other characteristics were controlled, there was no additional evidence of significant relationships between any other migration variables and mental health. Female gender, history of mental and chronic illness, at least one episode of binge drinking in the last three months, and experience of harm were all positively associated with experience of depressive symptoms (p=0.000 for all).

Conclusion: The migration journey should not be discounted in migration and health research as experiences related to the migration journey may help predict mental distress among new legal permanent residents in the U.S. Continued investigation into the influence the migration journey has on migrant mental health is strongly encouraged.

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I would also like to thank my friends and family for their consistent love and support. I am forever indebted to you for your unfailing encouragement and belief in me.

Most of all, I would like to honor the migrants in my family, especially my father, whose own migration journey was one that provided me with a constant point of reflection and inspiration. It is to my father, C P Peter Yee, and my mother, Jayne Norton-Yee, that I dedicate this work.

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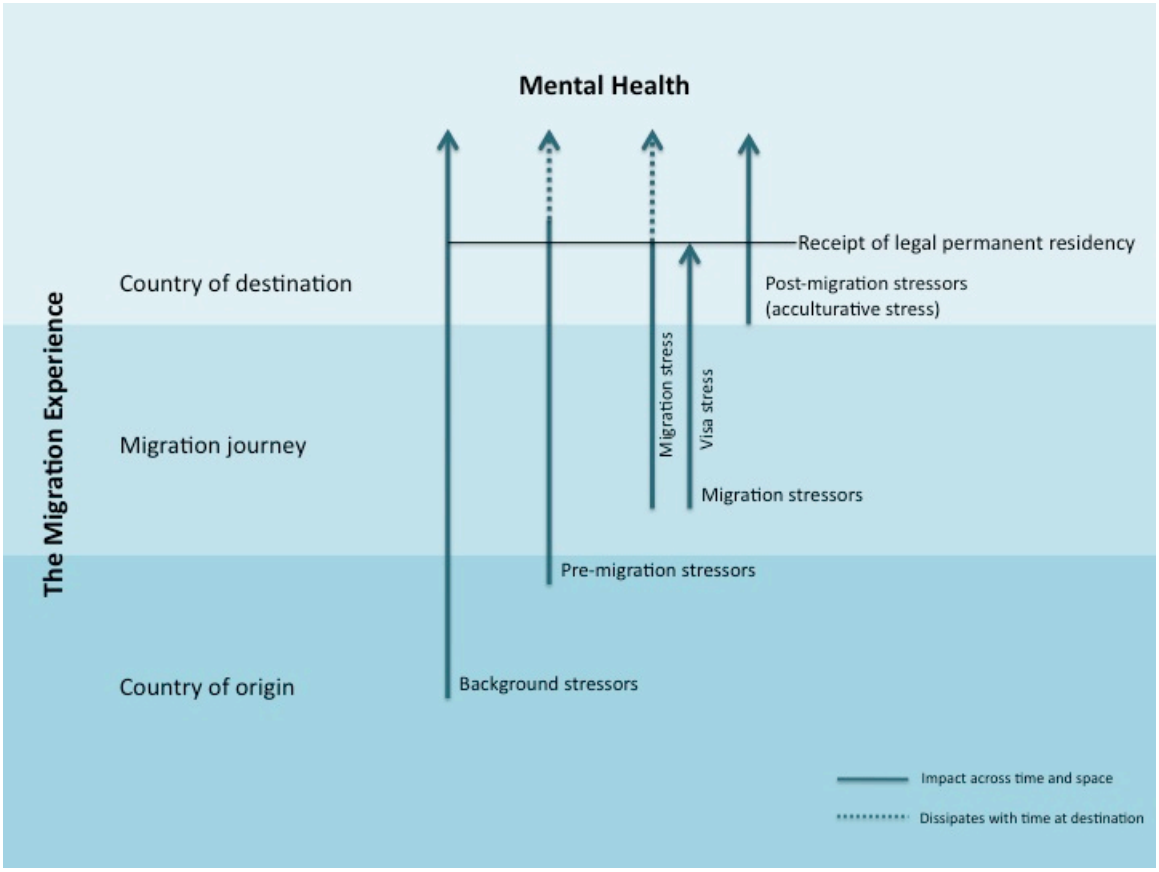
CHAPTER 1: INTRODUCTION

Migration theory focuses on the context of one's place of origin and destination, with little consideration for the journey in between. There is much talk in the literature of the 'push' and 'pull' factors that contribute to an individual's move from one place to another, voluntarily or involuntarily, considering the journey to be neutral (Lee, 1966, Abraído-Lanza et al., 1999). This approach is shortsighted. People do not uniformly transport themselves from one place to another; there is substantive variation in how people take on their migratory journey. Factors associated with variability in the migration journey include but are not limited to: the age at which people first migrate; the length of the journey; the segmentation of the journey, with possible stops in between; familial separation; possession of valid immigration documentation; form of transportation; financial burden. The context of the migration journey can be related to a number of stressful circumstances and thus, has the potential to profoundly impact an individual's mental health (Jasso et al., 2005).

Jasso et al. (2005) suggest that the migration journey to the United States consists of two major stressors: 'migration stress' and 'visa stress'. Migration stress includes the stressors related to the process of moving from one country to another, while visa stress surrounds the stressors related to the process of obtaining legal permanent residence (Jasso et al., 2005). Therefore, there is both a spatial and temporal component to the migration journey. Figure 1 provides a conceptual framework describing how the factors associated with the migration experience to the U.S., in its entirety, affect mental health across time and space.

Figure 1: A conceptualization of the stressors that affect migrant mental health, in time and space, across the entirety of the migration experience to the United States



Individual demographic characteristics, such as age, gender, marital status and history of mental illness, can predispose individuals to mental distress (Hyman et al., 2006). Although the risk of mental illness can shift over time, these background characteristics remain ever-present and thus, can continuously influence individual mental health over the course of the migration experience. Mounting towards the actual departure, the context of exit, that is, the circumstances surrounding migration from one's country of origin, can cause stress and impact current and future mental health (Portes and Rumbart, 1996). For instance, stressful life events, such experience of trauma prior to migration, are carried with individuals when they migrate, and can impact their mental health status over time (Portes and Rumbaut, 1996).

Throughout the journey itself, people can also find themselves at risk of mental distress. Depending on the developmental period within which one first migrates from their country of origin, this can have a profound impact on an individual's mental health status (Gong et al., 2011, Sullivan and Rehm, 2005). Constant instability can cause individual stress, but also has the potential to foster resiliency as individuals develop coping strategies to minimize distress (Cochrane, 1983, Bonanno, 2004). The frequency with which one moves may show similar effects on mental health.

The possession of appropriate immigration documentation, and how long one waits for such documentation to be processed, may also cause chronic stress, especially if compounded with other factors, such as experience of trauma (Jasso et al., 2005, Sullivan and Rehm, 2005). Lastly, once at destination, acculturative stress can result due to the necessity of having to adjust to a cultural milieu dissimilar to the one's own, ultimately affecting mental health status (Portes and Rumbaut, 1996). This multitude of exposure pathways makes evaluating migrant mental health challenging, and thus, calls for comprehensive analysis.

It is without critique that the experience of migration is a subjective one; the circumstances surrounding migration are so complex that it is difficult to generalize a typified experience (Portes and Rumbaut, 1996). However, this is an endeavor worthy of effort as, to understand how migration affects health, particularly mental health, is to understand the realities of contemporary human existence. In the U.S. alone, 12.9% of the population is foreign-born, a figure which has steadily increased over time (IOM, 2010). Through the consideration of the migration experience in its entirety, a holistic picture such as this will help fill current gaps in the literature that ignore the migration journey.

Objective and aims

The objective of this study is to examine the relationship between the context of the migration journey and migrant mental health in a nationally representative sample of new legal permanent residents in the United States. Towards this end, this study has two primary aims:

1. Through prevalence estimates, describe the context of migration exit, journey and entry among new legal permanent residents in the United States.
2. To examine the associations between mental health outcomes and the background, pre-migration, migration, and post-migration characteristics of new legal permanent residents in the United States, creating a more holistic picture of migrant mental health.

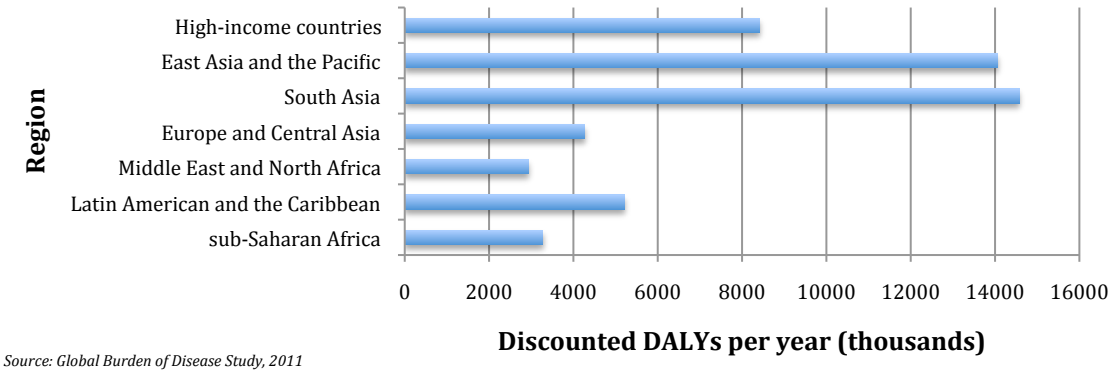
Global mental health

Recently, greater attention has been paid to the state of the world's mental health. Highlighting this shift were results from the Global Burden of Disease study (WHO, 2001) that demonstrated the substantive impact of mental illness on global health. Updated in 2004, the study noted that mental, neurological and substance abuse (MNS) disorders remain a leading contributor to the global burden of disease (Matters et al., 2008). This is attributed to the high prevalence of MNS disorders in all countries where their prevalence has been examined, and the early onset, persistent, and impairing nature of this class of disorders (Hyman et al., 2006).

Within MNS disorders, unipolar depressive disorders are the most destructive as they are the third largest contributor to the global burden of disease, accounting for a total of 65.5 million disability adjusted life years (DALYs) worldwide (Matters et al., 2008). Disaggregated by income-level across regions of the world, unipolar depressive disorders are the number one contributor to the burden of disease in middle- and high-income

countries, and fall in eighth place in low-income countries (Matters et al., 2008). Figure 2 shows the number of discounted DALYs in the world per year as a result of depression.

Figure 2: Disease burden of depression by World Bank Region



Source: Global Burden of Disease Study, 2011

Good mental health is of paramount importance for successful human functioning. In addition to genetic dispositions, environmental factors are thought to contribute most to individual mental health status (Hyman et al., 2006). Disruptive life events, such as migration, have the potential to affect mental health, which, in turn, can affect an individual's ability successfully acculturate and function in their new environment (Portes and Rumbaut, 1996). With the dramatic increase in international migration over time, the study of migration and mental health is an important one.

International migrants and migration theory: an overview

Migration is an inherent part of the study of human populations. International migration is defined as any time a person changes his or her country of usual residence (UN, 1998). Any temporary travel abroad for holiday, business, medical treatment or religious pilgrimage are not considered events of international migration as they do not involve a change in the country of residence within which these travelers normally reside (UN, 1998). Thus, an international migration event is generally considered to be one that involves settling in new country for 60 days or more (NIS, 2006).

The birth of migration theory is attributed to Ravenstein (1885) who, through an analysis of British census data, demonstrated that patterns in migration exist; acts of migration do not occur at random. Many have built on Ravenstein's *Law of Migration*; popular theories include: spatial flow, push-pull and the cost benefit approach (Massey, 1990, Lee, 1966, du Toit, 1990). As an example, consider the push-pull model of migration, most commonly associated with Everett Lee (1966). Lee (1966) suggests that an act of migration includes the factors at origin and destination, obstacles intervening throughout the journey, and personal characteristics. Essentially Lee (1966) argues that there are push and pull factors at both a person's place of origin and their theoretical destination which play into whether or not a person will migrate successfully. Push and pull factors can be economic, political, and social in nature, for instance: greater educational and economic opportunities at destination relative to what is available at home can act as a 'pull' factor, drawing individuals to a particular destination, whereas 'push factors,' such as political turmoil or civil strife at origin can act to encourage migration (Lee, 1966). In addition, there are intervening obstacles in the process, which range from small to "insurmountable" barriers to migration (Lee, 1966). Such factors, like the financial costs associated with migration, may prolong the migratory process or make migration impossible. Lee's theory recognizes the non-uniform nature of migration.

While migration theory is often useful to explain migratory patterns, migration theory has a number of recognized limitations. Firstly, because most migration models focus on voluntary, economically motivated internal migration, theories often fail to consider larger structural forces that often prevent migration, such as visa requirements and systems that fail to recognize education acquired abroad. With this comes the assumption of personal agency in the decision to migrate, and fails to consider the prospect of forced migration.

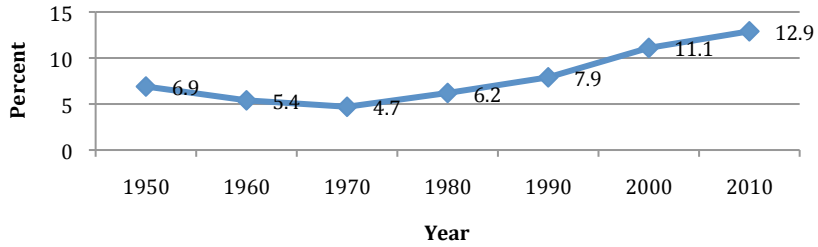
Although, since World War II, a shift in focus on forcibly displaced populations is evident (Batalova and Terrazas, 2010). Additionally, once migration has occurred, many theories assume the expectations associated with migration, like greater economic prosperity, have been achieved, but this is not often the case. Migrants often struggle with financial security at destination and often find that their expectations of success do not meet reality (Massey, 1990). Lastly, and most importantly in this analysis, is the failure to account to the migration journey. As Lee (1966) rightly notes, the nature of migration is non-uniform, allowing for considerable variability across individual experiences. Thus, without a more holistic understanding of the migration experience, through the consideration of all factors at play across the migration experience, it is impossible to clearly understand the relationship between migration and mental health in migrants to the U.S. The objective of this study is to address this gap in theory and literature through the inclusion of the migration journey in the study of migration and mental health. By adding to the literature in this way, a clearer understanding of migration and mental health will emerge. This can, in turn, help guide the ways in which migration is conceptualized, ultimately contributing to the approach current public health efforts take to safeguard migrant health in the United States.

CHAPTER 2: LITERATURE REVIEW

International migration levels, patterns, and trends in the United States

Since the end of World War II, the proportion of foreign-born individuals in the United States has steadily increased over time (Batalova and Terrazas, 2010). Figure 3 shows the rise in the number of immigrants as a total proportion of the U.S. population from 1950 to 2010.

Figure 3: Immigrants as a percentage of the total U.S. population (1950-2010)



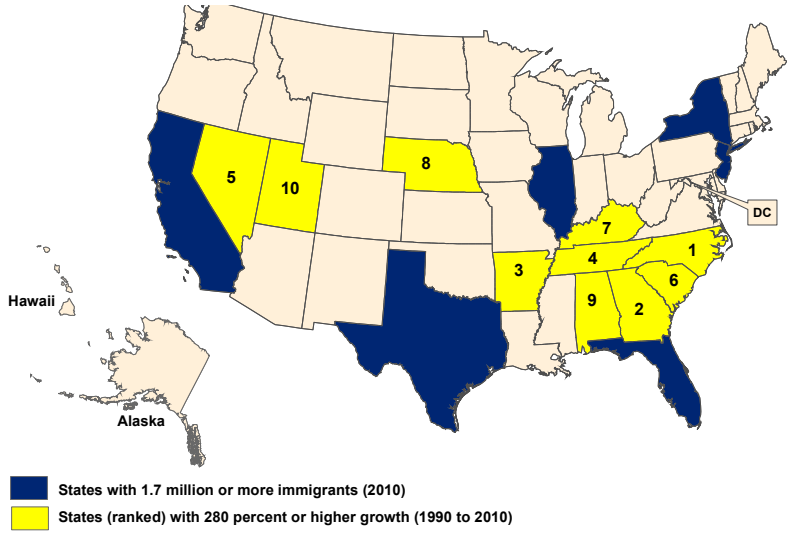
Source: DHS 2011

In 2010, the U.S. population was 317.6 million (IOM, 2011). Foreign-born individuals made up 12.9% of that total, with female migrants accounting for 49.8% of all foreign-born individual in the U.S. (IOM, 2011). Across the globe, the U.S. remains the number one destination country for migrants the world over (IOM, 2010). Roughly a fifth of the world's immigrants call the United States home (IOM, 2010).

Within the United States, immigrant populations are growing most rapidly in the southeast (MPI, 2011). Figure 4 shows the top ten states for which the foreign-born population is the largest and fastest growing (MPI, 2011). Despite the steady rise over time in the proportion of foreign-born individuals as part of the total U.S. population, this increase has slowed in recent years. Data from 2008 document the start of this decline, suggesting a number of push-pull factors as the cause, namely: the economic crisis, stricter U.S. immigration and

border enforcement, increasing anti-immigrant attitudes in the United States, and the amelioration of living conditions in some sending countries (IOM, 2010).

Figure 4: States with the largest and fastest growing foreign-born populations



Originally published on the Migration Policy Institute Data Hub, www.migrationpolicy.org/datahub.

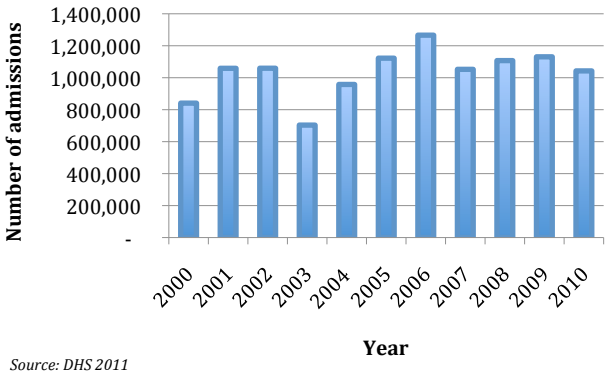
Despite this recent slow in migration to the country, the U.S. net migration rate remains 3.3 migrants per 1000 people (IOM, 2011). In the Americas, only the United States and Canada have positive net migration rates; others face higher rates of out-migration (IOM, 2010). This is important for population stability in both countries. The population within both countries is considerably varied, as the United States and Canada play host to an ethnically diverse array of immigrants. The large majority of migrants to the U.S. are from Latin America and the Caribbean, accounting for 53% of all foreign-born individuals (IOM, 2010). People of Mexican origin make up 30% of this total (IOM, 2010). The second largest group of migrants comes from Asia (27% of the total international migrant population), with most coming from the People's Republic of China, the Philippines, and India (IOM, 2010). For those from Latin America, proximity to the U.S. is thought to influence migratory patterns, where for those from Asia, sheer population numbers and a growing well-educated workforce with limited opportunities at home may act to promote migration abroad.

Most migrants have some form of work in the United States, yet within this workforce, a large number are irregular migrants who lack rights and documentation (IOM, 2011). The U.S. acts as the largest source of remittances in the world, with total figures estimated at just above 47 billion USD, 17% of the world's total remittance outflows in 2008 (IOM, 2010). The prospect of economic advancement is thought to be a major pull factor in an individual's decision to migrate, which may play a role in the large number of regular and irregular migrants to the U.S (Lee, 1966). Despite the large contribution of the U.S. economy to international remittance rates, the U.S. as a global source of remittance outflows has decreased over time, down from 28% in 2000 (IOM, 2010). This decrease has been attributed to diversification in the number of destination countries over time (IOM, 2010).

Persons may gain entry to the United States in a number of ways. Of focus in this analysis are legal permanent residents (L.P.R.s).[1] Migrants may obtain L.P.R. status either through the acquisition of appropriate documentation overseas, or as 'adjustee' migrants; migrants already living in the U.S. are sometimes able to gain permanent residency, and would have initially come to the U.S. on a temporary visa or irregularly (Monger and Yankay, 2011). The number of individuals gaining legal permanent residency in the U.S. has been relatively uniform over the last ten years, largely due to the annual limits in admission to the country, as defined by the United States government (Monger and Yankay, 2011). Figure 5 shows the number of migrants obtaining L.P.R. status in the U.S. over time, and Figure 6 shows the number of admission to L.P.R. status by admission category over time.

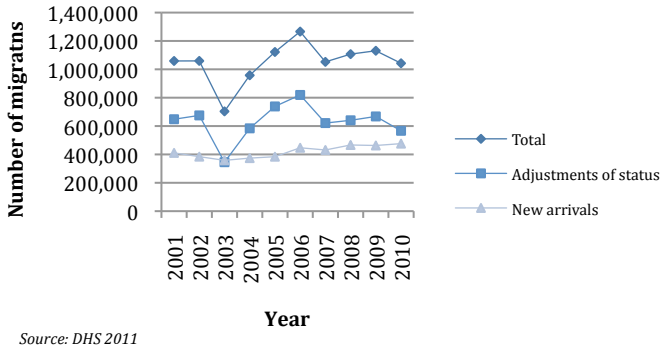
[1] In this study, L.P.R. is used interchangeably to refer to legal permanent residency and legal permanent residents

Figure 5: Number of migrants obtaining legal permanent residence in the U.S. (2000-2010)



Source: DHS 2011

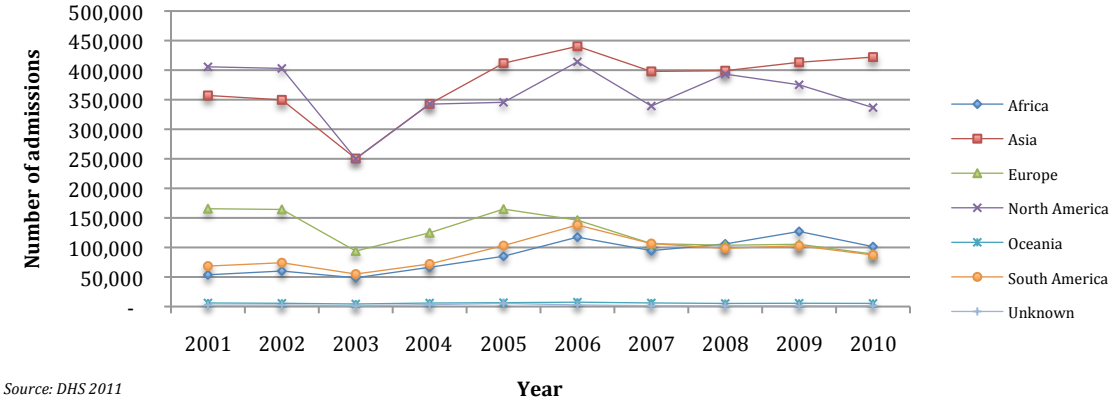
Figure 6: Number of migrants obtaining legal permanent residency in the U.S. by category of admission (2001-2010)



Source: DHS 2011

What these graphs do not show is the proportion of people wanting to migrate to the United States relative to those who gain entry. Demand for U.S. immigration visas, of any kind, far exceeds supply (Jasso et al., 2005). Interestingly, the trend in those who gain legal permanent residency in the U.S. by region of origin is markedly different from those who immigrate to the U.S. in all forms. Figure 7 shows the trends in admission to L.P.R. by region of origin over time.

Figure 7: Number of migrants obtaining legal permanent residency in the U.S. by region of origin (2001-2010)



Source: DHS 2011

Most individuals who obtain legal permanent residence in the U.S. come from Asia and North America, with those of Asian origin having become the most prominent regional group to obtain L.P.R. over time. Over the course of the last decade, admission to L.P.R. for migrants of European origin has slowed, while admissions for individuals of African origin have increased slowly over time. This is thought to have occurred due to improved quality of life at origin for those coming from Europe, while the increase in the number of individuals from African countries to the U.S. has been attributed to a lack of economic opportunities for an increasingly well-educated populace at origin (IOM, 2010). L.P.R. admissions for those from South America and Oceania have remained relatively constant over time. The disparity between the number of migrants to the U.S. from Latin America relative to the proportion that gain permanent residency in the U.S. is most illustrative of how the desire to migrate to the U.S. exceeds official opportunity to do so.

The health of international migrants in the United States

Little is known about the health of international migrants in the U.S. This is due in large part to a lack of available data, as it is common to solely collect information on most recent country of residence and migration status at entry to the country (Kandula et al., 2004). Based on what is known, the health of the international immigrant population in the United States is largely variable due to an extensive number of mediating factors and a lack of standardized tools for measurement. It is difficult to generalize information related to the international migrant population in the U.S. because the population is not homogenous – migrant populations come to the U.S. from every region of the world, bringing with them their own set of cultural beliefs and practices, as well as a diverse range of factors that may predispose them to better or worse health (Singh and Siahpush, 2002). In addition, the status under which individuals enter and stay in the U.S. can have a large impact on their health status once in country (Castaneda et al., 2011).

The literature on the health of international migrants in the U.S. predominately focuses on certain groups, mostly people of Latin American origin. This is largely due to the fact that migrants of Latino origin make up the largest proportion of international migrants in the U.S (Abraído-Lanza et al., 1999, Kandula et al., 2004, Breslau et al., 2011). As a result, such an emphasis is observable here. The literature on infectious and chronic disease, sexual, occupational and mental health will be presented and critiqued.

Infectious disease

The study of infectious disease among international migrant populations has long been of focus. The conditions under which individuals migrate, differences in immunity and susceptibility between populations at origin and destination, low immunization rates at place of origin, and the conditions within which migrants live in their country of destination all influence the spread of infectious disease. Adapted from Barnett (2008), Table 1 describes various types of infectious disease and their relationship with migration.

Due to the complex relationship between migration and different forms of infectious disease, understanding a migrant's migration history, including epidemiologic patterns at origin, is particularly important in diagnosis and treatment. With increasingly strict health requirements for legal entry into the U.S., there is generally good data around select infectious disease rates among newly arrived migrants. However, diseases endemic in other regions of the world, such as schistosomiasis, but not in the U.S. require greater surveillance among migrants in the U.S. as they can cause severe long-term disability (Barnett, 2008).

Table 1: The relationship between migration and emerging infectious disease	
Type of infection	**Migration association**
Acute infectious diseases with risk for local transmission. Includes: measles, rubella, varicella, pertussis, hepatitis A	Migrants may arrive at destination ill or incubating infection (i.e. measles, hepatitis A) Migrants may be more susceptible than U.S.-born population (i.e. varicella)
Infectious diseases with latency or asymptomatic states, with some risk for local transmission	Migrants may arrive ill or may disease relapse years later (i.e. malaria) Family/community members may need immunization
Infectious diseases with low potential for local transmission	Some migrant populations stem from regions of the world that bear a disproportionate burden of disease and are therefore disproportionately affected (i.e. HIV)
Infectious diseases with oncologic potential	Some migrant populations stem from regions of the world that bear an increased burden of disease and are therefore disproportionately affected (i.e. hepatitis B, C; HPV) Migrants may have less access to, or less acceptance of, screening procedures (i.e. pap smears for detection of HPV)
Vector-borne diseases	Migrants may arrive infected; circulatory migration or visits to family in endemic regions increases exposure potential Migrants may act as intermediate hosts

Chronic disease

In addition to the focus on infectious disease, much has been written about chronic disease in migrant populations. The literature is mixed, with studies showing inconsistent findings within and across different migrant populations (Kandula et al., 2004, Singh and Miller, 2004).

The prevalence of chronic disease in foreign-born populations is often described relative to that of the general U.S.-born population (Prus et al., 2010, Borrell and Lancet, 2011). This comparison is problematic because migrant populations tend to be dissimilar to the general U.S.-born population. Relative to the U.S. population, international migrants are more likely to have low socioeconomic status (SES) and be uninsured, thus limiting health care access

(Derose et al., 2007, Ku and Matani, 2001). Researchers are beginning to recognize this, and have widely changed their research strategies. In addition, or in place of, comparing migrants to the general U.S. population, studies, largely considering chronic disease, are increasingly looking to compare migrants to those of similar ethnic background in their country of destination, as well as to those who remain in their country of origin. This holds greater validity in the search to understand the complex picture of migrant health in the U.S.

Considering migrant Gujaratis in the United Kingdom relative to non-migrant Gujaratis in India, Patel et al. (2006) suggest that, through migration, dietary acculturation occurs, which accounts for higher BMI, blood pressure and lipid concentrations rates in migrant Gujaratis relative to their peers at origin. Having considered biomarkers and dietary logs in both populations, Patel et al. (2006) point to contextual changes in dietary patterns as the culprit, citing a diet higher in fat as the main contributor to obesity in the migrant population in the U.K. Patel et al.'s (1995) study of migrant Indians from Punjab in the U.K. show similar findings. They note that migrant Indians living in the U.K. had higher rates of obesity, blood pressure levels and were more insulin resistant than their siblings living in Punjab, India (Patel et al., 1995). These studies provide stronger evidence than most that there may be some truth to the statement that migrant health may start to mirror that of the host population the longer migrants remain in their destination country. However, these studies do have small sample sizes (N=537 and N=364, respectively), and the length of time migrants have lived in the U.K. is absent from each study. Length of time is specifically important to consider as the literature suggests greater time at destination is associated with greater acculturation, especially among those with higher SES (Portes and Rumbaut, 1996). This analysis aims to correct this through a large emphasis on the temporal elements of the migration experience.

While time spent at destination is important in predicting migration health, whether or not time is positively or negatively associated with chronic health outcomes is not always clear. A study by Read et al. found no significant difference between the health outcomes of Arab migrants to the U.S. and white U.S.-born Americans (2005). Although this study uses measures of self-reported health, the dataset used in analysis is a nationally representative sample of the U.S. population, including information related to whether or not respondents were born in the U.S (Read et al., 2005). Time spent in the U.S. and citizenship status were both controlled for in the model, suggesting results worthy of note.

Further complicating estimates of chronic disease in migration populations in the U.S. are the rising obesity rates worldwide. Since 1980, global rates of obesity have more than doubled (WHO, 2011). This may lessen the effect size of migration on chronic disease associations. Chronic disease estimates, like all health estimates across foreign-born populations in the U.S., are complex and require detailed analysis of factors across the migration experience to determine the degree to which migration-related factors affect health.

Sexual Health

Evidence suggests that immigrant groups engage in sexual activity at similar rates to the general U.S. population (Blake et al., 2001). However, susceptibility to sexually transmitted infections (STIs) and unwanted pregnancy may be higher in migrant populations due to health systems access, cultural norms and higher burden of disease at origin (mostly related to HIV serostatus) (Kandula et al., 2004). Several studies note that migrant women from various regions of the world may be less likely to use condoms due to power inequities in their relationships with their sexual partner(s) (Shedlin et al., 2006, Bhattacharya, 2011, Jemmott et al., 1999). In their qualitative study, Shedlin et al. (2006) found that, among

foreign-born Latinas, participants said they were reluctant to discuss condom use with their partners, thus reflecting perceived power imbalances in relationships. Quantitative studies of Latino youth and beliefs on condom use suggest similar findings concerning power inequities (Norris and Ford, 1994).

In terms of sexual health outcomes as a function of access, much of the literature focuses on the experience of women in both voluntary and forced migration. Among migrant women, adverse health outcomes, sexual and otherwise, have been attributed to bureaucratic barriers to care, a lack of awareness of available services, linguistic barriers, and the disadvantaged social status of women (Carballo et al., 1996). This is an area of the literature where the migration journey is often cited, predominately for victims of smuggling/trafficking and the need for specific, appropriate care (Carballo et al., 1996, Gushulak and MacPherson, 2000). Although smuggling/trafficking is contextually very specific, the focus on the migration journey can be applied to the rest of the literature on migration and health to improve the degree of specificity currently lacking.

Injury, violence and occupational health

For both migrants and U.S.-born individuals, the highest rates of injury fall among males 15-24 years of age (Kandula et al., 2004). Studies looking at death certificate data from California suggest that immigrants and U.S.-born individuals have similar rates of death from unintentional injuries, but international migrants have a higher risk of homicidal death (Sorenson and Shen, 1996, Sorenson and Shen, 1999). When disaggregated by ethnicity, these studies showed that Black migrants had a lower risk of homicidal death relative to U.S.-born Blacks, but the opposite is true of Latino migrants relative to those born in the U.S. (Sorenson and Shen, 1996, Sorenson and Shen, 1999). The authors of these studies, however, fail to suggest possible reasons for the association, limiting their applicability.

In terms of occupational health, much of the literature suggests that immigrants, particularly Latino migrants, face disproportionate risk for occupation-related hazards due to their limited economic and political resources (Kandula et al., 2004). This is true for both agricultural and non-agricultural workers, although the literature is heavily focused on those working in agriculture (Pransky et al., 2002, Villarejo, 2003). Immigrants working as farm laborers tend to be largely of Mexican origin (Mehta et al., 2000). These migrants also tend to have limited education, and it is estimated that a third of this population is undocumented; factors which contribute to labor exploitation and, ultimately, risk of on-the-job injury through this lack of economic and political power (Mehta et al., 2000). For instance, farm work often means heavy pesticide exposure, which has been linked to serious acute and chronic health effects, including skin disorders, cognitive impairment and cancer (Villarejo, 2003). Without appropriate safety measures in place, and without the ability to negotiate on-the-job safety and fair wages, migrants face higher odds of adverse health outcomes. While the literature in this area of migrant health is relatively strong, the inclusion of the context of the migration journey would strengthen current evidence, as it would provide evidence of the broader range of factors that could contribute to exploitation, ultimately impacting how best a resolution may be devised.

Mental health

Measuring mental health among migrants in the U.S. has proven challenging, however, reviews of the literature suggest that relative to the U.S.-born population (both to the U.S. population in general and those ethnically similar to migrant groups), migrants show lower rates of mental illness (Kandula et al., 2004). For instance, a study by Burham et al. (1987) found that Mexican migrants have lower rates of lifetime mental illness relative to U.S.-born Mexican Americans, when controlling for multiple factors such as marital status, education level, and degree of acculturation. This study is relatively sound, however, the measure of

acculturation used here was one developed by the authors and is not widely used, therefore, it is difficult to compare Buhame et al.'s (1987) results to others. In addition, as noted previously, the general U.S. population may not be a suitable comparison group to understand the effect of migration on the prevalence of mental illness. Due to the context of exit, entry and the migration journey itself, migrants groups are often dissimilar to the U.S. born population as a whole. Lastly, these studies focus largely on voluntary migrants to the U.S.; other migrant populations show different results (Ringold et al., 2005). In general, the influence migration exerts over mental health remains unclear. Studies show conflicting results across different migrant groups, both by ethnicity and by migrant class (i.e. forced vs. voluntary migrants) (Pernice and Brook, 1996, Shen and Takeuchi, 2001, Gong et al., 2011). Reasons for discrepancies include differing sampling methods, study methodology, and measures of what constitutes migration and mental illness.

Within the international migrant population as whole, those fleeing from harm, such as refugee populations, have been found to be at higher risk of adverse mental health outcomes relative to those who have not, due to their exposure to trauma prior to migration (Ringold et al., 2005, Derose et al., 2007). Thus, attempts to measure the prevalence of posttraumatic stress disorder (PTSD) have been of major focus in these populations (Mollica et al., 2004). However, the reporting of Western defined syndromes of mental illness may be misleading given the lack of validation for such measures. In his ethnographic work, Watters describes how a diagnosis of PTSD is inappropriate in the Sri Lankan context as the criteria of "psychological avoidance" that helps define PTSD interferes with local coping mechanisms that had been effective in managing retaliatory violence (Watters, 2010). Thus, culturally appropriate conceptualization and measures of mental illness are

important in research with non-Western born populations towards appropriate treatment and care.

Data show that individuals from regions outside the Western hemisphere are more likely to display somatic symptoms as signals of psychological distress, such as experiences of pain, relative to those born within North America and parts of Europe (Hyman et al., 2006). The way individuals around the world conceptualize mental illness varies, but it seems that there exists a relatively similar group of symptoms that look like what the DSM-IV classifies as depression; it is the way people from different regions of the world talk about mental distress and the totality of symptoms that are difference – at its core, MNS disorders share common manifestations (WHO, 2001). For example, a sound qualitative study by Betancourt et al. (2009) among Acholi youth in northern Uganda found that local descriptions of mental illness share similarities with Western definitions of mood disorders, but also have culturally specific symptoms associated with mental distress. In addition to symptoms common to Western definitions of depression, such as loss in appetite, loss of sleep, and frequent crying spells, not greeting people is considered part of the lexicon for the mental illness locally referred to as 'kumu' (Betancourt et al., 2009). Therefore, existing scales that measure mental disorders must be validated for use within different population sub-groups to ascertain and contextualize mental illness definitions (Bolton et al., 2003). Many studies fail to perform this validity exercise, and therefore, such results should be interpreted with caution (Summerfield, 2008).

Consensus on the current understanding of migrant health in the United States is minimal. Based on available data, scholars have attempted to theorize about what causal mechanisms account for the associations between health and migration in their research. This has

generated a number of different theories that attempt to explain the relationship between migration and health.

The relationship between migration and health

There have been a number of theories developed to explain how migration shapes health. The healthy migrant hypothesis and the acculturation theory are the two most prominent. The healthy migrant theory postulates that migration is a selective process that ultimately selects people who are healthier than those with similar characteristics in their country of origin, as well as those born in their country of destination (Araído-Lanza et al., 1999). Researchers have suggested that this trend could be due to culturally-rooted health-promoting behaviors that migrants carry with them, such as nutritious dietary practices (Singh and Siahpush, 2002). It is also thought that findings demonstrating the superior health status of migrants could be related to structural factors, such as the strict health screening process migrants must pass through in order to migrate, for instance, to countries like Australia (Singh and Siahpush, 2002).

Acculturation theory, on the other hand, states that the longer individuals live in their country of destination, the more their health mirrors that of the host population (Singh and Siahpush, 2002). This is varies somewhat from theories of acculturation and mental health, which are explored here elsewhere. Many studies have sought to demonstrate the existence of each theory; results are mixed.

Some studies, such that by Fang et al. (1996) suggest some validity to the healthy migrant hypothesis, whereas others, like that of Abraído-Lanza et al. (1999), do not. Both studies have similar methodologies and scientific rigor, making it difficult to refute the evidence of either. The literature is more cohesive around the theory of acculturation, especially in the

areas of substance abuse, dietary habits and birth outcomes, however variations still exist (Lara et al., 2005). Lara et al.'s (2005) review of the literature suggests this is largely due to methodological rigor. The inconsistencies across the research spectrum, including how health and acculturation are measured, have left much unresolved in migration and health research. Others suggest that migration in and of itself has little impact on the health of individuals, but rather, it is the factors pre- and post-migration that exacerbate and/or minimize health risks (Castaneda et al., 2011). While such a statement wrongly suggests researchers who attempt to validate the healthy migrant or acculturation theory discount the factors pre- and post-migration, this statement puts in focus the necessity of considering a multitude of factors to understand the relationship between migration and health. Considering the context of exit and entry, plus a consideration for the migration journey, absent in all accounts, will promote an analysis of the migration experience in its entirety, achieving a clearer picture of the relationship between migration and health.

Pre-migration factors considered in the literature mostly surround the circumstances under which refugees and asylees flee their country of residence (Porter and Haslam, 2005). Factors promoting exit include: protracted or acute unrest, experience of harm, discrimination, and low socioeconomic status (Kandula et al., 2004). Experiences such as these are associated with mental illness as they can cause individuals to feel multiple manifestations of mental distress, for instance, trauma, alienation, marginalization and hopelessness, which when exacerbated, can result in adverse mental health outcomes (Gilbert and Allan, 1998).

The literature on the relationship between the circumstances under which migrants live post-migration and migrant health is varied across different migrant groups. Of great focus

in the U.S. is the lack of ability in different migrant groups to access health care due to a lack in availability of health insurance. Research cohesively suggests that the majority of immigrants are minimally able to access and utilize preventive health care in the U.S. (Carrasquillo et al., 2000, Frisbie et al., 2001). Linked to low socioeconomic status, this is often cited as a catalyst for poor health outcomes in migrant groups as an inability to monitor health and/or treat illness can negatively impact overall health status (Castaneda et al., 2011). Immigrants are twice as likely to be uninsured relative to the general U.S. population (Carrasquillo et al., 2000). Based on this, and other factors, such as language barriers and a lack of awareness of available services, migrants often find themselves marginalized from health care access, thought to ultimately affect health status (Carrasquillo et al., 2000, Derose et al., 2007).

Here again, the literature concentrating on the context of exit and entry consistently falls short in its analysis of all factors related to migration and health. Fewer studies consider the migration experience as a whole, including a concern for how the factors associated with the migration journey itself may or may not affect health. What is available often considers the journey of those who are smuggled/trafficked (Grove and Zwi, 2006, Gushulak and MacPherson, 2000). The study of such events, however, is inherently difficult to consider due to the esoteric nature of the practice, and does not reflect the majority of migratory movements.

The realities associated with the actual movement of people from one place to another, possibly with stops elsewhere in between, have been ignored by migration theorists and subsequently in the migration and health literature. This is likely due to a lack of available data; comprehensive migration data is notoriously sparse (Kandula et al., 2004). Although,

analysis of the journey is not absent completely, some studies have considered the effect of age at first migration on health. Most studies show that, for those initiating migration at the age of twelve and under, these individuals report higher levels of depression in adulthood relative to those who migration later in life for the first time (Mossakowski, 2007, Alegria et al., 2007). This was true even when gender, socioeconomic and marital status were controlled (Mossakowski, 2007). Mossakowski's (2007) study is particularly compelling based on its large sample size (N=2129), randomized design and culturally validated scale for measures of depression. The association between younger age at migration and higher incidence of mental illness is thought to be due to a lack of agency in the decision to migrate among younger individuals and the disruptive nature of migration, the impact of which can cause distress at such a critical point in an individual's cognitive development (Gong et al., 2011, Mossakowski, 2007)

Speculations in the literature have been made to suggest that individuals who experience separation from family members through the migration process may experience adverse health outcomes, but no formal findings have been documented (Bhugra, 2004). Substantive research shows, however, that the dissolution of social support networks is associated with psychosocial distress as it represents the loss of support structures as a coping mechanism (Cochrane, 1983). Thus, it is likely that familial separation through migration may have a negative effect on individual mental health.

From the literature, the nature of the relationship between health and migration is heavily nuanced. Through the consideration of the migration experience as a whole, this analysis seeks to contribute to the literature by providing evidence of the relationship between factors across the international migration journey and experience of mental distress and

depression among new legal permanent residents in the U.S. In this search to provide a more comprehensive picture of migrant mental health in the U.S., the acculturation experience must also be considered as a final piece in the puzzle.

Acculturation and mental health among international migrants

There exists no formal definition of acculturation in migration theory. Generally, theorists rely on the definition put forth by Redfield et al. (1936), that acculturation refers to "those phenomena which result when groups of individuals having different cultures come into continuous first-hand contact with subsequent changes in the original culture patterns of either or both groups". Acculturation is considered to be a dynamic process that changes over time, and not necessarily in a linear way, and one that occurs across multiple planes, visible in psychological and behavioral ways, among others (Padilla and Perez, 2003). Acculturation does not necessarily mean that migrants give up their cultural heritage for another, rather it is a process that attempts to weave together different cultural viewpoints, which can result, as Berry (1980) suggests, in acculturated integration, separation, assimilation or marginalization.

What most theorists acknowledge but fail to take into consideration in their research is the totality of the migration experience – the factors present pre-migration, through the migration journey, and once migrants have arrived in their country of destination (post-migration). Portes and Rumbart (1996) rightly talk of migration as an inherently subjective experience, an experience that looks dramatically different from one individual to the next. This quality makes the study of migration, across populations, incredibly difficult. However, based on what is known about mental health and migration individually, the causal mechanisms that explain the associations between the two can be hypothesized.

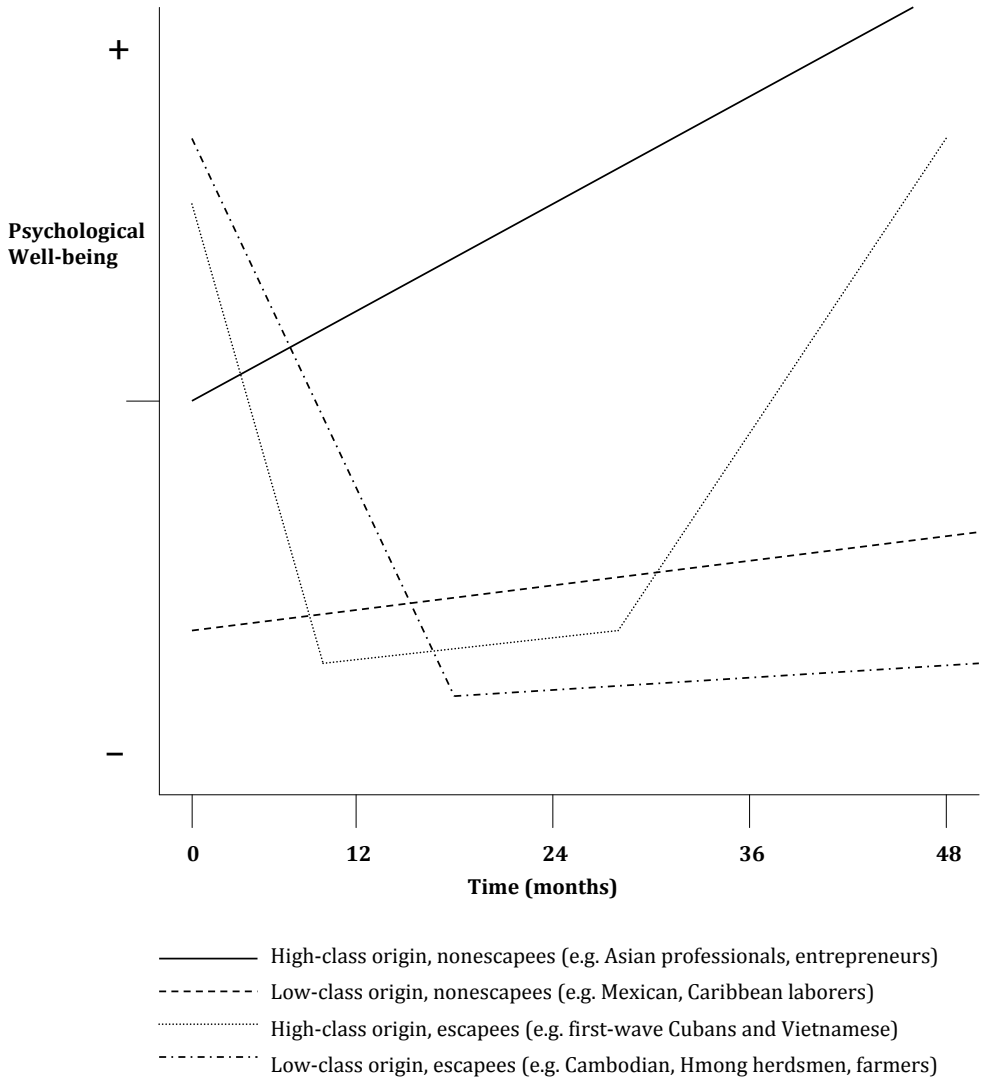
The community surveys undertaken in the U.S. in the 1950s by Hollingshead and Redlich (1958) demonstrated the link between mental health and various contextual factors. These studies provided evidence that: low socioeconomic status is linked to mental distress; women report more distress than men; unmarried individuals report more distress than those who are married; and lastly, that the greater number of undesirable life events an individual faces, the greater the mental distress experienced (Hollingshead and Redlich, 1958). Portes and Rumbart (1996) suggest that this can be understood through the lens of powerlessness and alienation – cornerstones of mental health research post-WWII. Based on one's disadvantaged social position, the inability to reach life goals and the powerlessness to control or affect these events can cause individuals to experience great distress, ultimately leading to adverse mental health outcomes (Portes and Rumbaut, 1996). Portes and Rumbart (1996) make note that, while these community surveys did not focus on immigrants, the connection to migration is obvious – the marginalized position of immigrants in the U.S. is one often characterized by powerlessness and alienation. Like other subordinate groups in society, such as women, one would expect to see migrants exhibit greater rates of mental illness because of this disadvantaged position (Portes and Rumbaut, 1996).

What Portes and Rumbart (1996) suggest is that, added to the background characteristics of individual migrants, consideration for a migrant's acculturation experience and the receptivity of host society is a must in establishing an understanding of migration and mental health. As Srolo et al.'s (1962) Midtown Manhattan Project in late 1950s New York City suggests, one must take into consideration the social distance migrants travel to acculturate, that is, the degree to which migrants may or may not be socially and culturally similar to the dominant population in their country of destination, and therefore the degree

to which adaptation is necessary. For instance, in their work, Srolo et al. (1962) found that for immigrants of urban origin, with more education, and of moderate socioeconomic status, the social distance to travel was less, and thus, cultural adaptation was easier. That is to say for those with greater social distances to travel, a greater sense of powerlessness and alienation was present, and with it symptoms of depression (Portes and Rumbaut, 1996). Padilla and Perez (2003) add one more important element to this, especially in the context of increasing anti-immigration sentiments across the U.S., the degree to which individuals physically look like mainstream Americans. The more migrants look, talk and act like mainstream Americans, the easier it is to acculturate, and the less likely individuals are to experience mental distress as a result of alienation and marginalization (Padilla and Perez, 2003).

In addition to associations of demographics and mental health, and the impact of social distance, one must take into consideration the context of exit and the context of entry, as Portes and Rumbart (1996) suggest. The more stressful and traumatic the context of exit and entry, the greater the risk of adverse mental health outcomes seen at destination (Portes and Rumbaut, 1996). Based their work and that of others, Portes and Rumbart (1996) puts forward their conceptualization of migrant mental health over time in the U.S., by the context of entry and exit, visible in Figure 8.

Figure 8: Migrant mental health over time in the U.S., by migrant class



For 'regular' migrants, those who have, in theory, migrated voluntarily, the expected relationship between migration and mental health is positive and linear over time, where migrants with greater socioeconomic status make a more rapid psychological adjustment to living in the U.S. relative to those with low SES (Portes and Rumbaut, 1996). For those having experienced forced migration or fleeing harm, such as refugees, their mental health pattern is expected to be more curvilinear over time. The traumatic experiences pre-migration result in high levels of mental distress initially, but fade over time in the U.S.,

giving way to a focus on the circumstances present in their new environment (Portes and Rumbaut, 1996). The second year shows resurgence in depressive symptoms, in what Portes and Rumbart (1996) call the "exile shock," but then psychological stress seems to minimize again over time at destination. SES again mediates this relationship: those with greater resources, or higher SES, see more rapid declines in their psychological distress over time relative to those who do not (Portes and Rumbaut, 1996). The assumption for this model, however, is that migrants enter the U.S. with valid documentation, which limits direct applicably to the entire migrant population in the U.S.

Despite their recognition that mental health looks different for different groups of migrant over time, what Portes and Rumbart's (1996) framework lacks is a consideration of what happens to individuals during their migration journey – the circumstances under which individuals travel to their place of destination, a journey Jasso et al. (2005) would argue, ends with the acquisition of certain rights and securities in the country of destination, in the context of the U.S., this means gaining legal permanent residence. This analysis seeks to extend Portes and Rumbart's (1996) conceptual framework by making note of the factors that influence mental health outcomes through the migration process in its entirety, up to and including the time migrants achieve legal permanent residency in the U.S.

While researchers grasp the subjective experience of migration, all aspects of the migration experience are not often considered in analysis. Where people come from, where they have traveled to, what the journey looked like to get there, what happened when they arrived and how different they are from the host culture, as well as the strategies migrants employ to manage this transition, all make up the complexities of migration. Here, the focus is on the migration journey. Few studies look at the circumstances through which people travel

from their place of origin to their ultimate destination. Migration for many is not a linear process, but a complex series of moves and reorientations; circumstances that, it is theorized, have an effect on migrant mental health outcomes. Using nationally representative data on new legal permanent residents to the U.S., this analysis considers events that occur through the migration journey, while controlling for backgrounds characteristics, and the characteristics of entry and exit, to provide a more complete picture of migrant mental health.

CHAPTER 3: METHODS

The New Immigrant Survey (NIS)

The data for this analysis comes from the New Immigrant Survey (NIS), a nationally representative longitudinal series of studies that aim to collect data on newly admitted legal permanent residents to the United States (Jasso et al., 2006). The NIS was piloted in 1996 and the first full cohort was sampled from June 2003-2004, known as NIS-2003-1 (NIS, 2006). The NIS is a collaborative research project among four main institutions: the RAND Corporation, Princeton University, New York University, and Yale University (NIS, 2006).

Due to a number of factors, relatively little is known about the experience of different groups of non-citizens in the U.S. Only data related to country of last residence and visa status are commonly available (Kandula et al., 2004). The NIS seeks to fill this knowledge gap through the provision of data on the demographic characteristics; migration histories; health status, behaviors and practices; economic profile; family life; and living conditions of new legal permanent residents in the U.S (NIS, 2006).

The NIS is supported by the following organizations: the National Institutes of Health (NIH)/ National Institute of Child Health and Human Development (NICHD)/ National Institute on Aging (NIA)/Office of Behavioral, Social Science Research (OBSSR), the National Science Foundation (NSF), the U.S. Immigration and Naturalization Service (now the U.S. Citizenship and Immigration Services), the Office of the Assistant Secretary for Planning and Evaluation (ASPE) and the Pew Charitable Trusts (NIS, 2006).

Study population

The NIS-2003-1 consists of an adult and child sample. The adult sample is composed of newly arrived and 'adjustee' immigrants. Newly arrived immigrants are defined as those individuals who had acquired immigration documentation abroad prior to their arrival in the U.S., whereas adjustee immigrants are considered to be those individuals already living in the U.S. with a temporary non-immigration visa or who were in the country irregularly and eventually acquired lawful permanent residence (NIS, 2006). Immigrants eighteen years of age or older at the time of admission to the Lawful Permanent Residence program in the U.S. between May-November 2003 were eligible for inclusion in the adult sample of the NIS-2003-1 (NIS, 2006).

Sampling frame

Participants eligible for inclusion in the study were identified through electronic administrative records on new immigrants to the U.S. collected by the U.S. government (through the former U.S. Immigration and Naturalization Service (INS), now the U.S. Citizenship and Immigration Service (USCIS)) (NIS, 2006). The NIS-2003-1 sampled adults who had acquired legal permanent residency in the U.S. between May-November 2003.

Data collection

The NIS-2003-1 was conducted between June 2003 and June 2004 (NIS, 2006). Adult participants were divided into three paths for analysis through the process of data collection – 'main immigrant,' 'overseas' and 'spouse' (NIS, 2006). Participants were asked a series of questionnaires throughout the study period. Table 2 presents information on questionnaire content for the adult 'main immigrant' and 'overseas' sample. Participants in this analysis include adults identified in the NIS-2003-1 paths 'main immigrant' and 'overseas' for a total sample size of 8573.

Table 2: Content of NIS-2003-1 survey questionnaires asked of 'main immigrant' and 'overseas' participants within the adult sample (NIS, 2006)

Section code	Section	Section content
Section A (NIS03-A)	Demographics	Age; education; migration history; marital history; military history; fertility history; language skills
Section B (NIS03-B)	Pre-immigration experiences	Childhood history and living conditions; employment history in the U.S. and in foreign countries
Section C (NIS03-C) (NIS03-Cppp)	Employment	Current work status; sources of income, including wages, pensions, and government subsidies. All non-response to amount questions was followed by random assignments to reduce non-response.
Section D (NIS03-D)	Health	Self-reports of health conditions; symptoms; functioning status; hygienic behaviors (e.g., smoking and drinking history)
Section E (NIS03-E)	Health and life insurance	Use, source and costs of health and life insurance
Section F (NIS03-F)	Health care utilization and daily activities	Use, source and cost of health care services; functioning status
Section G (NIS03-G)	Income	Amounts of income, including wages, pensions, and government subsidies. All non-response to amount questions was followed by random assignments to reduce non-response.
Section H (NIS03-H)	Assets	Type, value of assets and debts. All non-response to amount questions was followed by random assignments to reduce non-response.
Section I (NIS03-I)	Transfers	Financial assistance given, received by and/or from respondent
Section J (NIS03-J)	Social variables	Linguistic history and current practice; social participation; religion; immigration process
Section K (NIS03-K)	Migration history	When, where and for how long each migration took place; possession of documentation

The majority of interviews (60%) were conducted by telephone; the remainders were done in person (NIS, 2006). Survey instruments were translated into seven languages: Chinese, Korean, Polish, Russian, Spanish, Tagalog and Vietnamese (NIS, 2006). Interviews were conducted in the respondent's language of choice. The response rate for the NIS-2003-1 was 68.6% (NIS, 2006). Table 3 describes the NIS-2003-1 sampling outcome.

Table 3: Description of the NIS-2003-1 sampling outcome (NIS, 2006)		
	Sample	
	Adult	Child
Sampling frame	12,500	1,250
Completed interviews	8,573	810
Response rate	68.6%	64.8%

Data analysis

Select datasets from the NIS-2003-1 are publically available from the NIS website (Jasso et al., 2006). To download the data, users must register with the Office of Population Research (OPR) Data Archive at Princeton University. Codebooks and questionnaires for the NIS-2003-1 are also publically available on the NIS website. For this analysis, the adult sample of the NIS-2003-1 was downloaded in the STATA format on November 1, 2011. STATA 12 (StataCorp. 2011. Stata Statistical Software: Release 12. College Station, TX: StataCorp LP) was used for analysis.

Data cleaning

Twenty-six separate datasets make up the NIS-2003-1. The datasets on demographics (NIS03-A), pre-immigration experiences (NIS03-B), employment (NIS03-C, NIS03-Cppp), health (NIS03-D), transfers (NIS03-I), social variables (NIS03-J) and migration history (NIS03-K) were used. Downloaded in their original form, these datasets merged together exceed the maximum variable capacity in the version of STATA available to students within the Rollins School of Public Health. Therefore, the questionnaires and codebooks corresponding to each of the datasets in question were reviewed, and the variables of possible interest identified. All other variables were dropped, creating a new, trimmed version of each dataset for eventual merge.

Once each dataset had been trimmed, using the unique participant identification number, all datasets were merged together to create the final dataset within which new variables were created for descriptive, bivariate and multivariate analysis.

Outcome variables

The outcome variables in this analysis consider the mental health status of migrants in this sample of new legal permanent residents in the U.S. Report of sadness lasting at least two weeks is the primary indicator of a depressive episode as cited in the ICD-10 Classification of Mental and Behavioural Disorders (WHO, 1992). It is used here in two forms, firstly as a marker of mental distress in general, and also as a marker of visa stress.

The third outcome, the depressive symptoms index, measures the number of symptoms participants in the sample report related to depressive disorders, as outlined in the ICD-10 Classification of Mental and Behavioural Disorders (WHO, 1992). This includes report of pain, a somatic symptom often reported by individuals from low- to middle-income countries (Hyman et al., 2006). Since the sample of migrants in the NIS includes individuals from low- and middle-income countries, the measure was used here.

The health questionnaire (NIS03-D) of the NIS-2003-1 asks a series of questions around mental health. It is unclear from NIS reports how these questions were developed, but they resemble questions used in the Beck Depression Inventory (Beck et al., 1996), and the Hopkins Symptoms Checklist-25 (Mattsson; et al., 1969) to measure depression.

The same sample was used for analysis across all outcomes: (1) sadness lasting two consecutive weeks or more in the last twelve months, (2) sadness related to the prospect of becoming a permanent resident lasting two weeks or more in the last twelve months and,

(3) depressive symptoms index. The sample includes all participants within the adult main immigrants and adult overseas paths from the NIS-2003-1, making the final sample size 8573. This means data gathered from both the spouse and child proxy paths were not used in this analysis.

Variable creation

Individuals surveyed in the NIS-2003-1 were able to answer 'don't know,' or 'refused' to any question, should they choose. For all binary variables newly created for this analysis, answers of 'don't know,' 'refused' and missing observations in the original datasets were recoded as an answer of 'no'; only in instances where respondents answered 'yes' to a question in the original dataset were they coded as a 'yes' in the new variable created. Unless otherwise stated, this method can be assumed for all newly created binary variables – both independent and outcome variables. This was done for sample size considerations. The exact mechanism through which categorical variables were created is explained for each individual case.

Demographic and control variables

Age group

Variable a7 from the NIS03-A asks "In what year were you born?" The variable 'age' was created from variable a7 from the trimmed NIS03-A dataset. To create the variable 'age,' the year each respondent was born was subtracted from 2003 to determine at what age each respondent became a L.P.R. These data from 'age' were then grouped into another variable, called 'agegroup'. Age was categorized into six groups: 19 years of age and under, 20-29 years of age, 30-39 years of age, 40-49 years of age, 50-59 years of age, and 60 years of age and older.

Gender

Variable a6 from the NIS03-A asks "I need to ask these questions of everyone, are you male or female?" The variable a6 from the trimmed NIS03-A dataset was recoded into this new binary variable, 'gender' to indicate whether a respondent identified as male or female.

Marital status

Variable a52 from the NIS03-A asks respondents about their current marital status. The variable a52 from the trimmed NIS03-A dataset was recoded into this new categorical variable, 'married' to indicate a respondent's marital status. 'Married' has three possible classifications: married, single, or separated/widowed/divorced. The original variable, a52, has six categories. The categories married; and living together in a marriage-like relationship but not married from a52 were grouped together in the new variable as individuals who are 'married'. It was assumed that even without the legal pronouncement of marriage, individuals living together in a marriage-like relationship would we characteristically similar to those legally wedded. Those that indicated that they were separated, divorced, or widowed were grouped together in the new variable as separated/widowed/divorced, again with the assumption that these individuals were similar in character to one another. The remaining categories of responses in a52, never married, not living with someone in a marriage-like relationship, were categorized as 'single' in the new variable. Missing observations from a52 were set to missing in the new variable as well.

Current employment status

Variable c1 from the NIS03-C asks "Are you working now, temporarily laid off, unemployed and looking for work, disabled and unable to work, retired, a homemaker, or what?" The variables c1 and c1a from the trimmed NIS03-C dataset were recoded into this new binary

variable, 'employed,' indicating whether or not a respondent is currently employed. Variable c1 has seven categories, which includes a response of 'other'. The variable c1a provides additional information about a respondent's current employment status where respondents answered 'other' to question c1. Variable c1a has fifteen categories, one of which is working now; none of the other categories for c1a denotes current employment.

Those who indicated that they were: unemployed and looking for work; temporarily laid off, on sick or other leave; disabled; retired; homemaker; or where observations were missing in c1, these data were classified as currently unemployed under the new variable 'employed'. Only those that indicated that there were working now in variables c1 and c1a were classified as currently employed in the new variable.

Income

Individuals in the NIS-2003-1 were randomized to answer the income questionnaire. Variable c48 from the NIS03-C asks "Before taxes and other deductions, how much is your salary?" The variable c48_1ppp from the trimmed NIS03-Cppp dataset was recoded into this new binary variable, 'income' indicating whether a respondent had an annual income of less than or equal to 20 000 USD or if they had an annual income greater than 20 000 USD. The NIS03-Cppp is a separate file from the NIS03-C dataset on employment. The NIS03-Cppp contains information from the NIS03-C that had been collected in different currencies, and which was subsequently converted to United States Dollars using purchasing power parity over consumption (NIS, 2006). Not all original data were converted due to a lack of information (NIS, 2006), and coupled with the reduced sample size as a result of module randomization in data collection, there was a need to create 'income' as a dummy variable to provide adequate power for modeling purposes. Missing observations from c48_1ppp were coded as missing in the new variable as well. Data were split at 20 000 USD per year

based on classifications of poverty by income in the United States. The U.S. Department of Human Services 2011 Poverty Guidelines list an annual income of roughly 20 000 USD for a family of three within the 48 Contiguous States and D.C. as falling below the poverty threshold (DHS, 2011). The average household size for this sample is three individuals, hence the use of 20 000 USD as a cutoff.

Region of origin

Variable k1mo from the NIS03-K asks "in what country were you born?" The variable k1mo from the trimmed NIS03-K dataset was recoded into this new categorical variable, 'region' to indicate in what region of the world each respondent was born. Variable k1mo has a total of thirty recorded categories of response, which included specific countries or regions of the world. The new variable, 'region,' has five categories. Those who indicated that they were born in: Poland, Russia, Ukraine, the United Kingdom, the Arctic Region or Europe and Central Asia in k1mo were classified as from 'Europe and Central Asia,' in the new variable. Those who indicated that they were born in: China, Korea, the Philippines, Vietnam, India or Oceania in k1mo were classified as from 'East Asia, South Asia and the Pacific' under the new variable. Those who indicated that they were born in: Canada, the United States, El Salvador, Guatemala, Mexico, Colombia, Peru, Cuba, the Dominican Republic, Haiti, Jamaica, Other North America or Latin America and the Caribbean in k1mo were classified as from the 'Americas' under the new variable. Those who indicated that they were born in: Ethiopia, Nigeria or sub-Saharan Africa in k1mo were classified as from 'sub-Saharan Africa' under the new variable. Those who indicated that they were born in: the Middle East or North Africa in k1mo were classified as from the 'Middle East and North Africa' under the new variable.

Religion

Variable j30_1 from the NIS03-J asks "What religious tradition, if any, describes your current religion?" Respondents could mention more than one religious tradition (a second mention would be recorded under variable j30_2), but for simplicity purposes, and since the vast majority of respondents only mentioned one religious tradition, the first religious tradition mentioned was taken to be the respondent's primary religion.

The variable j30_1 from the trimmed NIS03-J dataset was recoded into this new categorical variable, 'religion' to indicate to which religious tradition, if any, respondents ascribed. Variable j30_1 includes a total of nine categories. The new variable, 'religion,' has seven categories. Individuals who classified themselves as Catholic, Orthodox Christian, Protestant, Muslim, Hindu, or no religion in j30_1, remained in these categories in the newly created 'religion' variable. Based on the sample size of the other categories, those who identified as Buddhist or Jewish were grouped together with those who denoted they belonged to another religion tradition different from the others mentioned.

History of mental illness

Variable d50 from the NIS03-D asks "Have you ever had or has a doctor ever told you that you have emotional, nervous, or psychiatric problems?" The variable d50 from the trimmed NIS03-D dataset was recoded into this new binary variable, 'precondition,' to indicate whether or not a respondent has a history of emotional, nervous or psychiatric problems.

History of chronic health condition

If respondents answered 'yes' to having any chronic condition listed on the health questionnaire, they were coded as a 'yes' in this newly created binary variable. Data were taken from variables d4, d8, d13, d19, d24, d55, and d59 from the trimmed NIS03-D dataset.

These variables correspond to a physician diagnosis of: high blood pressure or hypertension (d4), diabetes or high blood sugar (d8), cancer or other malignant tumor, excluding minor skin cancers (d13), chronic lung disease, such as bronchitis or emphysema (d19), heart attack, coronary heart disease, angina, congestive heart failure or other heart problems (d24), arthritis or rheumatism (d55), and/or asthma (d59). Each listed variable was recoded individually as a new binary variable (called: 'bp,' 'diabetes,' 'cancer,' 'lung,' 'heart,' 'arthritis,' and 'asthma,' respectively), at which point they were subsequently combined to indicate whether or not a respondent reported ever having any chronic health condition, forming the variable 'chronic'.

Episode of binge drinking

Variable d83 from the NIS03-D asks "In the last three months, on how many days have you had four or more drinks on one occasion?" The variable d83 from the trimmed NIS03-D dataset was recoded into this new binary variable, 'bingedrink,' to indicate whether or not a respondent had had at least one episode of binge drinking in the last three months. Although there is no agreement on what constitutes binge drinking, the CDC (2011) cites any more than one drink for women and two drinks for men in a day as exceeding moderate alcohol intake, therefore this label was thought to be appropriate. The range for d83 was 0-90 days. Responses of 'zero,' 'don't know,' and 'refused' were coded as 'no'; any instance indicating the consumption of four or more drinks on one or more occasions was coded as an affirmative response in the new variable.

Current smoker

Variable d75 from the NIS03-D asks "do you smoke cigarettes now?" The variable d75 from the trimmed NIS03-D dataset was recoded into this new binary variable, 'smoke,' to indicate whether or not a respondent currently smokes cigarettes.

Years of education

Variable a20 from the NIS03-A asks "How many years of schooling in total have you completed?" The variable a20 from the trimmed NIS03-A dataset was recoded into this new continuous variable, 'education'. The range for a20 is 0-86 years of education. In 'education,' total years of schooling was capped at 18; in the event that a respondent indicated they had had more than 18 years of schooling, they were coded as having 18 years of education in the 'education' variable. A cap on years of schooling at 18 years was done based on calculations used in the Human Development Index (HDI, 2011).

Pre-migration variables

Number of short visits to the United States

Variable k22 from the NIS03-K asks "How many times have you come to the United States for less than 60 days?" The variable k22 from the trimmed NIS03-K dataset was recoded into this new ordinal variable, 'USshort'. The range for k22 is 0-999. From k22, data were classified into four groups under 'USshort': one, two, three, or four or more short visits to the United States.

Experience of harm outside the United States

Variable k27 from the NIS03-K asks "Did you or your immediate family ever suffer any harm outside of the United States because of your political or religious beliefs, or your race, ethnicity or gender?" The variable k27 from the trimmed NIS03-K dataset was recoded into this new binary variable, 'harm,' to denote whether or not a respondent reported an experience of harm outside the U.S.

Harm index

In the migration history questionnaire (NIS03-K), respondents were asked about specific experiences of harm that they or their immediate family members had had outside of the U.S. If respondents answered 'yes' to having experienced any form of harm, they were coded as an event for this newly created index variable, 'harmindex'. This index variable is cumulative; any affirmative response to a harm-specific question was tabulated as a score of one, with a possible total score of four or more events (the questionnaire asks about seven different kinds of experiences). Data were taken from variables k28-k34 from the trimmed NIS03-K dataset. These variables correspond to events of: incarceration (k28), physical punishment by public officials (k29), physical punishment by others (k30), confiscation of property (k31), loss of job (k32), property damage (k33), and verbal or written threats (k34). All listed variables were recoded individually as new binary variables (called: jail, punish, punishother, confiscate, jobloss, property, and threat, respectively), at which point they were subsequently combined to indicate how many experiences of harm, if any, a respondent reported.

Migration variables

Age first left country of origin

Variable k4 from the NIS03-A asks "In what year did you leave [COUNTRY] to live in another country for at least 60 days?" Respondents were asked to list each migration they had had of 60 days or more. Variable k4_1 represents the first migration experienced by the respondent, taking to represent the age at which a respondent first left their country of origin. The continuous variable 'ageleft' was created from the variable k4_1 from the trimmed NIS03-K dataset. To create the 'ageleft' variable, the year each respondent was

born (a7) was subtracted from the year they first left their country of origin (k4_1) to determine at what age each respondent had first left their country of birth.

Years elapsed since first migration to receipt of permanent residency in the United States

Variable k4 from the NIS03-A asks "In what year did you leave [COUNTRY] to live in another country for at least 60 days?" Respondents were asked to list each migration they had had of 60 days of more. Variable k4_1 represents the first migration experienced by the respondent, taken to represent the time at which respondents first left their country of origin. The continuous variable 'timelap' was created from the variable k4_1 from the trimmed NIS03-K dataset. To create the 'timelap' variable, the year each respondent became a permanent resident (2003) was subtracted from the year they first left their country of origin (k4_1) to determine the number of years each respondent had been in migration between their place of origin and destination.

Absolute number of migrations

Variable k4 from the NIS03-K asks "In what year did you leave [COUNTRY] to live in another country for at least 60 days?" Respondents were asked to list each migration they had had of 60 days or more. Respondents reported between 1-17 migrations. Each migration is listed as a separate variable in the dataset (k4_1-k4_17). The variables k4_1-k4_17 from the trimmed NIS03-K dataset were recoded into this new ordinal variable, 'migindex'.

If respondents reported a migration event; i.e. they had data for a specific k4_x variable, this affirmative responsive was coded with a score of one in a new variable (i.e. k4_1test, k4_2test, etc.); a non-migration event was coded as zero. An index, 'migindex,' was then created to calculate the number of absolute migrations each respondent undertook from

their first migration (leaving their country of origin) until the time of data collection. The categories for 'migindex,' an ordinal variable, are one, two, three, or four or more migration events lasting 60 days or more.

Absolute number of moves in the United States since last entry

Variable k23 from the NIS03-K asks "Since you last came to live in the United States, how many addresses have you had in the United States?" The variable k23 from the trimmed NIS03-K dataset was recoded into this new ordinal variable, 'USmoves'. The range for k23 is 0-100. From k23, data were classified into five groups under 'USmoves': zero, one, two, three, four or more moves in the U.S. since last entry.

Time elapsed since first applied for and gained legal permanent residency in the United States

Variable j155 from the NIS03-J asks "In what year did you or a sponsor file the first application to start the process?" The variable j155 from the trimmed NIS03-J dataset was recoded into this new ordinal variable, 'appgroup' through a number of steps. The range for j155 is from the year 1947 to 2003. First, a variable called 'application' was created: the year each respondent first started the permanent resident application process (j155) was subtracted from 2003 to determine the length of time elapsed since an application was first completed to the time each respondent received their permanent residency status. These data from 'application' were then grouped into another new variable, called 'appgroup'. Years elapsed were categorized into four groups to form 'appgroup': 0-2 years, 3-5 years, 6-9 years, and 10 years or more since time of first application.

Possession of visa or other type of documentation for valid entry into the United States

For each migration to the U.S. of 60 days or more, respondents were asked about their possession of valid documentation for entry to the country. The variables k10_1-k10_17

from the trimmed NIS03-K dataset were used to create the binary variable 'doc'. If respondents answered 'yes' to having had valid documentation to enter the U.S. each time they made a migration to the U.S. for 60 days or more, they were coded as 'yes' under the new variable 'doc,' otherwise they were coded as 'no'.

Partner reunification

The variable 'expectparnter' was created through the use of variables a140_1 and a15_xx from the NIS03-A dataset. Variable a140_1 asks "Do you expect your [husband/wife] to join you in your household?" while variable a15_xx asks respondents to describe the relationship of each person currently living in their household. 'Expectpartner' is a categorical variable with three categories: lives with partner now, yes, and no, hence the use of a15_xx and a140_1 from NIS03-A.

The variable a140_1 from the trimmed NIS03-A dataset was recoded into a new binary variable, 'expect'. The variable a15_xx lists every relationship a respondent has to those individuals within their current household; only responses that indicate a current partner currently living with a respondent were included in the creation of the new binary variable, 'livesparnter,' to denote whether or not a respondent currently lives with their current partner or if a respondent is single. The following responses were recoded from a15_xx to 'livespartner' to denote the presence of one's partner within the respondent's current household: husband, wife, or unmarried partner. These two new variables, 'expect' and 'livespartner,' were then recoded into a new categorical variable, 'expectpartner' to denote whether a respondent was currently living with their partner, expected their partner to join their household or did not expect their partner to join their current household.

Duration of residence in the United States prior to receipt of permanent residency

The creation of this new variable, called 'yrsus' was done using variables k6_xxmo and k4_xx from the NIS03-K trimmed dataset. In the NIS03-K questionnaire, variable k4_xx asks "In what year did you leave [COUNTRY] to live in another country for at least 60 days?", while k6_xxmo corresponds to the country to which the respondent moved.

First, the data from k6_xxmo were analyzed to see when respondents moved to the United States. For respondents who had migrated to the United States multiple times, the first migration to the U.S. was taken. Then, using k4_xx, migrations to the U.S. were matched with the corresponding year. This new variable was called 'US'. The year of migration to the U.S was then subtracted from 2003 to form the variable 'yrsus' to indicate the number of years each respondent had spent in the U.S. prior to their receipt of legal permanent residency.

Post-migration variables

Current number of individual living in the household

Variable a11 from the NIS03-A asks "Including yourself, how many people are currently living in your household?" The variable a11 from the trimmed NIS03-A dataset was recoded into this new ordinal variable, 'numHH'. The range for a11 is 1-19. From a11, data were classified into four groups under 'numHH': one, two, three, or four or more people currently living in a respondent's household.

Spoken English fluency

Variable j14 from the NIS03-J asks "How well would you say you speak English?" The variable j14 from the trimmed NIS03-J dataset was recoded into this new ordinal variable, 'speak'. 'Speak' has the same four levels as j14: very well, well, not well, and not at all and

were recoded as such under the new variable 'speak'. Responses of 'refused,' 'don't know,' and missing observations from j14 were set to missing in 'speak' as well.

Enrolled in an English class in the last 12 months

Variable j28 from the NIS03-J asks "Have you attended classes to learn or improve your English in the last twelve months?" The variable j28 from the trimmed NIS03-J dataset was recoded into this new binary variable, 'english12M,' to denote whether or not a respondent had enrolled in a class to improve their English in the last twelve months.

Reads newspaper or magazine in native language

The variable 'read' was created through the use of variables j21 and j1 from the NIS03-J dataset. Variable j21 asks "Now that you are a permanent resident alien, please tell me how often you read a newspaper or magazine in your native language?" while variable j1 asks "Have you ever spoken any language other than English?" 'Read' is a categorical variable with four categories: never, sometimes, frequently, native English speaker.

The variable j1 from the trimmed NIS03-J dataset was recoded into a new binary variable, 'otherlang'. For the variable j21, responses of: every day, a few times a week, and once a week were recoded as frequently; responses of: less than once a week were recoded as sometimes and; responses of: never were recoded as never under 'read'. The negative responses from 'otherlang,' indicating that a respondent had never spoken any language other than English, were then added to 'read' to indicate which respondents were native English speakers.

Watches television in native language each week

The variable 'watch' was created through the use of variables j25 and j1 from the NIS03-J dataset. Variable j25 asks "Now that you are a permanent resident alien, about how many

hours a week do you watch television in your native language?" while variable j1 asks "Have you ever spoken any language other than English?" 'Watch' is a categorical variable with three categories: yes, no, and native English speaker.

The variable j1 from the trimmed NIS03-J dataset was recoded into a new binary variable, 'otherlang'. For the variable j25, responses other than zero, refused, or don't know were coded as yes under 'watch'. Negative answers from 'otherlang' were then added to 'watch' to indicate which respondents were native English speakers.

Current member of a religious institution in the United States

Variable j39 from the NIS03-J asks "Do you presently consider yourself to be a member of a specific church, parish, temple, synagogue, or mosque in the United States?" The variable j39 from the trimmed NIS03-J dataset was recoded into this new binary variable, 'relinst,' to denote whether or not respondents considered themselves to be current members of a religious institution.

Intention to remain in the United States

Variable j196 from the NIS03-J asks "Do you intend to live in the United States for the rest of your life?" The variable j196 from the trimmed NIS03-J dataset was recoded into this new binary variable, 'remain,' to denote whether or not a respondent intended to stay in the U.S. for the remainder of their lives.

Remits to extended relatives outside the United States

Variable i32 from the NIS03-I asks "How much financial assistance did you give to all other relatives (besides your spouse, children, parents, spouse's parents, siblings, or spouses' siblings) during the last twelve months during periods when they were not living with you and while they were living outside the U.S.? Do not count any financial assistance that you

may have already told us about." The variable i32 from the trimmed NIS03-I dataset was recoded into this new binary variable, 'remit,' to denote whether or not a respondent sent remittances to their extended family living outside the U.S.

Outcome variables

Reports of sadness for two weeks or more in the last twelve months

Variable d88 from the NIS03-D asks "During the past 12 months, was there ever a time when you felt sad, blue, or depressed for two weeks or more in a row?" The variable d88 from the trimmed NIS03-D dataset was recoded into this new binary variable to indicate whether or not the respondent had felt sad, blue, or depressed for two weeks or more in a row in the last twelve months. Respondents could voluntarily indicate that no, they had not felt sad or depressed because they were currently on antidepressant medication. These individuals were coded as 'no' under the new binary variable 'sad' for sample size considerations.

Reports of sadness concerning the prospect of becoming a U.S. permanent resident lasting two weeks or more in the last twelve months

Variable d101 from the NIS03-D asks "Did this period when you felt sad, blue, or depressed as a result of the process of becoming a resident alien last for 2 weeks or more in a row?" The variable d101 from the trimmed NIS03-D dataset was recoded into this new binary variable to indicate whether or not the respondent had felt sad, blue, or depressed for two consecutive weeks or more as a result of the process of becoming a resident alien in the last twelve months.

Depressive symptoms index

As available in the health questionnaire, NIS03-D, if respondents answered 'yes' to having any symptoms commonly associated with depression as measured by the Beck Depression Inventory (Beck et al., 1996) or the Hopkins Symptoms Checklist (Mattsson et al., 1969), they were coded as an event for this newly created index variable called 'depression'. This index variable is cumulative; any affirmative response to a symptom-related question was tabulated with a score of one, with a possible total score of nine symptoms (range 0-9). Data were taken from variables d67, d88, d92-d95, d97-d99 from the trimmed NIS03-D dataset. These variables correspond to feelings or experiences of: pain (d67), sadness lasting two weeks or more in the last twelve months (d88), loss of interest (d92), tired or low energy (d93), loss of appetite (94), trouble falling asleep (d95), trouble concentrating (d97), down, no good or worthless (d98) and thinking a lot of about death, the respondent's own or someone else's (d99) compared to normal within the same period of two weeks or more that they had felt blue, sad or depressed in the last twelve months. Each of the listed variables were recoded individually as new binary variables (called: sad, pain, interest, tired, appetite, sleep, concentrate, worthless, and death, respectively), at which point they were subsequently combined to indicate whether or not a respondent reported any depressive symptoms.

Descriptive, bivariate and multivariate analysis

The data were analyzed in STATA 12 (StataCorp. 2011. Stata Statistical Software: Release 12. College Station, TX: StataCorp LP). The ultimate goal of analysis was to produce two logistic regression models and one linear regression model that considered the relationship between events within the migration journey and three mental health outcomes among new L.P.R.s in the U.S. The three outcomes include: (1) report of sadness for two consecutive weeks or more within the last twelve months; (2) report of sadness concerning the

prospective of becoming a legal permanent resident for two consecutive weeks or more in the last twelve months and; (3) a depressive symptoms index. Descriptive statistics were performed using the tabulate and summarize commands in STATA. All variables were stratified by gender. Crude odds ratios were then generated for each independent variable by all three outcomes using logistic and linear regression where appropriate.

Following bivariate analysis, all variables that showed no statistical significance ($p > 0.05$) with any of the three outcome variables were excluded from further analysis. A pairwise comparison was performed on all independent variables to uncover any relationships of high collinearity. For correlations with values equal to or greater than 0.7, and those equal to or less than -0.7, one variable in the pair was considered for elimination from further analysis. High correlation values existed between age group and the age respondents first left their country of origin; years spent in the U.S. prior to receipt of L.P.R. and the time between first applied for and gained L.P.R.; harm and harm index.

Where collinearity existed between pairs, the variable kept for further analysis was the one that was considered to be more relevant to the migration journey relative to the one that was removed. The variables retained for modeling purposes are listed in Table 4. The variable age at which respondents first left their country of origin and the years elapsed since respondents' first migration are key to understanding the character of respondents' migration journey and were thus retained. Due to the relatively small proportion of affirmative reports of harm overall in the sample, it was thought more appropriate to keep the binary variable rather than the index so as to provide more power in analysis.

Table 4: Variables used in multivariate analysis			
Migration variables	**Pre-migration variables**	**Post-migration variables**	**Demographic and control variables**
Age first left country of origin for ≥ 60 days	Short visits to the U.S. < 60 days	Current member of religious institution in the United States	Gender
Absolute number of migrations	Experience of harm	How well speaks English	Marital status
Time elapsed since first migration to receipt of permanent residence visa		Frequency reads in native language	Current employment status
Valid documentation for entry into the United States		Frequency watches television in native language per week	Region of origin
Partner reunification		Intention to remain in the United States	Religion
		Remits to extended family outside United States	Pre-existing mental illness
			Any chronic illness
			At least one episode of binge drinking in last 3 months
			Current smoker
			Years of education

Due to the variability in sample size from variable to variable, of the remaining variables for analysis, variables were added to the logistic and linear regression models a few at a time. Problems with collinearity were found with the following variables in further analysis and were thus removed: partner reunification, reads newspaper in native language, watches television in native language, remits to extended relatives and intention to the remain in the U.S.

Once it was established that each of the variables remaining were adequate for inclusion in logistic and linear regression analysis, a stepwise regression ($p > 0.10$) was performed, determining which independent variables were significantly associated with each outcome of interest.

Results from the stepwise regression were used to construct the final models for each outcome. For the two outcomes measuring sadness, a logistic regression model was run

containing all significant ($p < 0.10$) independent variables. The same analysis was performed for the linear regression model measuring the number of depression symptoms reported. This concluded the analysis process.

CHAPTER 4: RESULTS

Descriptive analysis

Outcome variables

Most participants did not experience any form of sadness for two consecutive weeks or more in the last twelve months or report any depressive symptoms. Of the 11.86% of the sample that reported experiencing sadness for two consecutive weeks or more, the majority were females (61.46%). For report of sadness concerning the prospect of becoming a permanent resident alien (6.94% of the sample), the distribution was even across gender. For any report of depressive symptoms (18.03% of the sample), females reported more symptoms overall (61.97%). Of those that reported any depressive symptoms, the majority reported one symptom (69.40%), followed by two symptoms (10.28%), and seven symptoms (4.46%).

Demographic characteristics

The demographic characteristics of the sample are summarized in Table 5, stratified by gender. Of the 8573 participants in the sample, 4133 identify as male and 4440 as female. Most independent variables are evenly distributed across gender. The sample is normally distributed across age groups, with 34.31% of the sample falling between the ages of 30 – 39 years of age. The vast majority of participants are married, 70.84%. The mean number of years of education for the sample is 12.50 years, with males averaging one year of education more than females. An overwhelming majority of participants are non-smokers, 90.09%.

Table 5: Demographic characteristics for adult new lawful permanent residents in the United States, stratified by gender, NIS-2003-1

Variables	Male (N=4133)			Female (N=4440)			Total (N=8573)		
	No.	%		No.	%		No.	%	
Age group									
19 and under	90	2.19		89	2.01		179	2.10	
20-29	920	22.35		1083	24.52		2003	23.47	
30-39	1537	37.34		1391	31.49		2928	34.31	
40-49	824	20.02		860	19.47		1684	19.74	
50-59	410	9.96		491	11.12		901	10.56	
60 and over	335	8.14		503	11.39		838	9.82	
Marital status									
Married	2998	72.57		3071	69.23		6069	70.84	
Separated/Divorced/Widowed	178	4.31		537	12.11		715	8.35	
Single	955	23.12		828	18.67		1783	20.81	
Currently employment status									
No	1120	27.10		2429	54.71		3549	41.40	
Yes	3013	72.90		2011	45.29		5024	58.60	
Income (USD)									
≤ 20 000	420	43.21		296	58.15		716	48.35	
> 20 000	552	56.79		213	41.85		765	51.65	
Region of origin									
Europe & Central Asia	706	17.09		682	15.36		1388	16.20	
East & South Asia & the Pacific	1298	31.43		1454	32.75		2752	32.11	
Americas	1460	35.35		1813	40.83		3273	38.19	
Sub-Saharan Africa	433	10.48		331	7.45		764	8.91	
Middle East & North Africa	233	5.64		160	3.60		393	4.59	
Religion									
Catholic	1371	34.76		1748	41.50		3119	38.24	
Orthodox Christian	409	10.37		431	10.23		840	10.30	
Protestant	616	15.62		697	16.55		1313	16.10	
Muslim	347	8.80		296	7.03		643	7.88	
Hindu	368	9.33		250	5.94		618	7.58	
Other	266	6.74		365	8.67		631	7.74	
No religion	567	14.38		425	10.09		992	12.16	
Current smoker									
No	3536	85.56		4187	94.30		7723	90.09	
Yes	597	14.44		253	5.70		850	9.91	
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Years of education	0	18	13.14	0	18	11.80	0	18	12.50

The sample is split evenly across both current employment status and report of income (USD) per year, with 58.60% of participants currently employed and 51.65% of participants

reporting annual incomes of more than 20 000 USD per year. However, there is a large gendered difference in employment status as 72.90% of males are currently employed relative to 45.29% of females.

Of the six regions of the world identified in the sample, most participants come from the Americas, 38.19%, followed by East Asia, South Asia and the Pacific, 32.11%. In terms of religious affiliation, most participants identify as Catholic, 38.24%, followed by 16.10% identifying as Protestant.

Control characteristics

Background variables with known association with mental illness are summarized in Table 6.

Table 6: Control characteristics for adult new lawful permanent residents in the United States, stratified by gender, NIS-2003-1

Variables	Male (N=4133)		Female (N=4440)		Total (N=8573)	
	No.	%	No.	%	No.	%
History of mental illness						
No	4094	99.06	4328	97.48	8422	98.24
Yes	39	0.94	112	2.52	151	1.76
History of chronic illness						
No	3491	84.47	3588	80.81	7079	82.57
Yes	642	15.53	852	19.19	1494	17.43
At least one episode of binge drinking in last 3 months						
No	3534	85.51	4264	96.04	7798	90.96
Yes	599	14.49	176	3.96	775	9.04

A very small proportion of participants report a history of mental illness, 1.76%, with 2.52% of females reporting a history of mental illness relative to 0.94% of men. A larger proportion of participants report having ever had a chronic health condition, 17.43%, with a slight difference by gender: 19.19% of females report a chronic health condition relative

to 15.53% of males in the sample. Lastly, while 90.96% of participants do not report having had a least one episode of binge drinking in the last three months, there is a marked gender difference between those who had: 14.49% of males report having had at least one episode of binge drinking in the last three months compared to 3.96% of females.

Pre-migration characteristics

Pre-migration characteristics are summarized in Table 7. These variables represent the context of exit prior to actual migration, variables that may have an effect on a participant's mental health outcomes across the migration experience. Most participants, 73.59%, had never made any short visits to the United States (visits of less than 60 days) prior to their migration to the United States. In terms of experiences of harm outside the United States based on political or religious belief, or race, ethnicity or gender, few participants report experience of harm, either by themselves or members of their immediate families, 6.67% of the sample. Of those that had experienced harm, 3.15% of males and 2.58% of females report having experienced four or more forms of harm.

Table 7: Pre-migration characteristics for adult new lawful permanent residents in the United States, stratified by gender, NIS-2003-1

	Male (N=4133)		Female (N=4440)		Total (N=8573)	
Variables	No.	%	No.	%	No.	%
Number of short visits to the US (< 60 days)						
0	3048	73.75	3261	73.45	6309	73.59
1	509	12.32	602	13.56	1111	12.96
2	147	3.56	172	3.87	319	3.72
3	102	2.47	106	2.39	208	2.43
4 or more	327	7.91	299	6.73	626	7.3
Experience of harm outside the US because of political or religious beliefs, race, ethnicity or gender						
No	3812	92.23	4189	94.35	8001	93.33
Yes	321	7.77	251	5.65	572	6.67
Harm index						
No experiences of harm	3842	92.96	4227	95.20	8069	94.12
Experienced 1 type of harm	56	1.35	42	0.95	98	1.14
Experienced 2 types of harm	57	1.38	44	0.99	101	1.18
Experienced 3 types of harm	48	1.16	36	0.81	84	0.98
Experienced ≥ 4 types of harm	130	3.15	91	2.05	221	2.58

Migration characteristics

Migration characteristics are summarized in Table 8. These variables represent the primary variables of interest: those associated with the migration journey. The mean age at which participants first left their country of origin for 60 days or more (range 0-94 years of age) is 32 years for the sample. On average, participants waited 6.84 years from first migration to the receipt of permanent residency in the United States (range 0-65 years). The mean number of years elapsed since first migration to receipt of permanent residence differed between males and females by one year: the mean number of years for males is 7.42 years relative to 6.31 years for females. The length of time elapsed since participants first applied for and gained permanent residency in the U.S. is evenly distributed across the four categories, with the slight majority of participants, 32.33%, reporting a wait time of 0-2

years for their application to be approved. This varied by gender with 28.93% of males reporting the process taking 0-2 years, compared to 35.42% of females.

The majority of participants, 82.61%, had undertaken only one migration in their lifetime, that which brought them to the United States. For the remainder of the sample, 7.06%, 6.32%, and 4.01% had undertaken two, three, and four or more migrations in their lifetime at the time of data collection. Most of the sample, 76.11%, report having had valid documentation to enter the U.S. upon arrival. On average, participants spent 5.11 years in the U.S. prior to the receipt of permanent residency.

Once participants had arrived in the United States, 38.97% had moved once within the United States since their last entry. A slightly higher percentage of females, 41.42%, report one move within the U.S. since last entry, relative to 36.34% of males. Of the participants that have a romantic partner, most currently live with that partner, 90.68%.

Table 8: Migration characteristics for adult new lawful permanent residents in the United States, stratified by gender, NIS-2003-1

Variables	Male (N=4133)			Female (N=4440)			Total (N=8573)		
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
Age when first left country of origin for ≥ 60 days									
	0	94	31.05	0	93	33.18	0	94	32.15
Years elapsed since first migration to receipt of permanent residency in the US									
	0	65	7.42	0	64	6.31	0	65	6.84
Duration of residence in the US prior to receiving permanent residency									
	0	63	5.45	0	64	4.81	0	64	5.11
	No.	%		No.	%		No.	%	
Absolute number of migrations									
1	3356	81.2		3726	83.92		7082	82.61	
2	302	7.31		303	6.82		605	7.06	
3	282	6.82		260	5.86		542	6.32	
4 or more	193	4.67		151	3.40		344	4.01	
Absolute number of moves in the US since last entry									
0	326	7.89		409	9.21		735	8.57	
1	1502	36.34		1839	41.42		3341	38.97	
2	946	22.89		1012	22.79		1958	22.84	
3	531	12.85		527	11.87		1058	12.34	
4 or more	828	20.03		653	14.71		1481	17.28	
Time elapsed since first applied for and gained US permanent residency									
0-2 years	239	28.93		322	35.42		561	32.33	
3-5 years	217	26.27		200	22.00		417	24.03	
6-9 years	170	20.58		160	17.60		330	19.02	
10+ years	200	24.21		227	24.97		427	24.61	
Had valid documentation for valid entry to the US									
No	1022	24.73		1026	23.11		2048	23.89	
Yes	3111	75.27		3414	76.89		6525	76.11	
Expects partner									
Lives with partner now	2643	89.93		2,756	91.41		5399	90.68	
Yes	136	4.63		124	4.11		260	4.37	
No	160	5.44		135	4.48		295	4.95	

Post-migration characteristics

Post-migration characteristics are summarized in Table 9. These variables are related to the circumstances in which new legal permanent residents in the U.S. live, and provide some indication of assimilation and acculturation characteristics within the sample. Most participants do not live alone, only 8.18% live by themselves, with more males living alone than females, 10.17% relative to 6.33%, respectively. Almost half of the sample, 49.05%, lives in households with four or more individuals.

Overall, participants report a relatively uniform distribution in how well they speak English, with the majority, 30.37%, reporting that they do not speak English well. There is a large gendered difference in self-report of spoken English fluency: 27.75% of males report speaking English well relative to 20.40% of females. Similarly, 13.00% of males report that they do not speak English at all relative to 24.56% of females in the sample. Most participants have not enrolled in a class to improve their English in the last twelve months; only 15.29% have, with more females than males reporting enrolment in an English class, 17.52% relative to 13.00% of males.

In terms of reading and watching television in their native language, 33.48% of participants report reading in their native language frequently, whereas 40.30% report watching television in their native language at least once each week. For both variables approximately 24% of the sample report English as their native language.

Few in the sample report current membership with a religious institution in the United States, 20.19%. More females than males report religious membership, 22.18% relative to 18.05%, respectively. Most participants, 81.07%, report an intention to remain in the

United States for the rest of their lives. Whereas most participants, 99.13%, do not remit to members of their extended family living outside the U.S.

Table 9: Post-migration characteristics for adult new lawful permanent residents in the United States, stratified by gender, NIS-2003-1

Variables	Male (N=4133)		Female (N=4440)		Total (N=8573)	
	No.	%	No.	%	No.	%
Lives alone						
No	3710	89.83	4156	93.67	7866	91.82
Yes	420	10.17	281	6.33	701	8.18
Number of individuals in current household						
1	482	11.66	332	7.48	814	9.49
2	842	20.37	992	22.34	1834	21.39
3	854	20.66	866	19.50	1720	20.06
4 or more	1955	47.3	2250	50.68	4205	49.05
How well speaks English						
Very well	1064	27.75	866	20.40	1930	23.68
Well	1135	29.07	1042	24.54	2177	26.71
Not well	1180	30.23	1295	30.50	2475	30.37
Not at all	525	13.00	1043	24.56	1568	19.24
Enrolled in class to improve English in the last 12 months						
No	3600	87.00	3662	82.48	7262	84.71
Yes	533	13.00	778	17.52	1311	15.29
Reads newspaper or magazine in native language						
Never	292	29.55	324	30.37	616	29.98
Sometimes	108	10.93	137	12.84	245	11.92
Frequently	333	33.70	355	33.27	688	33.48
Native English speaker	255	25.81	251	23.52	506	24.62
Watches television in native language each week						
No	435	41.87	400	38.72	835	40.30
Yes	349	33.59	382	36.98	731	35.28
Native English speaker	255	24.54	251	24.30	506	24.42
Current member of a religious institution in the US						
No	3387	81.95	3455	77.82	6842	79.81
Yes	746	18.05	985	22.18	1731	20.19
Intention to remain in the US						
No	185	9.89	222	11.25	407	10.59
Yes	1552	82.95	1565	79.28	3117	81.07
Sent remittances to extended relatives outside the US						
No	4094	99.06	4404	99.19	8498	99.13
Yes	39	0.94	36	0.81	75	0.87

Bivariate analysis

Demographic characteristics

Bivariate analyses for each outcome by individual demographic characteristics are summarized in Table 10. The three outcomes are: (1) report of sadness lasting two consecutive weeks or more in the last twelve months, (2) report of sadness related to the prospect of becoming a permanent resident lasting two consecutive weeks or more in the last twelve months and, (3) report of depressive symptoms.

For reports of general sadness and number of depressive symptoms, age is mostly protective; the older participants are, the odds of sadness or experience of depressive symptoms are reduced. However, none of these associations are significant. For reports of sadness concerning the prospect of becoming a permanent resident, a different trend is visible. Compared to those 19 years of age and younger, all older age group had higher odds of sadness concerning the prospect of becoming a permanent resident. The odds ratios for those within the range of 30-59 years of age were statistically significant. For instance, those between 30-39 years of age were 2.95 (1.20, 7.26) times as likely to experience sadness concerning the prospect of becoming a permanent resident relative to those 19 years of age and under.

Few significant bivariate associations were found for experience of sadness lasting two weeks or more concerning the prospect of becoming a permanent resident. Only age, current employment status and years of education were significantly associated with the outcome. For every year of education gained, participants were 1.0% less likely to report sadness concerning the prospect of becoming a permanent resident.

Table 10: Crude odds ratios for each outcome by individual demographic characteristics among new adult L.P.R.s in the United States, NIS-2003-1

Variables	Sadness lasting for ≥ 2 weeks		Sadness related to receipt L.P.R		Depressive Symptoms Index	
	OR (CI 95%)	p-value	OR (CI 95%)	p-value	β CI 95%	p-value
Age						
19 and under						
20-29	0.92 (0.58, 1.46)	0.733	2.30 (0.93, 5.69)	0.073	-0.13, 0.25	0.519
30-39	0.87 (0.55, 1.36)	0.538	2.95 (1.20, 7.26)	0.018 *	-0.18, 0.19	0.946
40-49	0.96 (0.60, 1.52)	0.848	2.89 (1.17, 7.15)	0.022 *	-0.16, 0.23	0.728
50-59	1.04 (0.65, 1.68)	0.866	2.84 (1.13, 7.15)	0.027 *	-0.11, 0.28	0.391
60 and over	0.82 (0.50, 1.33)	0.416	1.65 (0.64, 4.26)	0.298	-0.12, 0.28	0.426
Gender						
Male						
Female	1.56 (1.37, 1.79)	0.000 *	1.04 (0.88, 1.23)	0.619	0.16, 0.27	0.000 *
Marital status						
Married						
Separated/Divorced/Widowed	1.76 (1.43, 2.18)	0.000 *	0.88 (0.64, 1.21)	0.415	0.19, 0.38	0.000 *
Single	1.31 (1.11, 1.53)	0.001 *	1.03 (0.84, 1.27)	0.761	0.01, 0.14	0.122
Currently employed						
No						
Yes	0.81 (0.71, 0.93)	0.002 *	1.33 (1.12, 1.58)	0.001 *	-0.12, -0.01	0.020 *
Income (USD)						
≤ 20 000						
> 20 000	0.95 (0.89, 1.02)	0.130	1.01 (0.95, 1.09)	0.700	-0.20, -0.01	0.029 *
Region of origin						
Europe & Central Asia						
East Asia, South Asia & the Pacific	0.91 (0.71, 1.15)	0.410	1.15 (0.86, 1.53)	0.355	-0.17, -0.01	0.032 *
Americas	2.28 (1.85, 2.82)	0.000 *	1.77 (1.35, 2.31)	0.000 *	0.14, 0.30	0.000 *
sub-Saharan Africa	1.42 (1.06, 1.91)	0.019 *	1.38 (0.96, 2.00)	0.084	-0.13, 0.11	0.936
Middle East & North Africa	1.50 (1.05, 2.15)	0.026 *	1.31 (0.83, 2.09)	0.248	0.01, 0.28	0.034 *
Religion						
Catholic						
Orthodox Christian	0.70 (0.55, 0.88)	0.003 *	0.94 (0.71, 1.26)	0.692	-0.21, -0.02	0.015 *
Protestant	0.71 (0.59, 0.87)	0.001 *	0.91 (0.71, 1.17)	0.469	-0.17, -0.02	0.025 *
Muslim	0.79 (0.61, 1.01)	0.062	0.85 (0.61, 1.19)	0.337	-0.13, 0.09	0.707
Hindu	0.40 (0.29, 0.56)	0.000 *	0.52 (0.34, 0.79)	0.002 *	-0.40, -0.19	0.000 *
Other	0.60 (0.50, 0.79)	0.000 *	1.11 (0.81, 1.51)	0.515	-0.23, -0.02	0.020 *
No religion	0.63 (0.50, 0.79)	0.000 *	0.83 (0.63, 1.10)	0.197	-0.26, -0.08	0.002 *
Current smoker						
No						
Yes	1.96 (1.63, 2.36)	0.000 *	1.36 (1.06, 1.75)	0.016 *	0.14, 0.32	0.000 *
Years of education	0.94 (0.93, 0.96)	0.000 *	0.99 (0.97, 1.01)	0.289	-0.03, -0.02	0.000 *

* significant p-value ≤ 0.05

Current employment status was positively associated with sadness related to receipt of L.P.R, with those employed 1.33 (1.12, 1.58) times as likely to report sadness related to gaining permanent residency relative to those who are not.

For report of sadness and experience of depressive symptoms, gender showed a positive association and was statistically significant (p=0.000 for both). Females were 1.56 (1.37, 1.79) times as likely as males to report feeling sad for two weeks or more in the last twelve months.

Separated, divorced or widowed participants were significantly more likely to report sadness for two weeks or more and experience depressive symptoms relative to those who are married (p=0.000 for both). Separated, divorced or widowed participants are 1.76 (1.43, 2.18) times as likely to report sadness lasting two weeks or more relative to those who are married. Single individuals are 1.31 (1.11, 1.53) times as likely to report sadness for two weeks or more in the last twelve months relative to those who are married.

Current employment status is protective for report of sadness lasting two weeks or more and depressive symptoms relative to those who are not employed. Currently employed individuals are 19.0% less likely than individual not currently employed to report sadness lasting two weeks or more in the last twelve months. This relationship is statistically significant. Income is similarly protective for report of depressive symptoms (p=0.029), and years of education (p=0.000). Years of education is also significant in relation to experience of sadness lasting two weeks or more in the last twelve months: with every year increase in educational attainment, individuals are 6.0% less likely to report sadness.

Control characteristics

Bivariate analyses for each outcome by individual control characteristics are summarized in Table 11.

Table 11: Crude odds ratios for each outcome by individual control characteristics among new adult L.P.R.s in the United States, NIS-2003-1

	Sadness lasting for ≥ 2 weeks			Sadness related to receipt of permanent residency			Depressive symptoms index		
Variable	OR (CI 95%)	p-value		OR (CI 95%)	p-value		β CI 95%	p-value	
History of mental illness									
No									
Yes	9.52 (6.86, 13.20)	0.000	*	3.75 (2.52, 5.60)	0.000	*	2.13, 2.51	0.000	*
History of chronic illness									
No									
Yes	2.17 (1.87, 2.51)	0.000	*	1.73 (1.43, 2.10)	0.000	*	0.34, 0.48	0.000	*
At least one episode of binge drinking in the last 3 months									
No									
Yes	1.39 (1.13, 1.71)	0.002	*	0.90 (0.66, 1.21)	0.478		0.00, 0.18	0.044	*

* significant p-value ≤ 0.05

Virtually all relationships are statistically significant. Only the relationship between binge drinking and report of sadness concerning the prospect of becoming a L.P.R. for two weeks or more in the last twelve months is not.

Individuals with a history of mental illness are 9.52 (6.86, 13.20) times as likely to report sadness lasting two weeks or more in the last twelve months relative to those who do not. These individual are also 3.75 (2.52, 5.60) times as likely to report sadness related to the prospect of becoming a permanent resident compared to those who do not. History of mental illness is significantly associated with report of depressive symptoms as well (p=0.000).

History of chronic illness shows a similar trend. Individuals with a history of chronic illness are 2.17 (1.87, 2.51) times as likely to report sadness for two weeks or more, and 1.73 (1.43, 2.10) times are likely to report sadness related to the prospect of becoming a permanent resident relative to those who do not have a history of chronic illness. Experience of symptoms of depression is statistically significant for individuals with a history of chronic illness relative to those without (p=0.000). Individuals who, on at least one occasion, binge drank in the last three months were 1.39 (1.13, 1.71) times as likely to report sadness lasting two weeks or more relative to those who did not.

Pre-migration characteristics

Bivariate analyses for each outcome by individual pre-migration characteristics are summarized in Table 12.

Table 12: Crude odds ratios for each outcome by individual pre-migration characteristics among new adult L.P.R.s in the United States, NIS-2003-1

	Sadness lasting for ≥ 2 weeks		Sadness related to receipt of permanent residency		Depressive symptoms index	
Variables	OR (CI 95%)	p-value	OR (CI 95%)	p-value	β CI 95%	p-value
Number of short visits to the US (< 60 days)						
0						
1	0.84 (0.68, 1.03)	0.092	0.93 (0.72, 1.20)	0.571	-0.09, 0.07	0.778
2	0.74 (0.50, 1.08)	0.122	0.92 (0.58, 1.44)	0.709	-0.23, 0.05	0.213
3	1.02 (0.67, 1.54)	0.937	1.31 (0.81, 2.12)	0.273	-0.26, 0.08	0.322
4 or more	0.85 (066, 1.11)	0.240	0.68 (0.47, 0.99)	0.042 *	-0.18, 0.03	0.142
Experience of harm outside US because of political or religious beliefs, race, ethnicity or gender						
No						
Yes	1.38 (1.09, 1.75)	0.007 *	1.47 (1.10, 1.97)	0.010 *	0.27, 0.48	0.000 *
Harm index						
No experiences of harm						
Experienced 1 type of harm	0.86 (0.45, 1.66)	0.652	0.29 (0.07, 1.17)	0.081	0.04, 0.53	0.021 *
Experienced 2 types of harm	1.64 (0.98, 2.74)	0.059	1.51 (0.78, 2.92)	0.219	0.16, 0.64	0.001 *
Experienced 3 types of harm	1.26 (0.68, 2.33)	0.460	1.86 (0.95, 3.62)	0.068	0.06, 0.59	0.015 *
Experienced ≥ 4 types of harm	1.42 (0.99, 2.06)	0.060	1.83 (1.21, 2.79)	0.005 *	0.25, 0.57	0.000 *

* significant p-value ≤ 0.05

For the number of short visits taken to the United States (visits of less than 60 days), only four or more visits showed statistical significance for report of sadness related to the prospect of receiving L.P.R. Individuals who undertook four or more short visits to the U.S. were 32% less likely to report sadness related to the prospect of becoming a permanent resident relative to those who did not make any short visits to the U.S. This association is significant.

Experience of harm outside the U.S. was significantly associated with all three outcomes. These associations are positive. For instance, individuals who had experienced harm, or whose immediate family had experienced harm outside the U.S. were 1.47 (1.10, 1.97) times as likely to report sadness related to the prospect of becoming a permanent resident relative to those who did not.

The number of different forms of harm experienced by an individual or their immediate family was significantly associated with report of depressive symptoms. For one, two, three and four or more forms of harm experienced, p-values are 0.021, 0.001, 0.015, and 0.000, respectively, all showing positive associations.

Migration characteristics

Bivariate analyses for each outcome by individual migration characteristics are summarized in Table 13. These are the variables of key interest. For every year older participants were at their first migration from their country of origin, this was significantly associated with a decline in all three outcomes; the older an individual is at the time of first migration, the odds become increasingly protective for their mental health. For instance, with every year older an individual was at the time of first migration, their report of sadness lasting two weeks or more in the last twelve months decreases by 1.0%.

Table 13: Crude odds ratios for each outcome by individual migration characteristics among new adult L.P.R.s in the United States, NIS-2003-1

	Sadness lasting ≥ 2 weeks			Sadness related to receipt of permanent residency			Depressive symptoms index		
Variables	OR (CI 95%)	p-value		OR (CI 95%)	p-value		β CI 95%	p-value	
Age when first left country of origin ≥ 60 days									
	0.99 (0.990, 0.999)	0.028	*	0.99 (0.98, 0.995)	0.001	*	-0.00, 0.00	0.214	
Years elapsed since first migration to receipt of permanent residency in the US									
	1.01 (1.01, 1.02)	0.000	*	1.02 (1.01, 1.03)	0.000	*	0.00, 0.01	0.000	*
Duration of residence in the US prior to receipt off permanent residency									
	1.02 (1.01, 1.03)	0.000	*	1.04 (1.03, 1.05)	0.000	*	0.01, 0.02	0.000	*
Absolute number of migrations									
1									
2	0.94 (0.72, 1.22)	0.628		0.88 (0.62, 1.24)	0.461		-0.12, 0.08	0.697	
3	0.99 (0.76, 1.30)	0.947		1.16 (0.84, 1.61)	0.365		-0.04, 0.17	0.254	
4 or more	1.03 90.74, 1.43)	0.864		1.10 (0.73, 1.66)	0.642		-0.14, 0.12	0.862	
Absolute number of moves in the US since last entry									
0									
1	0.90 (0.70, 1.16)	0.420		0.79 (0.57, 1.08)	0.142		-0.10, 0.07	0.730	
2	0.97 (0.74, 1.27)	0.829		0.94 (0.67, 1.31)	0.709		-0.03, 0.15	0.184	
3	1.32 (0.99, 1.75)	0.055		1.23 (0.86, 1.76)	0.253		0.04, 0.23	0.006	*
4 or more	1.30 (0.99, 1.70)	0.055		1.42 (1.02, 1.98)	0.038	*	0.05, 0.24	0.002	*
Time elapsed since first applied for and gained permanent residency in the US									
0-2 years									
3-5 years	1.27 (0.86, 1.87)	0.224		1.32 (0.78, 2.24)	0.298		-0.11, 0.22	0.493	
6-9 years	1.57 (1.06, 2.33)	0.026	*	2.51 (1.53, 4.11)	0.000	*	0.03, 0.38	0.021	*
10+ years	1.77 (1.23, 2.55)	0.002	*	2.14 (1.32, 3.45)	0.002	*	0.11, 0.44	0.001	*
Had visa or other type of documentation for valid entry to the US									
No									
Yes	0.67 (0.58, 0.78)	0.000	*	0.73 (0.61, 0.88)	0.001	*	-0.25, -0.13	0.000	*
Expects partner to join respondent									
Lives with partner now									
Yes	1.20 (0.82, 1.75)	0.351		1.19 (0.76, 1.89)	0.448		-0.19, 0.10	0.516	
No	0.93 (0.63, 1.38)	0.721		0.68 (0.39, 1.17)	0.162		-0.07, 0.16	0.425	

* significant p-value ≤ 0.05

All outcomes are positively associated with the number of years elapsed between first migration and receipt of permanent residency in the United States. With every year added to the time between participants' first migration and receipt of permanent residency, the odds of reporting sadness for two weeks or more increase by 1.01 (1.01, 1.02) times, and increase by 1.02 (1.01, 1.03) times for those who report sadness related to the prospect of becoming a permanent resident.

No significant relationships were found between any of the three outcomes and the total number of migrations undertaken. However, the general trend is the more migrations taken, the higher the odds of report of sadness, sadness related to the prospect of becoming a permanent resident, and experience of depressive symptoms.

Similarly, the data show a positive association between the number of moves within the United States an individual has and report of all three outcomes. Significant relationships exist between number of moves within the U.S. and sadness related to the prospect of becoming a permanent resident and, experience of depressive symptoms. Individuals who moved four times or more since their last entry to the U.S. have 1.42 (1.02, 1.98) times the odds of reporting sadness related to gaining permanent residency relative to those who have not moved at all.

Experiences of six or more years elapsed since first application to receipt of permanent residency in the U.S have positive, significant associations with all three outcomes. For instance, individuals who report having to wait six to nine years from the time of first application to receipt of permanent residency are 2.51 (1.53, 4.11) times as likely to report sadness related to the prospect of becoming a permanent resident relative to those who

waited only zero to two years. In general, the trend shows that the longer an individual had to wait to receive permanent residency, the greater the odds of mental distress.

The possession of valid documentation for entry to the United States is statistically significant across all three outcomes; the possession of valid documentation had a protective effect. Individuals with valid documentation were 33.0% less likely to report sadness for two weeks or more in the last twelve months relative to those who did not. A significant positive relationship exists between participants' duration of residence in the U.S. prior to receiving permanent residency and all three outcomes (p=0.000 for all). For instance, with every year more participants lived in the U.S. prior to gaining L.P.R., the odds of experiencing sadness for two weeks or more increased by 1.02 (1.01, 1.03) times with each unit increase.

Partner reunification in the United States was not significantly associated with any of the three outcomes. The general trend across all three outcomes, however, is that, relative to those who currently live with their partner, a positive relationship exists for individuals who expect to be reunited with their partner, whereas a negative association exists for individuals who do not expect their partners to join them in the U.S.

Post-migration characteristics

Bivariate analyses for each outcome by individual post-migration characteristics are summarized in Table 14.

An interesting relationship exists between reports of spoken English fluency across the three outcomes. For report of sadness, the less participants report spoken English fluency, the more likely they are to report experiencing sadness relative to those who speak English

Table 14: Crude odds ratios for each outcome by individual post-migration characteristics among new adult L.P.R.s in the United States, NIS-2003-1

	Sadness lasting ≥ 2 weeks			Sadness related to receipt of permanent residency			Depressive symptoms index		
Variables	OR (CI 95%)	p-value		OR (CI 95%)	p-value		β CI 95%	p-value	
Current number of individuals living in households									
1									
2	1.02 (0.78, 1.33)	0.877		0.88 (0.63, 1.22)	0.443		-0.12, 0.08	0.688	
3	1.09 (0.83, 1.41)	0.545		0.97 (0.70, 1.34)	0.849		-0.05, 0.16	0.303	
4 or more	1.18 (0.93, 1.50)	0.171		1.01 (0.75, 1.35)	0.954		-0.03, 0.15	0.202	
How well speaks English									
Very well									
Well	1.38 (1.12, 1.70)	0.002	*	1.19 (0.93, 1.52)	0.158		0.04, 0.19	0.002	*
Not well	1.55 (1.27, 1.90)	0.000	*	1.17 (0.92, 1.48)	0.197		0.07, 0.21	0.000	*
Not at all	1.99 (1.62, 2.46)	0.000	*	1.04 (0.79, 1.37)	0.767		0.14, 0.30	0.000	*
Enrolled in English class in the last 12 months									
No									
Yes	1.30 (1.10, 1.54)	0.003	*	1.22 (0.98, 1.52)	0.077		0.01, 0.15	0.034	*
Reads newspaper or magazine in native language									
Never									
Sometimes	0.85 (0.55, 1.31)	0.456		1.34 (0.79, 2.28)	0.269		-0.14, 0.23	0.653	
Frequently	0.74 (0.53, 1.02)	0.066		0.95 (0.66, 1.46)	0.826		0.00, 0.28	0.045	*
Native English speaker	0.86 (0.61, 1.21)	0.394		0.91 (0.57, 1.45)	0.682		-0.14, 0.15	0.914	
Watches television in native language each week									
No									
Yes	1.45 (1.07, 1.97)	0.018	*	1.61 (1.09, 2.38)	0.017	*	0.02. 0.26	0.022	*
Native English speaker	1.30 (0.92, 1.83)	0.134		1.17 (0.74, 1.85)	0.504		-0.11, 0.16	0.737	
Currently member of a church, parish, temple, synagogue or mosque in the US									
No									
Yes	1.13 (0.97, 1.33)	0.121		1.10 (0.90, 1.35)	0.348		0.05, 0.18	0.000	*
Intention to remain in the US									
No									
Yes	0.63 (0.48, 0.82)	0.001	*	0.73 (0.511, 1.04)	0.085		-0.39, -0.20	0.000	*
Sent remittances to extended relatives outside the US									
No									
Yes	1.57 (0.86, 2.86)	0.144		2.08 (1.06, 4.07)	0.032	*	-0.09, 0.47	0.185	

* significant p-value ≤ 0.05

well. This relationship is statistically significant. For instance, those who do not speak English well are 1.99 (1.62, 2.46) times as likely to report sadness relative to those who report speaking English very well. The same is true of experience of depressive symptoms across spoken fluency levels when compared to those who report that they speak English very well; these associations are statistically significant. However, an inverse relationship exists between reports of sadness related to the prospect of receiving permanent residency. Odds of sadness related to the prospect of becoming a L.P.R. decrease with a decline in fluency level relative to those who speak English well; this relationship, however, is not statistically significant.

The more frequently participants watch television in their native language, the higher the odds across all outcomes; these associations are statistically significant. Individuals who watch television in their native language at least once a week are 1.45 (1.07, 1.97) times as likely to report sadness lasting two weeks or more relative to those who do not. Similarly, relative to those unaffiliated with a religious institution in the United States, current membership with a religious institution is significantly associated with an increase in depressive symptoms ($p=0.000$).

Participants' intention to remain in the U.S. for the rest of their lives demonstrates a protective effect on their mental health relative to those who intend to leave. This relationship is significant for experience of sadness and depressive symptoms. Individuals who plan to stay in the United States are 37.0% less likely to report sadness lasting two weeks or more in the last twelve months relative to those who do not.

Multivariate analysis

Report of sadness lasting two weeks or more in the last twelve months

Multivariate analysis for report of sadness lasting two weeks or more in the last twelve months among new legal permanent residents in the U.S. (2003) is summarized in Table 15.

Table 15: Multivariate analysis for episodes of sadness lasting ≥ 2 weeks in the last 12 months among new legal permanent residents in the United States, NIS-2003-1 (N=8218)

Variables	OR (CI 95%)	p-value	
Region of origin			
Europe & Central Asia			
East Asia, South Asia & the Pacific	1.06 (0.83, 1.36)	0.628	
Americas	2.10 (1.66, 2.65)	0.000	*
sub-Saharan Africa	1.74 (1.28, 2.36)	0.000	*
Middle East & North Africa	1.53 (1.05, 2.22)	0.026	*
Years of education			
	0.97 (0.95, 0.98)	0.000	*
History of mental illness			
No			
Yes	7.62 (5.36, 10.85)	0.000	*
History of chronic illness			
No			
Yes	2.06 (1.74, 2.43)	0.000	*
Current smoker			
No			
Yes	2.05 (1.68, 2.50)	0.000	*
Number of short visits to the US (< 60 days)			
0			
1	0.84 (0.68, 1.05)	0.124	
2	0.82 (0.55, 1.23)	0.337	
3	1.03 (0.66, 1.60)	0.901	
4 or more	0.91 (0.69, 1.21)	0.518	
Age when first left country of origin for ≥ 60 days			
	0.99 (0.98, 0.99)	0.000	*

* significant p-value ≤ 0.05

When compared to individuals from Europe and Central Asia, participants from the Americas, Sub-Saharan Africa, and the Middle East and North Africa were significantly more likely to experience sadness lasting two weeks or more. Participants from the Americas report the highest odds of sadness, with an odds ratio (OR) of 2.10 (1.66, 2.65). The same relationship exists for those from East Asia, South Asia, and the Pacific compared to those from Europe and Central Asia, however the association is not significant.

With every unit increase in years of education, the odds of sadness lasting two weeks or more diminishes by 3.0%. However, histories of mental illness and chronic illness and smoking significantly increase the odds of experiencing sadness, by 7.62 (5.36, 10.85), 2.06 (1.74, 2.43) and 2.05 (1.68, 2.50) times respectively.

In terms of migration variables, the number of short visits undertaken seems to have little effect on the relationship with experience of sadness. No significant relationship was found here. However, the age at which participants first left their country of origin was statistically significant in this model. Older age at first migration was protective: with every year increase in age, the odds of sadness decrease by 1.0%.

Report of sadness related to the prospect of becoming a permanent resident in the U.S. lasting two weeks or more in the last twelve months

Multivariate analysis for report of sadness related to the prospect of becoming a permanent resident lasting two weeks or more in the last twelve months among new L.P.R.s in the U.S. (2003) is summarized in Table 16. Few significant relationships exist in this model. Significant relationships were found between report of sadness related to receipt of permanent residency and histories of mental and chronic illness, as well as with one

migration variable: time elapsed since first applied for and gained permanent residency in the United States.

Table 16: Multivariate analysis for episodes of sadness surrounding the prospect of becoming a permanent resident lasting ≥ 2 weeks in the last 12 months among new legal permanent residents in the United States, NIS-2003-1 (N=1735)

Variables	OR (CI 95%)	p-value	
Region of origin			
Europe & Central Asia			
East Asia, South Asia & the Pacific	0.77 (0.44, 1.35)	0.365	
Americas	1.24 (0.74, 2.08)	0.406	
sub-Saharan Africa	0.86 (0.37, 2.00)	0.721	
Middle East & North Africa	0.90 (0.34, 2.37)	0.833	
History of mental illness			
No			
Yes	2.63 (1.23, 5.64)	0.013	*
History of chronic illness			
No			
Yes	1.56 (1.04, 2.33)	0.031	*
Number of short visits to the US (< 60 days)			
0			
1	0.71 (0.40, 1.27)	0.245	
2	1.06 (0.47, 2.40)	0.882	
3	1.06 (0.35, 3.15)	0.923	
4 or more	1.57 (0.80, 3.10)	0.193	
Absolute number of migrations			
1			
2	1.81 (0.96, 3.42)	0.068	
3	0.74 (0.31, 1.76)	0.490	
4 or more	0.62 (0.19, 2.07)	0.438	
Time elapsed since first applied for and gained US permanent residency			
0-2 years			
3-5 years	1.33 (0.78, 2.26)	0.297	
6-9 years	2.43 (1.46, 4.04)	0.001	*
10+ years	1.92 (1.16, 3.16)	0.010	*

* significant p-value ≤ 0.05

Those with a history of mental illness have 2.63 (1.23, 5.64) the odds of reporting sadness related to the acquisition of permanent residency in the U.S. relative to those who do not; for those with a history of chronic illness, the odds of sadness related to receipt of permanent residency are 1.56 (1.04, 2.33) times that of those who do not.

For the migration specific variables, those having to wait six or more years between the time they first applied for and received permanent residency are significantly more likely to report sadness related to receipt of permanent residency relative to those who had to wait two years or less. No significant relationship was found for the other two migration variables in the model. For the absolute number of migrations undertaken, the overall trend demonstrates that the more migrations undertaken, the odds of sadness related to the prospect of becoming a permanent resident decrease. Inversely, the more short visits taken to the U.S., the higher the odds of sadness related to receipt of permanent residency.

Report of depressive symptoms

Multivariate analysis for report depressive symptoms among new legal permanent residents in the U.S. (2003) is summarized in Table 17. All significant relationships in the model demonstrate a positive association with the number of depressive symptoms reported. None of the migration variables made it into the model.

Females show higher odds of depressive symptoms relative to males (p=0.000). Compared to those from Europe and Central Asia, participants from the Americas and the Middle East and North Africa were significantly more likely to demonstrate symptoms of depression (p=0.000 and p=0.003, respectively). The other regions were not statistically significant. Background factors with known associations to mental illness demonstrate significant positive associations with report of depressive symptoms. Those with a history of mental

illness, a history of chronic illness, and those who had at least one episode of binge drinking in the last three months all show p-values of 0.000.

Lastly, those who had experienced harm outside the United States because of political or religious beliefs, race, ethnicity or gender had significantly higher odds of reporting depressive symptoms relative to those who did not (p=0.000).

Table 17: Multivariate analysis for experience of depressive symptoms among new legal permanent residents in the United States, NIS-2003-1 (N=8570)

Variables	β CI 95%	p-value	
Gender			
Male			
Female	0.14, 0.24	0.000	*
Region of origin			
Europe & Central Asia			
East Asia, South Asia & the Pacific	-0.08, 0.07	0.850	
Americas	0.15, 0.30	0.000	*
sub-Saharan Africa	-0.11, 0.20	0.079	
Middle East & North Africa	0.07, 0.33	0.003	*
History of mental illness			
No			
Yes	1.93, 2.31	0.000	*
History of chronic illness			
No			
Yes	0.24, 0.37	0.000	*
At least one episode of binge drinking in the last 3 months			
No			
Yes	0.07, 0.25	0.000	*
Experience of harm outside US because of political or religious beliefs, race, ethnicity or gender			
No			
Yes	0.23, 0.43	0.000	*

* significant p-value ≤ 0.05

Overall, the characteristics of the sample are relatively evenly distributed across most demographic variables, except in areas of smoking status, region of origin and religious affiliation. The sample is a relatively healthy cohort, with few reports of illness. More females than males report a history of mental illness, and there are also gendered differences across employment status and episodes of binge drinking. The characteristics of the migration journey for the sample are largely centered on the migration to the U.S. Most participants undertook only one migration – that which brought them to the United States, and most had appropriate documentation for entry to the country. However, migrants faced long wait times for receipt of L.P.R., waiting an average of 6.84 years from their first migration to the receipt of their L.P.R. For adjustee migrants, the wait time was 5.11 years on average. Participants demonstrated various levels of English fluency. Figures 9-12 show select summary characteristics for the sample.

Figure 9: Age distribution among new L.P.R.s to the U.S., NIS-2003-1

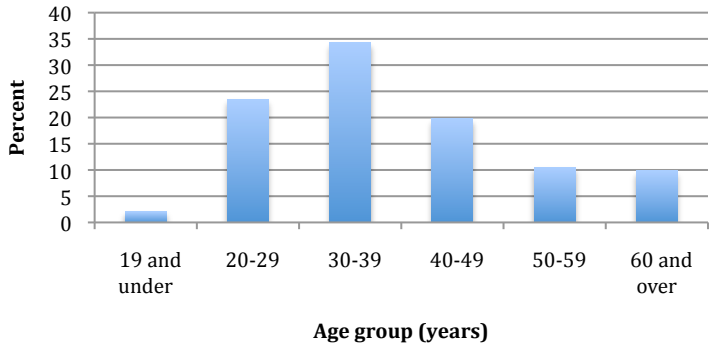


Figure 10: Region of origin among new L.P.R.s to the U.S., NIS-2003-1

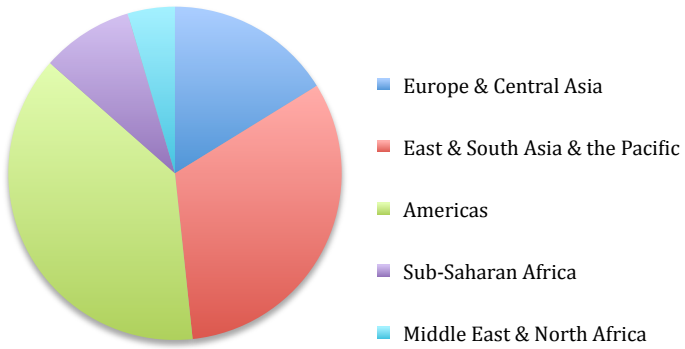


Figure 11: Time elasped since first applied for and gained L.P.R. status in the U.S. among new L.P.R.s, NIS-2003-1

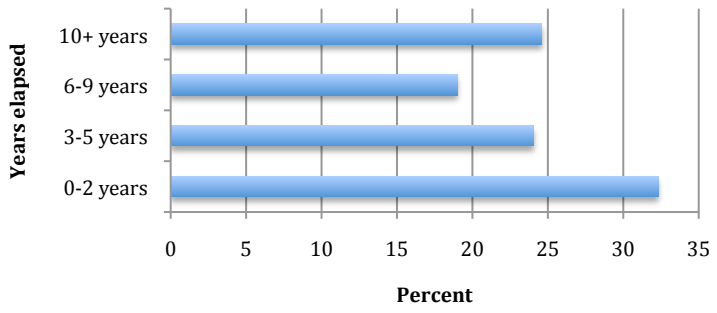
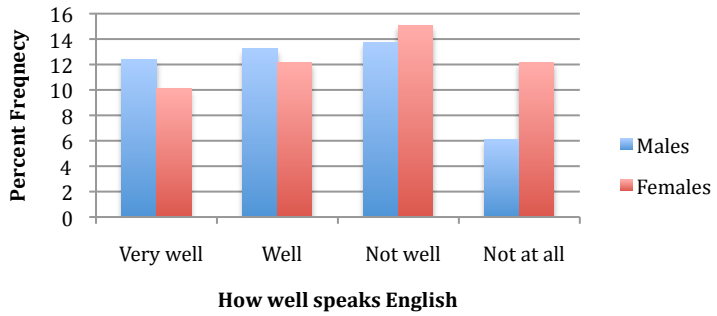


Figure 12: Self-report of English language fluency among new L.P.R.s, stratified by gender, NIS-2003-1



Models show that a history of mental or chronic illness is positively associated with all three outcomes. For report of depressive symptoms positive associations exist for experience of harm, at least one episode of binge drinking in the last three months, and those originating from the Americas and the Middle East and North Africa. Two migration variables show significant associations with the two models for experience of sadness. Wait times of six or more years between first application and receipt of permanent residency was positively associated with report of sadness related to the prospect of becoming a permanent resident. Only greater education and older age at first migration were protective against report of sadness for two consecutive weeks or more in the sample. Migration journey variables show some associations with mental health outcomes.

CHAPTER 5: DISCUSSION

Results show that a more holistic understanding of the migration experience, which includes factors related to the migration journey, is important in examining the relationship between migration and mental health. When variables across the migration experience were controlled for, age at first migration and the time between first applied for and gained L.P.R. were both significant factors in signaling events of mental distress. Older age at first migration was protective of mental health, whereas longer visa wait times were associated with increased mental distress. Results demonstrate that, when considered together, factors across the migration experience –background characteristics, pre-migration and migration factors – all influence migrant mental health. Post-migration variables were absent from final models. This is assumed to be the case largely due to the time within which that data were collected. The period of visa stress had recently ended for all participants, and, as Portes and Rumbart (1996) suggest, sufficient time had not passed for acculturative stressors to show their effect. Results make a case for migration and health research to consider the migration journey; evidence from this analysis suggests that such factors may be predictive of mental distress.

This analysis specifically considered factors associated with the migration journey, within the context of the entire migration experience. Of the migration journey variables, both age at first migration and the time between first application and receipt of L.P.R. status in the U.S. were significantly associated with experiences of sadness for two consecutive weeks or more. The longer an individual stays in their country of origin, that is, the older individuals are when they first migrate, the less likely they are to experience mental distress. This is consistent with the findings of Mossakowski (2007) and Gong et al. (2011). The study by Gong et al. (2011) highlights the relationship between age at first migration and human

agency. They suggest the older the individual, the more likely they are to have clear reasons for migration and are also more able to control how the migration process occurs (Gong et al., 2011). Such individuals may demonstrate better planning in preparation for migration, i.e. having taken language classes or spent time establishing social networks, and thus, face less migratory stress and acculturative stress when at destination (Gong et al., 2011). Results do not indicate any confounding by any of the post-migration/acculturation variables, suggesting validity in the relationship. Mirowsky and Ross (2003) propose that the more stability individuals have across all aspects of their lives, the better their health, and so, prolonged stability at origin, measured in years spent at origin prior to migration, could explain the protective effect against mental distress seen in the model. This association holds for those who experienced harm in the sample as well. There is no significant difference between age at first migration among those who experienced harm and those that did not, the mean age at first migration is 31.3 years and 32.2 years of age, for each respectively. Thus, when controlling for experience of harm and acculturation factors as predictors of mental distress, age at first migration shows a significant association with mental health.

The time elapsed since participants first applied for an gained L.P.R. status in the U.S. was also associated with sadness, in this instance, sadness for two consecutive weeks or more concerning the prospect of becoming a permanent resident. Those who had to wait six years or more were significantly associated with distress concerning the prospect of becoming a L.P.R. Jasso et. al (2005) refer to this as 'visa stress,' the stressors that surround the process of becoming a permanent resident. Chronic stress is known to affect mental health, as stress over the long term can eventually overwhelm an individual, resulting in the manifestation of depressive symptoms (Marin et al., 2011). Although, in the model, a slight decline is visible

in the likelihood of experiencing sadness after waiting for ten years or more for the acquisition of L.P.R. This could suggest the development of resiliency over time (Bonanno, 2004), or suggest that other factors mediate this relationship.

The decision to grant L.P.R. in the U.S. is based on an individual's status claim, the possession of needed skills, place of origin, and the presence of relatives already in the U.S. with U.S. citizenship (Monger and Yankay, 2011). The status upon which individuals in the sample entered the U.S. was difficult to ascertain through data analysis, and thus, experience of harm was used as a proxy to test for confounding in the relationship between visa stress and the time elapsed since first applied for and gained permanent residency. No confounding was apparent, nor was there any evidence of confounding when region of origin was controlled. This suggests that prolonged visa stress is associated with mental distress. Notwithstanding this association, there is evidence in the data to suggest that visa wait time varied across the sample.

There exists a significant difference between those who waited six years or more for receipt of L.P.R. and region of origin. Of those waiting six to nine years for L.P.R., 46.97% were from the Americas. The proportion of those from the Americas waiting for L.P.R. increases among those waiting for ten years or more for L.P.R.; the percentage climbs to 51.99%. This trend is reflective of U.S. national immigration estimates as the large majority of applications for L.P.R. come from individuals with origins in the Americas (Monger and Yankay, 2011). In this sample, individuals from the Americas includes those born in: Canada, the United States, El Salvador, Guatemala, Mexico, Colombia, Peru, Cuba, the Dominican Republic, Haiti, Jamaica, or Latin America and the Caribbean. The association between the time elapsed since first applied for and gained L.P.R. and region of origin, however, was not related to

mental distress concerning the prospect of becoming a permanent resident. Further research could consider to explain this relationship, as well as investigate other factors associated with prolonged L.P.R. wait times, such as the presence of relatives in the U.S. already possessing citizenship in the country, and possession of a needed skill set, data which are unavailable in this analysis.

The absolute number of migrations undertaken by participants was not found to be significant in the model for sadness related to the prospect of becoming a permanent residence, when other factors are controlled. The general trend, however, suggests a curved pattern, where individuals experience more stress having undergone two migrations relative to one, but, with three or more migrations, distress begins to lessen, suggesting again the development of coping mechanisms with prolonged exposure to migratory stress (Bonanno, 2004). The number of migration events undertaken is not commonly used in research, and so, future analysis could investigate this curious pattern.

None of the other migration journey variables were successfully included in the final models, as they showed no significant relationship with any of the outcomes for mental distress. This was particularly surprising for expected partner reunification. It has been well established that the dissolution of social networks can lead to adverse mental health outcomes due to the disruption of social networks as a functioning coping mechanism (Cochrane, 1983). In addition, the literature suggests that family division and reunification as a result of migration is psychologically challenging for all involved (Adams, 2000, McGuire and Martin, 2007). Closer attention to such circumstances in the consideration of the migration experience as a whole could prove valuable to migration and mental health research.

A different picture, however, emerges with the consideration of duration of residence in the U.S. prior to receipt of L.P.R., and the time elapsed between first applied for and received L.P.R. These two variables were highly correlated in preliminary analysis. This suggests that the longer participants lived in the U.S. prior to their receipt of permanent residency, the greater their visa stress, as seen in those who waited longer periods to be granted L.P.R. status. When duration of residence in the U.S. was substituted into the visa stress model in place of the application timeframe variable, it was found that for every additional year participants spent in the U.S. waiting to gain L.P.R., their likelihood of experiencing sadness related to the prospect of becoming a permanent resident increased by 1.03 (1.02, 1.04) times. This again suggests the role of chronic stress in migration. This stand contradictory to other studies, such as that by Mossakowski (2007), who found that, when age at first migration was controlled for, duration of residence in the U.S. was not associated with mental distress in Filipino Americans. When age at first migration was controlled for in this model, it revealed that it did not affect the relationship between experience of sadness and visa application time, but did mediate the relationship between duration of residence in the U.S. and experience of sadness, rendering duration of residence in the U.S. statistically insignificant. This strengthens the use of age at first migration and the time elapsed since first applied for and gained permanent residency as important variables for consideration in migration and mental health research.

The evidence suggests that understanding the context of the migration journey is important in establishing a more holistic picture of migrant mental health among new L.P.R.s in the United States. However, these variables may also be mediated by other factors, as models here show, and so, the more researchers are able to consider the migration experience in its entirety, the more strength and accurate their results.

Background and control characteristics

Unsurprisingly, across all modeled outcomes, a history of mental illness and chronic disease showed significant positive associations with current mental health status. Those who have a history of mental illness have substantively higher odds of reporting sadness lasting two consecutive weeks or more in the last twelve months relative those who do not (OR: 7.62, 95% CI: 5.36, 10.85). For chronic illness, the odds are 2.06 (1.74, 2.43) times. Results are consistent with conventional understanding of mental illness as individuals with a history of mental illness have a high chance of relapse (Mueller et al., 1999). Gender, which was found to have a significant positive association with report of depressive symptoms, is also a known risk factor for relapse and experience of depression in general (Hyman et al., 2006, Mueller et al., 1999). As Portes and Rumbart (1996) note, the higher reports of depression in women could be partially related to their disadvantaged position in society overall, a position associated with feelings of marginalization and powerlessness.

Chronic disease and mental illness are thought to manifest in a cyclical pattern. The presence of chronic disease, such as diabetes, can impact an individual's mental health as the demands of treatment may become overwhelming and feelings of hopelessness may emerge (Lando et al., 2006). In turn, these feelings can affect an individual's ability to undergo and continue treatment (Lando et al., 2006). Level of functioning was not considered in this analysis, which would help indicate the degree to which chronic illness impacts individuals in their daily lives. Future research may consider this as well.

Of the NIS-2003-1 cohort, region of origin was incorporated into all models, but found to be significant in the models for report of sadness lasting two weeks or more and for report of depressive symptoms. Compared to those from Europe and Central Asia, those from the

Americas were 2.10 (1.66, 2.65) times as likely to report sadness lasting two consecutive weeks or more, and those from sub-Saharan Africa were 1.74 (1.28, 2.36) times as likely to report sadness, while those from the Middle East and North Africa were 1.53 (1.05, 2.22) times as likely to report sadness lasting two consecutive weeks or more. Those from the Americas and the Middle East and North Africa showed significant positive associations with depressive symptoms relative to those from Europe and Central Asia (p=0.000 and 0.003, respectively).

Although this is an in-group comparison, evidence suggests that mediated in part by SES, the experience of mental distress in this cohort could be related to acculturative stress and a greater social distance to be traveled for individuals from non-Western regions of the world relative to those from Europe and Central Asia (Srolo et al., 1962). Also, as Padilla and Perez (2003) suggest, relative to those from Europe and Central Asia, the vast majority of the other individuals in the sample would be less likely to physically resemble mainstream Americans, and thus this could explain their higher reports of mental distress. This is most compelling for the groups that report depressive symptoms, as those of Latino or Arab origin face the brunt of anti-immigration sentiment in the U.S. Experiences of mental distress and illness, as Portes and Rumbart (1996) note, are known to be medicated by SES. SES is often measured by an individual's education, income and occupation (APA, 2012). Overall, in the model for experience of sadness, education was found to be protective, consistent with the literature (Mirowsky and Ross, 2003, Bhugra, 2005). Secondary analysis showed income levels were significantly different across region of origin and education level (p=0.000 for both). Proportionally, those from the Americas and the Middle East and North Africa were found to be the poorest among all new L.P.R.s in the sample, with only 30.56% of those from the Americas and 31.48% of those from the Middle East and North

Africa earning more than 20 000 USD per year. Within each region, the average number of years of education is roughly 13.5 years, except for those from Europe and Central Asia, who averaged 14.6 years, and those from the Americas with a mean of 10.2 years of education. The demonstration of the highest odds of sadness reported by those from the Americas relative to those from elsewhere could be due, in part, to their limited SES. By including the background characteristics of migrants, results suggests that this provides added value towards understanding the relationship between the migration experience and mental health outcomes.

Pre- and post-migration characteristics

No post-migration characteristics were selected for inclusion in the models. This may seem strange due to the documented importance of certain characteristics, such as language fluency, as a component of acculturative stress (Aprahamian et al., 2011, Leu et al., 2011). In a recent study of Korean migrants in the U.S., Leu et al. (2011) note that low English-language proficiency is associated with depression. Similar findings are evident in the work of Aprahamian et al. (2011) among Arab migrants. Since the period of visa stress had recently ended for all participants (efforts were made to sample individuals soon after admission to L.P.R. (Jasso et al., 2005)), it is likely that data were collected at too early a point to see strong associations between acculturation and mental health sample. Participants may still be in their 'euphoric period,' following admission to L.P.R. status, or for those experiencing distress, are likely still dealing with the stressors associated with the migration journey and those present at their exit from their country of last residence (Portes and Rumbaut, 1996). It is only over time in the U.S. that acculturation variables may become significant predictors of mental distress as the current circumstances of individual migrants at destination start to become more important (Portes and Rumbaut, 1996).

Experience of harm was positively associated with experience of depressive symptoms. This is supported by the literature (Kaltman et al., 2010, Porter and Haslam, 2005). Those who report experience of harm prior to migration were found to be at higher risk of adverse mental health outcomes relative to those who did not, due to the exposure to, and the lasting effect of trauma prior to migration (Ringold et al., 2005, Derose et al., 2007). These experiences are carried with participants as they have moved, the residual of which is visible here.

Portes and Rumbart (1996) suggest that distress associated with traumatic experiences pre-migration can be high initially, but fade over time, giving way to a focus on the circumstances present at destination. The availability of such longitudinal data, that which measures changing circumstances across the migration experience and well into settlement would strengthen the migration and mental health literature, providing researchers with a better understanding of how mental health may change throughout a migrant's life course.

This analysis supports the notion that the migration experience in its entirety, including a focus on the migration journey, should be considered in the examination of mental health among migrant populations. The migration process is complex and involves many factors that may confound one another. To establish true associations between migration and mental health, background factors, the context of exit and entry, and the migration journey must be included in future research to present the clearest picture possible.

CHAPTER 6: RECOMMENDATIONS

From this analysis, various recommendations for future research and public health implications emerge.

1. Continued analysis of the migration experience in its entirety, including aspects associated with the migration journey.

This analysis shows the context of the migration journey can be important in the explanation of migrant mental health. The migration journey is not only one that involves measuring the movement of people, but also the visa acquisition process. Additional information not available here could also be considered to help strengthen the conceptualization of the relationship between the migration journey and mental health, such as the financial costs of migration relative to poverty status and the form of travel involved in migration. For instance, the journey, including its surrounding circumstances, of individuals escaping poverty and conflict in Mexico by foot to the U.S. is likely to be vastly different from that of individuals traveling from China by plane to the U.S. This process is in no way uniform. Understanding this variation in experience can only strengthen migration and health research. The inclusion of such information could be done through the expansion of the migration questionnaire in the NIS in subsequent rounds.

2. The provision of culturally appropriate diagnoses and treatment for individuals with mental distress.

The depressive symptoms index is the most robust indicator of mental distress in this analysis. It suggests that the migrants may present with symptoms and risk factors associated with mental distress similar to those common among U.S.-born Americans.[2] However, people from different parts of the world conceptualize and experience mental

[2] Based on classifications of depression in the DSM-IV; APA 1999. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition,* Washington, D.C., American Psychiatric Association.

illness differently (Betancourt et al., 2009). It is not certain that the true experience of mental distress was captured here, as the questions on mental health in the NIS-2003-1 were not clearly validated for use in populations of different cultural backgrounds. It is thus important to develop tools that will appropriately diagnose and help treat mental illness among individuals of diverse cultural backgrounds, especially as the U.S. continues to become more and more ethnically and culturally diverse. Understanding specific conceptualizations of mental illness can only improve treatment outcomes. This is especially important considering the debilitating effect mental illness can have on human functioning and productivity. Towards the most appropriate care possible, such tools can be developed in partnership between research institutions and community-based health centers that work with migrants to the U.S.

CONCLUSION

International migration is an increasingly common phenomenon. In 2010, it was estimated that roughly 214 million persons undertook an international migration (IOM, 2010). Understanding the pattern of human movement is crucial to understanding human health. For too long, theorists and researchers have ignored the role of the migration journey in shaping mental health. This study demonstrates the importance of considering the migration experience in its entirety, of which elements within the migration journey are an important part. Here, the variables age at first migration and the time elapsed since first applied for and gained permanent residency were significantly associated with experience of sadness in new permanent residents to the U.S. The older individuals are when they first migrate, the less likely they are to experience sadness. Whereas, the longer individuals wait for their applications for legal permanent residency to be approved, the more likely they are to experience sadness. Future migration and health research should consider factors related

to the migration journey in their analysis, along with background and pre- and post-migration variables towards the most comprehensive picture of migrant mental health possible.

LIMITATIONS

Like most studies on migration and health, this study is cross-sectional (Kandula et al., 2004). The collection of migration histories in the NIS-2003-1 allows for some understanding of health over time, however is subject to recall bias and health status is self-reported. The NIS project on the whole plans to continue to collect data in the years to come on new cohorts of legal permanent residents in the U.S. (NIS, 2006). Their efforts should be supported as comprehensive data, especially longitudinal data, on migration is sparse, and without such data, an understanding of the relationship between migration and health will remain elusive.

Despite the inclusion of migration histories in the NIS-2003-1, few variables related to the migration journey itself were collected, and thus, it is difficult to construct a comprehensive picture of how migrants undertook their journey to the U.S. and the variations that existed between them. Factors such as the financial burden associated with migration and the means of travel to the U.S. are data not collected here. These factors, highlighted specifically in studies related to smuggling/trafficking, are known to cause financial and psychological strain and may influence migrant mental health (Gushulak and MacPherson, 2000). The inclusion of such information also calls for the addition of more psychosocial factors related to the migration experience in data collection, and not just those associated with the journey, but overall. Factors such as discrimination, the degree to which a migration was planned, including psychological preparation, and demonstration of resiliency all have implications for migrant mental health (Mossakowski, 2007, Gong et al., 2011, Bonanno, 2004). Such additions to the NIS questionnaires could enhance the ability of researchers to more fully understand how immigration-related factors influence mental health.

Where the measure of mental health is concerned, it is not known that the indicators within the NIS are valid for use on the populations sampled. Thus, it is not clear the degree to which true mental distress experienced by this cohort was captured.

In data analysis, some variables had small sample sizes and were consequently not strong enough to be used in regression modeling. For instance, due to the small sample size of the income variable, it had to be made dichotomous, which limited the variable's power. The inability to control for income as a proxy for SES, a known mediator of mental illness, limits the applicability of results. Additionally, there may be some misclassification bias where some variables are concerned. For instance, in understanding whether or not individuals ever spoke a language other than English, used in the construction of the post-migration variables 'read' and 'watch,' just because an individual had ever spoken a language other than English does not mean that he or she is not a native English speaker. Despite these limitations, the study provides concrete evidence that a more holistic view of migration is needed in the attempt to understanding migration's complex relationship to mental health.

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