Published in final edited form as:

Soc Sci Med. 2007 July ; 65(2): 214–230.

Understanding Differences in Past Year Psychiatric Disorders for Latinos Living in the U.S

Margarita Alegria,

Cambridge Health Alliance Somerville, MA UNITED STATES, malegria@charesearch.org

Patrick E Shrout, Ph.D.,

New York University, pat.shrout@nyu.edu

Meghan Woo, ScM,

Harvard University School of Public Health, mwoo@hsph.harvard.edu

Peter Guarnaccia, Ph.D.,

Rutgers University, pguarnaccia@ifh.rutgers.edu

William Sribney, M.S.,

Third Way Statistics, bill@thirdwaystat.com

Doryliz Vila, M.S,

University of Puerto Rico, dvila@rcm.upr.edu

Antonio Polo, Ph.D.,

Harvard Medical School and Cambridge Health Alliance, apolo@charesearch.org

Zhun Cao, Ph.D.,

Harvard Medical School and Cambridge Health Alliance, zcao@charesearch.org

Norah Mulvaney-Day, Ph.D.,

Harvard Medical School and Cambridge Health Alliance, nmulvaney-day@charesearch.org

Maria Torres, M.A., and

Cambridge Health Alliance, mtorres@charesearch.org

Glorisa Canino, Ph.D.

University of Puerto Rico, gcanino@rcm.upr.edu

Abstract

This study seeks to identify risk factors for psychiatric disorders that may explain differences in nativity effects among adult Latinos in the USA. We evaluate whether factors related to the processes of acculturation and enculturation, immigration factors, family stressors and supports, contextual factors, and social status in the U.S. account for differences in twelve-month prevalence of psychiatric disorders for eight subgroups of Latinos. We report results that differentiate Latino respondents by country of origin and age at immigration (whether they were U.S.-born or arrived before age 6 [IUSC] or whether they arrived after age 6 [LAI]). After age and gender adjustments, LAI Mexicans and IUSC Cubans reported a significantly lower prevalence of depressive disorders than IUSC Mexicans. Once we adjust for differences in family stressors, contextual factors and social status factors, these differences are no longer significant. The risk for anxiety disorders appears no different for LAI

Correspondence to: Margarita Alegria.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

compared to IUSC Latinos, after age and gender adjustments. For substance use disorders, family factors do not offset the elevated risk of early exposure to neighborhood disadvantage, but coming to the U.S. after age 25 does offset it. Family conflict and burden were consistently related to the risk of mood disorders. Our findings suggest that successful adaptation into the U.S. is a multidimensional process that includes maintenance of family harmony, integration in advantageous U.S. neighborhoods, and positive perceptions of social standing. Our results uncover that nativity may be a less important independent risk factor for current psychiatric morbidity than originally thought.

Keywords

Latinos; acculturation; psychiatric diagnosis; epidemiology; culture; race; immigrants; USA

Latino immigrants have better overall mental health than their U.S.-born counterparts and non-Latino whites (Burnam, Hough, Karno, Escobar, & Telles, 1987; Ortega, Rosenheck, Alegria, & Desai, 2000; Vega et al., 1998), but the universality of this claim for all Latino subgroups has not been rigorously tested. Our findings from the National Latino and Asian-American Study (NLAAS) on the prevalence of psychiatric disorders among Latinos in the U.S. indicate that foreign nativity is protective for some Latino groups (e.g., Mexicans), but not others (e.g., Puerto Ricans) (Alegria et al., 2007) and that protectiveness varies by disorder. Similar results were reported in the National Epidemiologic Survey on Alcohol and Related Conditions [NESARC] (Alegria, Canino, Stinson, & Grant, 2006), suggesting that other factors besides nativity play a role in the likelihood of psychiatric disorders for Latinos.

This article seeks to identify risk factors for specific psychiatric disorders that may explain differences in nativity effects among Latinos. We report new results from the NLAAS that differentiate Latino respondents by country of origin and age at immigration. We hypothesize that past-year psychiatric disorders across Latino subgroups will be associated with differences not only in acculturation and enculturation processes, but also with factors related to family stressors and supports, contextual factors, and social status factors.

Background

Complex factors may impact psychopathology across Latino ethnicity/nativity subgroups; differences could be due to variation in age, immigration experiences, acculturation and enculturation processes, family stressors, and perceptions of neighborhood and social status factors. Although Mexicans, Cubans, Puerto Ricans, and Other Latinos are usually grouped together as Latinos, their experiences both as immigrants and children of immigrants can be very different. For example, living in close proximity to Mexico and experiencing higher rates of immigration may reinforce Mexicans' cultural identity (Escobar, Nervi, & Gara, 2000), while high rates of undocumented status might block opportunities for social mobility in the U.S. (Powers & Seltzer, 1998; Sullivan & Rehm, 2005). Meanwhile, Cubans have the highest socioeconomic status of all Latino groups, tend to remain Spanish-speaking in the U.S. (Rivera-Sinclair, 1997), and mainly reside within Cuban enclaves in Miami that assist in easing the transition to the U.S. (Boswell, 2002; Hagan, 1998). In contrast to the other Latino subgroups, Puerto Ricans have lived with more than a century of U.S. influence, are U.S. citizens, and are more likely to be bilingual and to have adopted many of the lifestyle patterns of U.S. society (Guarnaccia, Martinez, Ramirez, & Canino, 2005), including expectations for increased social mobility in the mainland U.S. (Cortes, Malgady, & Rogler, 1994). Other Latinos mainly include South Americans, Central Americans and Dominicans, who come mostly as young adults in search of better employment opportunities or to escape violence (Pellegrino, 2004).

Acculturation, Enculturation and the Bicultural Model of Adaptation

Few psychiatric epidemiological studies of Latinos have investigated factors that account for the risk of psychopathology among Latino ethnicity/nativity subgroups living in the U.S., at least partially due to the challenge of disentangling the effects of acculturation from other risk factors (Rogler, Cortes, & Malgady, 1991). Acculturation can be defined as “the acquisition of the cultural elements of the dominant society” (Lara, Gamboa, Kahramanian, Morales, & Bautista, 2005), including norms, values, ideas and behaviors. Since acculturation is an intangible process, researchers often rely on English-language proficiency as a proxy for cultural integration into U.S. society (Blank & Torrechila, 1998). Traditional acculturation measures have been criticized for their focus on a single variable with the extreme values (all Spanish/all English) representing high adherence to either the native or host-culture (Cortes, 1994; Kim & Abreu, 2001). This unidimensional model mistakenly assumes that the increasing acquisition of the dominant culture directly corresponds to systematic disengagement from the native culture (Rogler et al., 1991), thereby precluding assessment of the degree to which an individual is involved in each culture (Cortes, 1994; Marin & Marin, 1992).

To address this gap, the concept of enculturation has been introduced as part of a bicultural model. Enculturation is the process of preserving the norms of the native group (Kim & Ominzo, 2006), whereby individuals retain identification with their traditional ethnic culture. Acculturation and enculturation can occur at the same time and can be measured separately (Kim & Ominzo, 2006). Measures of Spanish language proficiency and usage and strong Latino ethnic identity are key indicators of close identification with Latino culture (Wallen, Feldman, & Anliker, 2002), and therefore serve as proxies for enculturation. Different combinations of acculturation and enculturation (e.g., biculturalism, high acculturation-low enculturation, low acculturation- high enculturation, low acculturation-low enculturation) may lead to different adaptation experiences, and consequently different prevalence of psychiatric disorders. For example, bicultural individuals (those who have both acculturated to the dominant culture and retained ethnic identity through enculturation) may be able to contend with the demands of both cultures, leading to better mental health (LaFromboise, Coleman, & Gerton, 1993). Both the acquisition of U.S. cultural norms and values related to acculturation (Lara et al., 2005) and the maintenance of native cultural values, or enculturation, have been hypothesized to be linked to the mental health outcomes of different ethnic groups such as Native Americans, Asians and Latinos (Kim & Ominzo, 2006).

Immigration Factors and Family Stressors and Supports

Other immigration and nativity factors could also affect adaptation experiences. Specifically, those living in the U.S. at an early age have more exposure to U.S. culture at formative ages and may have weaker identification with native cultural values, such as strong family ties, that have been associated with better mental health (Finch & Vega, 2003). From a developmental perspective, there are few expected differences between a U.S.-born child of recent immigrant parents and a child who migrates to the U.S. before the age of 6 (Suarez-Orozco & Suarez-Orozco, 2001). Both would experience enculturating forces during their pre-school years, but would then integrate into U.S. culture as they enter American schools (Suarez-Orozco & Suarez-Orozco, 2001). Moreover, immigrants who come to the U.S. before age 6 may confront significant pressure to acquire English as their dominant language (Suarez-Orozco & Todorova, 2003), and this represents a strong cultural anchor for socially-constructed meaning. “Because culture is a shared phenomenon passed from one generation to the next, language becomes the core medium of the communication and creation of culture” (Guarnaccia & Rodriguez, 1996 p. 423–424).

Many researchers ignore the developmental relevance of age of immigration. We define immigration effects in a novel way. Instead of simply noting who was born in the U.S. and

who was born elsewhere, we propose to combine those immigrants who arrived before the age of 6 with those born in the U.S. The combined group is called “In-US-as-Child” (IUSC). Alegria et al., (2007) have documented that age 6 is, empirically, the best age cut point, as well as the one justified developmentally. The IUSC group is contrasted to immigrants who arrived after they already were in school. Later-Arrival Immigrants (LAI) refers to those who immigrated to the U.S. after age 6.

In addition to a new look at the immigration experience, we evaluate the importance of social support processes for Latino groups. Several groups have argued that higher levels of family support among immigrants may also be associated with lower prevalence of mental disorders relative to U.S.-born Latinos. For example, Hovey (Hovey, 2000a,2000b) found that family dysfunction and ineffective social support were predictors of depression but the provision of emotional support from family seemed to ease stressful experiences of acculturation (Hovey & Magana, 2002). However, there are few formal empirical tests on the role of family ties as a resiliency factor for Latinos’ mental health, and most studies have only been conducted with Mexicans.

Moreover, disruption of family support networks (Rogler et al., 1991), increased intergenerational conflict, and heightened family burden in the form of excessive demands by extended family are hypothesized to be linked to psychiatric disorders. The socialization of young Latino children in U.S. schools could be related to family cultural conflict, which itself may have an impact on the social support network. On the other hand, religious attendance, common among low-income Latino groups, might help minorities cope with the hardship of disadvantageous circumstances (Jarvis, Kirmayer, Weinfeld, & Lasry, 2005) by establishing socially-protective ties that buffer stressors.

Contextual Factors

Regardless of nativity, Latinos (and other minorities) in the U.S. may face additional life stressors linked to contextual factors that can influence the risk for psychiatric disorders. Unsafe neighborhoods, where Latinos are more likely to be living in comparison to non-Latino whites (Martinez, 1996;Phillips, 2002), may increase the likelihood of psychiatric disorders (Singer, Baer, Scott, Horowitz, & Weinstein, 1998). Exposure to racial/ethnic-based discrimination (Finch, Kolody, & Vega, 2000;Singh & Siahpush, 2001) have been associated with negative health outcomes. Latinos—because of their skin color and as a result of their culture and language—are considered “persons of color” upon migration to the U.S. mainland (Szalacha et al., 2003), leaving them vulnerable to experiences of discrimination that have been linked to poor mental health outcomes (Klonoff, Landrine, & Ullman, 1999;Szalacha et al., 2003).

Social Status and Perceived Social Standing in the U.S. Community

In addition, low social status (Alegria, Bijl, Lin, Walters, & Kessler, 2000;Williams & Collins, 1995) and subjective perceptions of low social status (Adler, Epel, Castellazzo, & Ickovics, 2000) have been associated with higher risk of psychopathology. There is some evidence that once in the U.S., some Latinos experience a rapid transition in family structure from two- to one-parent families (Rumbaut, 2006) and increased drug use (Hernandez & Charney, 1998), with reports of marital disruption for Puerto Ricans and Mexicans but less data on whether this phenomenon applies to all Latino groups. Of all Latino groups, U.S.-born Puerto Ricans have the highest rates of single-headed households and also the highest rates of substance use disorders (U.S. Census Bureau, 2000). We include marital status, employment status, income, education, and self-perceived social status as dimensions of social status following Marceau and McKinlay’s model (Alegria, Takeuchi et al., 2004;McKinlay & Marceau, 1999). These social status measures help describe where Latinos integrate into the hierarchy of U.S. society and consequently can be used as proxies for the risk of psychiatric illness.

Goals of the Paper

As the preceding review suggests, there are a wide variety of potential influences on psychiatric risk and resilience among Latinos, and these influences might vary across subgroups defined by country of origin. The goal of this article is to examine these influences, paying special attention to the role of immigration experience within subgroups. To do this, we form eight strata of NLAAS Latino participants by crossing origin (Cuban, Mexican, Puerto Rican and Other Latino) with a binary indicator of developmentally-informed immigration experience: Immigration after age 6 (Later Arrival Immigrants: LAI) vs. In-U.S.-as-Child (IUSC). The latter group combines children who immigrated by age 6 with those who were born in the U.S., and we provide evidence supporting this combination. We examine the risk of these groups for depressive, anxiety, and substance use disorders: disorders with relatively high prevalence and important public health and individual costs.

In addition to considering a developmentally-informed definition of immigration experience, we incorporate ideas about enculturation when considering the experience of Latinos in the U.S. We differentiate the process of acculturation from that of enculturation in order to be able to conceptually and empirically capture the complex process by which immigrants may adapt to a new society. Including both acculturation and enculturation processes is particularly important for analyzing the factors associated with psychopathology (Kim & Ominzo, 2006).

Methods

Sample

As described in detail elsewhere (Heeringa et al., 2004), the NLAAS is a nationally representative survey of English- and Spanish-speaking household residents ages 18 and older in the non-institutionalized population of the coterminous United States. Latinos were divided into four subgroups: Puerto Rican, Cuban, Mexican and all Other Latinos. 2554 Latinos comprised the final sample with a response rate of 75.5%. This includes an NLAAS Core sample, designed to provide a nationally-representative sample of all Latino origin groups regardless of geographic residential patterns; and NLAAS-high density (HD) supplements, designed to over sample geographic areas with moderate to high density ($\geq 5\%$) of targeted Latino households in the U.S. Weighting reflects the joint probability of selection from the pooled Core and HD samples provides sample-based coverage of the full national Latino population. The NLAAS weighted sample is similar to the 2000 Census in sex, age, education, marital status and geographical distribution (data not shown) but different in nativity and household income, with more Latino immigrants to the U.S. and lower-income respondents. This is consistent with reports of the undercounting of immigrants in the Census (Anderson & Fienberg, 1999).

Data Collection

Data were collected by the Institute for Social Research at the University of Michigan between May 2002 and November 2003. Eligibility criteria for the Latino sample of the NLAAS included age (18 years or older), ethnicity (Latino, Hispanic, or Spanish descent), and language (English or Spanish). Professional lay interviewers administered the NLAAS battery, averaging 2.6 hours. The Institutional Review Board Committees of the Cambridge Health Alliance, the University of Washington, and the University of Michigan approved all recruitment, consent, and interviewing procedures. A detailed description of the NLAAS data collection procedures are described elsewhere (Pennell et al., 2004).

Measures

The development of the NLAAS instrument involved creation of new measures, cultural adaptation of existing measures, and translation of most measures into Spanish. Some measures, such as family burden and discrimination, were adopted from the National Survey of African American Life (Jackson et al., 2004) and the National Comorbidity Replication Study (Kessler & Merikangas, 2004). Key variables and scales with their psychometric properties are described in (Alegria, Vila et al., 2004). Most measures were selected based on face validity, internal reliability, and use in other studies of Latino mental health, maintaining the items of the originators.

Demographic variables used in the analysis are *gender* and *age* (18–24; 25–34; 35–49; 50–64; ≥ 65), using comparable categories to those previously used in the literature (Capps, Fix, Ost, Reardon-Anderson, & Passel, 2004). Individual immigration factors, such as *parental nativity for U.S.-born* (whether one or both of respondent's parents were U.S.-born, or both foreign-born) and *age of arrival of immigrants* (to U.S.: 0–6, 7–17, 18–24, and 25+ years of age), are also assessed as variables linked to nativity that might influence experience of adaptation to U.S. society. We used an *English language proficiency* scale ($\alpha=0.98$) as a proxy to measure the construct of acculturation. This scale assesses respondents' ability to speak, read, and write in English (higher scores indicate higher-level proficiency; (Felix-Ortiz, Newcomb, & Myers, 1994). Similarly, we used the *Spanish language proficiency* scale ($\alpha=0.90$) and the *ethnic identity* scale ($\alpha=0.75$) as proxies to measure the construct of enculturation. The Spanish language proficiency scale assesses respondents' ability to speak, read, and write in Spanish (higher scores indicate higher-level proficiency; (Felix-Ortiz et al., 1994). The ethnic identity scale determines respondents' identification with, closeness of ideas about things, and shared time with members of their own ethnic group; with higher values indicating higher Latino ethnic identity.

To evaluate family stressors and family and other supports, we include three scales measuring *family factors* and one question evaluating *religious attendance*. The three-item *family support* scale assesses respondents' ability to rely on relatives by asking how often they talk on the telephone and how much they can open up to relatives ($\alpha=0.71$). *Family burden*, a two-item measure, captures frequency of demands and arguments with relatives or children, developed by Kessler and colleagues (Pennell et al., 2004). The *family cultural conflict* scale consists of five items measuring respondents' frequency of cultural and intergenerational conflict with families (e.g., family interference with personal goals, arguments with family members due to different belief systems) ($\alpha=0.91$). All scale scores shown in Table 1 were transformed so that their range was 0–1; hence, the scales represent the comparison of a subject with the highest possible score to a subject with the lowest possible score. Average scale scores were: 0.660 for family support, 0.307 for family burden and 0.134 for family cultural conflict (with larger numbers respectively indicating more support, greater burden, and greater conflict). *Religious attendance* measured frequency of attendance at religious services (≥ 1 per week, <1 per week, never). Religious attendance was classified as a support factor, since religious institutions have been shown to offer critical comfort to Latino immigrants by easing the transition to a new context and serving to link immigrants into U.S. communities while remaining connected to cultural values and norms (Levitt, 1998; Menjivar, 1999).

Contextual factors include *perceived neighborhood safety* and exposure to *discrimination*. In the *neighborhood safety* scale, three items measure respondents' perceived level of neighborhood safety and lack of violence ($\alpha=0.72$). Higher scores indicate a greater degree of perceived safety. Exposure to *discrimination* is a nine-item measure measuring frequency of routine experiences of unfair treatment (e.g., being treated with less respect than other people, having people act afraid of them; $\alpha=0.82$).

Social status variables include *marital status* (married as reference; divorced, separated, and widowed; never married), level of *education* (no high school [<9]; some high school [9–11]; high school graduate [12]; some college [13–15]; college degree or greater [≥ 16]), *annual household income* for the prior year (\$0–14,999; \$15,000–34,999; \$35,000–74,999; $\geq$ \$75,000), *employment status* (employed, unemployed, out of workforce), and *perceived social status*. *Perceived social status* is assessed by asking respondents to identify their social status relative to others in their U.S. community, based on money, education, and job respect (Adler et al., 2000). Higher scores indicate higher levels of perceived social status.

Diagnostic measures for last twelve-month prevalence of psychiatric disorders were obtained using the diagnostic interview of the World Mental Health Survey Initiative version of the World Health Organization Composite International Diagnostic Interview (WMH-CIDI; Kessler & Ustun, 2004) a structured diagnostic instrument based on criteria of the DSM-IV.

Analyses

We compute percentages and means of key variables in two ways: unadjusted, and adjusted for gender, age, parental nativity of U.S.-born, and age of arrival of immigrants. These analyses contrast Latino subethnic groups, then adjust in separate steps for immigration-acculturation-enculturation factors, family factors, contextual factors, and social status factors. Analysis of variables related to immigration experience required a special approach. Certain sources of variation are only meaningful for subsets of participants. For example, age of immigration is only meaningful for immigrants. Birth place of parents will only have meaningful variation among U.S.-born respondents. To allow comparisons across both immigrants and U.S.-born, we chose to use group averages as the reference group for contrasts involving parental nativity and age of immigration. Specifically, we contrasted U.S.-born respondents with both parents U.S.-born to the average of the In-U.S.-as-Child (IUSC) group, and we contrasted U.S.-born respondents with both parents foreign-born to the same IUSC average. Immigrants who arrived age 0–6 were contrasted to the IUSC average. Similarly, the three age groups of immigration associated with risk (7–17, 18–24, 25+) were contrasted to the average of the Later-Arrival Immigrant (LAI) group. Two of these six contrasts are redundant with the others, but we provide them all for descriptive purposes.

We also compared unadjusted and adjusted twelve-month prevalence of DSM-IV disorders focusing on composite diagnostic categories of *any depressive disorder* (dysthymia and/or major depressive episode), *any anxiety disorder* (agoraphobia, social phobia, generalized anxiety disorder, post traumatic stress, and/or panic disorder), *substance disorder* (drug abuse, drug dependence, alcohol abuse, and/or alcohol dependence) or *any disorder across subgroups* (any depressive, any anxiety, any substance disorder). Unadjusted and adjusted contrasts across the four Latino subethnicity groups (see Table 1) are tested using the Rao-Scott adjustments (Rao & Scott, 1984) provided by the STATA survey command for categorical variables and tests of mean value differences for continuous variables. This first set of comparisons reveals the differences across Latino subethnicity. We also contrasted Latinos by nativity and age of arrival to the U.S. (before age six or after age six, in Table 2) in the factors of interest. This second set of comparisons helps clarify the delineation of our nativity groups based on age of arrival to the U.S., with both sets of comparisons establishing the eight Latino ethnicity/nativity subgroups.

Logistic regression models assess whether proposed factors explain differences in risk of depressive, anxiety, and substance disorders among the eight Latino ethnicity/nativity subgroups. We constructed five hierarchical models that successively adjusted for the immigration and cultural measures described above. To conserve space, we present only the first and final models in this article, but the complete set is available from the authors. The first model includes indicators for ethnicity/nativity subgroups and adjusts only for age and sex.

The second through fourth models successively add immigration, acculturation, and enculturation factors, then family stressors and support factors (including religious attendance), and then contextual factors (e.g. perceived neighborhood safety and discrimination). The final includes all of these variables and social status factors (e.g., marital status, employment status, education, income, and self-perceived social standing). To maximize the precision of estimates, we used all available observations for each step. As additional variables were added, sample size declined slightly because of missing values. To be sure that difference in results between Model 1 and the Final Model are not due to changes in sample size, we conducted a sensitivity analysis that restricts the samples for Model 1 to be the same as that of the Final Model. Results are consistent with those reported here. Stata statistical software (StataCorp, 2004) survey analysis procedures, which account for the complex sampling design, were used to conduct all analyses.

Results

Differences by Latino Subethnicity

Table 1 depicts the variation in factors related to psychopathology risk, stratified by Latino subethnicity. Looking only at unadjusted values, we observe that more than half of Puerto Ricans are born in the mainland U.S. Puerto Ricans have high levels of family cultural conflict, perceived exposure to discrimination, and good or excellent English language proficiency; low levels of perceived neighborhood safety; and increased likelihood of marital disruption and of any twelve-month disorders compared to other Latino subgroups. Cubans tend to be mostly late-arrival immigrants, arriving in the U.S. after age 6. They report high levels of family support, Latino ethnic identity, and good or excellent Spanish language proficiency; and low levels of family burden and family cultural conflict in comparison to other Latino groups. Mexicans on average are young, with low mean household incomes. They are less likely to be divorced, and report low rates of any 12-month disorders. Other Latinos are similar to Mexicans in terms of level of family cultural conflict, perceived exposure to discrimination, and level of perceived neighborhood safety. They report the lowest rates of any anxiety and any 12-month disorder.

Our findings for the unadjusted percentages/means in Table 1 show how Latino subethnic groups are significantly different in demographic, immigration, acculturation, enculturation, family, contextual and social status factors. These results also demonstrate that subethnic groups vary significantly in prevalence of anxiety and any psychiatric disorder. However, these differences diminish and are no longer statistically significant once we adjust for differences in age, sex, nativity, and age of arrival for immigrants.

Differences by Nativity and Age of Arrival to the U.S

To clarify the rationale for the delineation of our nativity groups, we present the findings that led us to combine immigrants who arrived before age 6 together with the U.S.-born. Table 2 shows demographic and risk comparisons of U.S.-born and immigrant respondents, with immigrant respondents split into two categories: immigrants who arrived in the U.S. before, and after, age six. The majority of the sample consists of Later-Arrival Immigrants who immigrated after age six (51.6%), whereas 41.6% are U.S.-born and 6.8% arrived in the U.S. between the ages of 0–6. Although the last group speaks Spanish as well as Later-Arrival Immigrants, they are much more like the U.S.-born in terms of English fluency. This reflects the developmental salience of immigration before starting school.

In addition to language comparisons, young immigrants differed from Later-Arrival Immigrants in seven other risk/demographic variables (age, family burden, neighborhood safety, reported level of discrimination, education, income and social standing). In contrast,

young immigrants only differed from the U.S.-born in three variables (other than Spanish proficiency): religious attendance, neighborhood safety, and social standing. For the latter two variables, young immigrants were more advantaged than the U.S.-born, but even more advantaged than Later-Arrival Immigrants. These findings provide empirical support for the formation of the In-U.S.-as-Child (IUSC) group, as a combination of U.S.-born and young immigrants, in contrast to Later-Arrival Immigrants (LAI).

Regression Models for Depressive, Anxiety, and Substance Use Disorders

Table 3 summarizes the results of logistic regression models to study factors that contribute to the explanation of risk for depressive, anxiety, and substance use disorders. The first block of information shows odds ratios (OR) for Latino subgroups relative to In-U.S.-as-Child (IUSC) Mexicans, using the seven pair-wise comparisons with the IUSC Mexican reference group. The second block (shaded dark grey) report derived odds ratios for Later-Arrival Immigrants (LAI) versus In-U.S.-as-Child (IUSC) for each subethnicity. These odds ratios are derived from contrasts of the subethnicity/nativity terms shown above them, and are not additional terms in the model. These derived estimates are generated using the `lincom` command in STATA 9, which computes point estimates and confidence intervals from linear combinations of coefficients. They are presented to facilitate inferences about LAI in each subethnic group. Three sets of columns in the Table show results for depressive, anxiety and substance use disorders, and in each set we present Model 1 (adjusted for only age and sex) and the Final model (adjusted for all available measures). The bottom rows of Table 3 show results from the three omnibus statistical tests for nativity and subethnicity differences for each model that are computed as adjusted Wald tests. The first row shows the test of any difference among eight ethnicity/nativity subgroups, such as whether differences exist between LAI Puerto Ricans and IUSC Mexicans. The second row gives the test of LAI versus IUSC difference, stratified by subethnicity, such as whether differences exist between LAI Cubans and IUSC Cubans. The third row shows the test of whether the immigration (IUSC vs. LAI) variation is significantly different across the four pairs of Latino subgroups (Puerto Ricans, Cubans, Mexicans and Other Latinos).

Depressive Disorders

The first columns of Table 3 show that two of the seven Latino subgroups are significantly different from IUSC Mexicans in the risk of past-year depressive disorders, after age and gender adjustments. IUSC Cubans and LAI Mexicans reported significantly lower prevalence of depressive disorders than IUSC Mexicans (IUSC Cubans: OR=0.4, $p<0.05$; LAI Mexicans: OR = 0.5, $p<0.001$) (Model 1). The bottom of Table 3 reports omnibus tests. All three show significance at the $p<0.05$ level in Model 1 (with age and gender adjustments). The first verifies that subethnicity groups differ from each other, and the second indicates that LAIs tend to differ from IUSCs groups within each subethnicity. The third test reveals that immigration effects vary from one subethnic group to the next.

In the Final Model, which adjusted for a variety of effects shown in Table 3, none of the omnibus tests showed significance. In this model, the terms that increased risk for depressive disorders include: family burden (OR=3.0, $p<0.05$); family cultural conflict (OR=2.7, $p<0.01$); being divorced, separated or widowed compared to being married (OR=2.0, $p<0.001$); and being out of the work force compared to being employed (OR=1.8, $p<0.01$). The terms that seemed to be protective for depressive disorders include perceived neighborhood safety (OR=0.3, $p<0.01$) and perceived high social standing in the U.S. community (OR=0.2, $p<0.05$).

Anxiety Disorders

The risk for anxiety disorders appears no different for LAI relative to IUSC Latinos, after age and sex adjustments (Model 1 in the shaded block of Table 3). After adjusting for all other

factors in the final model (Final Model), IUSC Other Latinos reported a significantly lower prevalence of anxiety disorders than IUSC Mexicans (OR = 0.4, $p < 0.05$). In the final model, those with both parents foreign-born have lower risk for anxiety disorders (OR=0.6, $p < 0.05$) as compared to the average IUSC participant. This is consistent with all the models (results not shown). Risk factors for past-year anxiety disorders include: family burden (OR=6.0, $p < 0.001$); family cultural conflict (OR=3.2, $p < 0.01$); perceived discrimination (OR=4.9, $p < 0.05$); never being married compared to being married (OR=1.6, $p < 0.05$); and being out of the work force compared to being employed (OR=2.7, $p < 0.001$). Similar to the findings for depressive disorders, self-perceived high social standing is significantly associated with decreased likelihood of reporting any anxiety disorders in the past twelve months (OR=0.2, $p < 0.05$). Religious attendance of less than once per week, compared to attendance one or more times per week, was also significantly associated with decreased likelihood of reporting any 12-month anxiety disorders (OR=0.6, $p < 0.05$). Compared with respondents with a \$35,000-\$74,999 household income, those with less than \$15,000 showed decreased likelihood of reporting any 12-month anxiety disorders (OR=0.6, $p < 0.05$). Although the specific contrast between IUSC Other Latinos and IUSC Mexicans was significant in the Final Model as noted above, the effect was not large enough to make the omnibus test at the bottom of Table 3 significant. Indeed, none of the three omnibus tests for the Final Model were significant.

Substance Use Disorders

Prevalence of 12-month substance-use disorders were estimated to be literally zero among those persons aged 65 years or older in the sample ($N = 228$), and were near zero (only one person observed with 12-month substance disorder) among immigrants whose age at arrival was 25 years or older ($N = 640$). Analysis of substance-use disorders in Table 3 was thus restricted to the subsample (78% of total weighted sample; $N = 1,825$) of persons younger than age 65, excluding immigrants whose age of arrival was 25 years or older. In Model 1 (with age and gender adjustments), the omnibus test of differences between LAI and IUSC Latinos across the four subethnic groups was significant for 12-month substance-use disorders ($p < 0.05$), with all groups showing a protective effect for LAIs, when contrasted to IUSCs. However, none of the individual odds ratios were significantly different from IUSC Mexicans, probably due to the small sample size. As anticipated, once we adjust for immigration, acculturation, and enculturation factors, as well as family, contextual, and social status variables in the final model, the omnibus test for comparing LAI and IUSC Latinos is no longer significant. In the Final Model, female gender (OR=0.1, $p < 0.001$) and perceived neighborhood safety (OR=0.1, $p < 0.01$) appear as protective factors, while never attending religious services compared to attending more than once a week (OR=3.5, $p < 0.01$), and never being married compared to being married (OR=2.4, $p < 0.01$) appear as risk factors for substance-use disorders. Once again, as with the findings for both depressive and anxiety disorders, self-perceived high social standing in the U.S. community is significantly associated with decreased likelihood of reporting any substance use disorder in the past twelve months (OR=0.3, $p < 0.05$).

Discussion

Consistent with previous findings (Grant et al., 2004), Mexican immigrants who arrive after age six to the U.S. show lower risk of depressive disorders than their IUSC counterparts, after age and gender adjustments. As reported in past studies (Escobedo, 1996; Narrow, Rae, Moscicki, Locke, & Regier, 1990), IUSC Cubans also reported significantly lower prevalence of depressive disorders than IUSC Mexicans, showing that the risk for U.S.-born Latinos might differ across subethnic groups. Less perceived discrimination, greater neighborhood safety, and lower family conflict and burden appear to contribute to decreased prevalence of depressive disorders among IUSC Cubans in comparison to IUSC Mexicans. Once we adjust for these

contextual and family differences in the Final Model, the differences in risk become insignificant.

In contrast, the eight ethnicity/nativity subgroups are not significantly different for anxiety after adjusting for age and gender. It seems that Other Latinos (mostly Bolivians, Nicaraguans, Salvadorians and Colombians) who arrived in the U.S. as children had lower risk of anxiety disorders compared to IUSC Mexicans, after adjusting for all other factors. However, this contrast was not predicted and it was not strong enough to yield a significant omnibus test, which was designed to control Type I error. We note this difference so that it can be monitored in future studies.

As hypothesized, family burden and family cultural conflict, perceived low neighborhood safety, exposure to discrimination, disrupted marital status, being out of the labor force, and perceived low social standing all to varying degrees figure as risk factors for 12-month depressive, anxiety, and substance-use disorders (as shown in the Final Models of Table 3). This implies that demonstrated differences in prevalence of psychiatric disorders among Latinos by ethnicity/nativity subgroups are a function of multiple factors beyond foreign nativity. These results help explain the inconsistent findings of other studies regarding whether foreign nativity is protective against psychiatric disorders, given that type of disorder and variables included in adjustments might produce different results across studies.

We identified several risk and protective factors linked to psychiatric disorders as Latinos integrate into U.S. society. Elevated family cultural conflict and family burden are associated with increased risk for depressive and anxiety disorders. This is consistent with Hovey's findings (Hovey, 2000a, 2000b) showing that family dysfunction and ineffective social support predict depression. After adjusting for family cultural conflict and family burden, LAI Mexicans experience similar risk for depressive disorders as IUSC Mexicans, suggesting the importance of family harmony to counter depression. These factors remain significant, even after adjusting for differences in marital status, perceived neighborhood safety, or social status.

We found no differences in risk for anxiety disorders for LAI relative to IUSC Latinos after age and sex adjustments. Our findings question the existence of a protective effect of nativity for past-year anxiety disorders. Nonetheless, foreign parental nativity emerges as a protective factor for anxiety disorders for U.S.-born Latinos (i.e. after adjusting for the LAI/IUSC distinction). Foreign parental nativity may inhibit the internalization of U.S.-society lifestyles, including expectations that might be incongruous with one's perceived social status (Dressler, 1988), diminishing the risk for anxiety disorders. For example, U.S. expectations for the disadvantaged may be unrealistic, with pressure to succeed and achieve the "American dream" without the opportunities to do so (Hochschild, 1995). Expectations for those whose parents were foreign-born (e.g., having healthy children, getting married) may be more compatible with the hardships and struggles of the disadvantaged, providing for a less stressful and disempowering experience of everyday life, and consequently lower risk for anxiety disorders. These findings highlight the importance of intergenerational effects on health outcomes.

One surprising result from our analysis is that low income (family income less than \$15,000) seems to be associated with less anxiety disorder relative to higher income (\$35,000 - \$74,999). This seems to fly in the face of considerable literature on economic disadvantage. In sensitivity analyses, we determined that this association only appeared when we adjusted for perceived social standing. This suggests that higher perceived social standing may suppress the potentially negative effect of low income, given that once we removed social standing from the model in sensitivity analyses, the protective effect of low income for anxiety disorders is no longer observed. We also cannot rule out that for Latinos in poverty, limited expectations

for social mobility might provide buffer from the stresses of low income and be protective for anxiety disorders (Breslau et al., 2006).

After age and gender adjustments (Model 1), Later Arrival Immigrants have lower risk for 12-month substance use disorders, independent of subethnicity, when contrasted to IUSC Latinos. This supports the persistence of the Latino immigrant paradox in substance-use disorders. Perceived level of neighborhood safety also seems associated with lower risk for substance-use disorders. This finding is consistent with other research (Cho, Park, & Echevarria-Cruz, 2005; Lambert, Brown, Phillips, & Ialongo, 2004; Wandersman & Nation, 1998) which emphasizes the importance of the receiving context, particularly early exposure to neighborhood disadvantage as a risk factor for illness, even after controlling for individual-level socioeconomic status. For substance-use disorders, the importance of arrival to the U.S. after age 25 offers insight into the context-dependent risk for substance use disorders. Coming to the U.S. as an adult might protect against exposure to risky social networks linked to drug use. Religious attendance also emerges as a factor that facilitates social participation and integration into positive social networks that protect against the negative impact of disadvantageous neighborhoods. This is consistent with evidence that religious involvement may be a protective factor against substance disorders (Miller, 1998), with the church functioning as a source of social control that discourages deviance.

There are certain limitations of this study. Most importantly, although a cross-sectional study helps us understand some aspects of the process of acculturation and enculturation, identifying causality is best assessed using a longitudinal approach. Some of the observed associations could reflect reverse causation, such as the possibility that family conflict is an outcome of depressive or anxiety disorders. Another limitation involves disentangling the effect of variables that are only proxies for certain cultural processes. For example, while Spanish proficiency might relate to internalization of Latino cultural values and attitudes, it does not indicate which values and attitudes might be protective. Language could also reflect the presence of different networks and lifestyles, independent of acculturation. However, these findings do suggest important future directions for research, such as the importance of contextual environment, religious attendance, and perceived social status for substance-use disorders. For example, findings presented in Table 2 suggest that Later-Arrival Immigrant Latinos with significantly lower incomes live in neighborhoods they perceive to be less safe and report lower social standing in their U.S. communities, increasing the importance of context in the prospective risk for psychiatric illness.

Our findings show that nativity may be a less important independent risk factor for current psychiatric morbidity than originally thought. In other words, it is not nativity per se that protects from psychiatric illness once immigrants arrive in the U.S., but rather family, contextual and social status factors associated with nativity and age of arrival in the U.S.. Family harmony, marital status, integration in employment and self-perception of high social standing appear to be central to decreased risk of depressive and anxiety disorders for Latinos in the U.S., while late arrival, perceived neighborhood safety, religious attendance, and self-perceptions of high social standing appear more relevant as protective factors for substance-use disorders. The within-group variation among Latinos means that ethnicity/nativity subcategories mask meaningful differences in historic and current living circumstances of ethnic minority populations.

Our results question the generalizability of the finding that all Latino immigrants have better mental health than U.S.-born Latinos. Among Mexicans, once we adjust for family factors, we find no differences between IUSC and LAI. A more complicated picture emerges whereby the risk of psychiatric disorders, depending on the disorder, can be a function of family burden and family conflict, as well as the availability of effective family supports, the contextual

environment (including exposure to discrimination, perceived neighborhood safety, and religious attendance) and self-perceived social status in the U.S. Most studies of the “immigrant paradox” lack explanatory factors specific to the Latino experience, and ignore the challenges of disentangling effects of nativity from other risk factors. Our findings suggest that comparing groups of Latinos by subethnicity and nativity is an important way to sort out potential mechanisms involved in increasing or decreasing risk of psychiatric disorders for Latinos living in the United States.

Acknowledgements

The National Latino and Asian American Study data used in this analysis was provided by the Center for Multicultural Mental Health Research at the Cambridge Health Alliance. The project was supported by NIH Research Grant # U01 MH62209 funded by the National Institute of Mental Health as well as the Substance Abuse and Mental Health Services Administration Center for Mental Health Services and the Office of Behavioral and Social Sciences Research. This publication was also made possible by Grant # P20 MD000537 from the National Center on Minority Health and Health Disparities. Its contents are solely the responsibility of the authors and do not necessarily represent the official views of the NCMHD. We appreciate the crucial comments of Naihua Duan and Tom McGuire.

References

- Adler N, Epel E, Castellazzo G, Ickovics J. Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy white women. *Health Psychology* 2000;19(6):586–592. [PubMed: 11129362]
- Alegria M, Bijl R, Lin E, Walters E, Kessler R. Income differences in persons seeking outpatient treatment for mental disorders: A comparison of the United States with Ontario and the Netherlands: A Comparison of the United States with Ontario and the Netherlands. *Archives of General Psychiatry* 2000;57(4):383–391. [PubMed: 10768701]
- Alegria M, Canino G, Stinson F, Grant B. Nativity and DSM-IV psychiatric disorders among Puerto Ricans, Cuban Americans and non-Latino Whites in the United States: Results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Journal of Clinical Psychiatry* 2006;67(1): 56–65.
- Alegria M, Mulvaney-Day N, Torres M, Polo A, Cao Z, Canino G. Prevalence of Psychiatric Disorders Across Latino Subgroups in the United States. *American Journal of Public Health* 2007;97:68–75. [PubMed: 17138910]
- Alegria M, Takeuchi D, Canino G, Duan N, Shrout P, Meng XL, et al. Considering Context, Place and Culture: the National Latino and Asian American Study. *International Journal of Methods in Psychiatric Research* 2004;13(4):208–220. [PubMed: 15719529]
- Alegria M, Vila D, Woo M, Canino G, Takeuchi D, Vera M, et al. Cultural Relevance and Equivalence in the NLAAS Instrument: Integrating Etic and Emic in the Development of Cross-Cultural Measures for a Psychiatric Epidemiology and Services Study of Latinos. *International Journal of Methods in Psychiatric Research* 2004;13(4):270–288. [PubMed: 15719532]
- Anderson, M.; Fienberg, S. *Who Counts?: The Politics of Census-taking in Contemporary America*. New York: Russell Sage Foundation; 1999.
- Blank S, Torrechila R. Understanding the living arrangements of Latino immigrants: a life course approach. *International Migration Review* 1998;32(1):3–19. [PubMed: 12321471]
- Boswell, T. *A Demographic Profile of Cuban Americans*. The Cuban American National Council; 2002.
- Breslau J, Aguilar-Gaxiola S, Kendler KS, Su M, Williams D, Kessler RC. Specifying race-ethnic differences in risk for psychiatric disorder in a USA national sample. *Psychological Medicine* 2006;36(1):57–68. [PubMed: 16202191]
- Burnam MA, Hough R, Karno M, Escobar J, Telles C. Acculturation and lifetime prevalence of psychiatric disorders among Mexican Americans in Los Angeles. *Journal of Health and Social Behavior* 1987;28:89–102. [PubMed: 3571910]
- Capps, R.; Fix, M.; Ost, J.; Reardon-Anderson, J.; Passel, J. *The Health and Well-Being of Young Children of Immigrants*. Urban Institute; 2004.
- Cho Y, Park GS, Echevarria-Cruz S. Perceived neighborhood characteristics and the health of adult Koreans. *Social Science & Medicine* 2005;60(6):1285–1297. [PubMed: 15626524]

- Cortes D, Malgady R, Rogler L. Biculturalism among Puerto Rican Adults in the United States. *American Journal of Community Psychology* 1994;22(5):707–721. [PubMed: 7755006]
- Cortes, DE. Acculturation and its relevance to mental health. In: Malgady, RG.; Rodriguez, O., editors. *Theoretical and conceptual issues in Hispanic mental health*. Melbourne, FL: Robert E. Krieger Publishing Co, Inc; 1994. p. 54–68.
- Dressler W. Social consistency and psychological distress. *Journal of Health & Social Behavior* 1988;29(1):79–91. [PubMed: 3367031]
- Escobar J, Nervi CH, Gara M. Immigration and Mental Health: Mexican Americans in the United States. *Harvard Review of Psychiatry* 2000;8(2):64–72. [PubMed: 10902095]
- Escobedo LKD, Anda R. Depression and smoking initiation among US Latinos. *Addiction* 1996;91(1):113–119. [PubMed: 8822019]
- Felix-Ortiz M, Newcomb MD, Myers H. A multidimensional measure of cultural identity for Latino and Latina adolescents. *Hispanic Journal of Behavioral Sciences* 1994;16:99–115.
- Finch B, Kolody B, Vega W. Perceived discrimination and depression among Mexican-origin adults in California. *Journal of Health and Social Behavior* 2000;41:295–313. [PubMed: 11011506]
- Finch BK, Vega WA. Acculturation stress, social support, and self-rated health among Latinos in California. *Journal of Immigrant Health* 2003;5(3):109–117. [PubMed: 14512765]
- Grant BF, Stinson FS, Hasin DS, Dawson DA, Chou P, Anderson K. Immigration and lifetime prevalence of DSM-IV psychiatric disorders among Mexican Americans and non-Hispanic Whites in the United States. *Archives of General Psychiatry* 2004;61(12):1226–1233. [PubMed: 15583114]
- Guarnaccia P, Martinez I, Ramirez R, Canino G. Are ataques de nervios in Puerto Rican children associated with psychiatric disorder? *Journal of the American Academy of Child and Adolescent Psychiatry* 2005;44(11):1184–1192. [PubMed: 16239868]
- Guarnaccia P, Rodriguez O. Concepts of Culture and Their Role in the Development of Culturally Competent Mental Health Services. *Hispanic Journal of Behavioral Sciences* 1996;18(4):419–441.
- Hagan J. *Social Networks, Gender, and Immigrant Incorporation: Resources and Constraints*. *American Sociological Review* 1998;63(1):55–67.
- Heeringa S, Wagner J, Torres M, Duan N, Adams T, Berglund P. Sample Designs and Sampling Methods for the Collaborative Psychiatric Epidemiology Studies (CPES). *International Journal of Methods in Psychiatric Research* 2004;13(4):221–240. [PubMed: 15719530]
- Hernandez, D.; Charney, E. *From generation to generation: The health and well-being of children in immigrant families*. Washington, DC: National Academy Press; 1998.
- Hochschild, J. *Facing Up to the American Dream: Race, Class, and the Soul of the Nation*. Princeton, N.J: Princeton University Press; 1995.
- Hovey J. Acculturative stress, depression, and suicidal ideation among Central American immigrants. *Suicide & life-threatening behavior* 2000a;30(2):125–139. [PubMed: 10888053]
- Hovey J. Psychosocial predictors of depression among Central American immigrants. *Psychological reports* 2000b;86:1237–1240. [PubMed: 10932588]
- Hovey JD, Magana C. Cognitive, Affective, and Physiological Expressions of Anxiety Symptomatology Among Mexican Migrant Farmworkers: Predictors and Generational Differences. *Community Mental Health Journal* 2002;38(3):223–237. [PubMed: 12046676]
- Jackson J, Torres M, Caldwell C, Neighbors H, Nesse R, Taylor RJ, et al. The National Survey of American Life: a study of racial, ethnic and cultural influences on mental disorders and mental health. *International Journal of Methods in Psychiatric Research* 2004;13(4):196–207. [PubMed: 15719528]
- Jarvis E, Kirmayer L, Weinfeld M, Lasry J. Religious Practice and Psychological Distress: The Importance of Gender, Ethnicity and Immigrant Status. *Transcultural Psychiatry* 2005;42(4):657–675. [PubMed: 16570522]
- Kessler R, Merikangas K. The National Comorbidity Survey Replication (NCS-R). *International Journal of Methods in Psychiatric Research* 2004;13(2):60–68. [PubMed: 15297904]
- Kessler R, Ustun T. The World Mental Health (WMH) survey initiative version of the World Health Organization (WHO) Composite International Diagnostic Interview (CIDI). *International Journal of Methods in Psychiatric Research* 2004;13(2):93–121. [PubMed: 15297906]

- Kim, B.; Abreu, J. Acculturation measurement: Theory, current instruments, and future directions. In: Ponterotto, G.; Casas, J.; Suzuki, L.; Alexander, C., editors. Handbook of multicultural counseling. 2. Thousand Oaks, CA: Sage; 2001. p. 394-424.
- Kim B, Ominzo M. Behavioral acculturation and enculturation and psychological functioning among Asian American college students. *Cultural Diversity & Ethnic Minority Psychology* 2006;12(2):245–258. [PubMed: 16719575]
- Klonoff E, Landrine H, Ullman J. Racial discrimination and psychiatric symptoms among Blacks. *Cultural Diversity and Ethnic Minority Psychology* 1999;5(4):329–339.
- LaFromboise T, Coleman HLK, Gerton J. Psychological impact of bioculturalism: Evidence and theory. *Psychological Bulletin* 1993;114(3):395–412. [PubMed: 8272463]
- Lambert S, Brown TL, Phillips CM, Ialongo N. The Relationship Between Perceptions of Neighborhood Characteristics and Substance Use Among Urban African American Adolescents. *American Journal of Community Psychology* 2004;34(3–4):205–219. [PubMed: 15663207]
- Lara M, Gamboa C, Kahramanian MI, Morales L, Bautista D. Acculturation and Latino Health in the United States: A Review of the Literature and its Sociopolitical Context. *Annual Review of Public Health* 2005;26:367–397.
- Levitt P. Local-Level Global Religion: The Case of U.S. Dominican Migration. *Journal for the Scientific Study of Religion* 1998;37(1):74–89.
- Marin BV, Marin G. Predictors of condom accessibility among Hispanics in San Francisco. *American Journal of Public Health* 1992;82(4):592–595. [PubMed: 1546783]
- Martinez R Jr. Latinos and Lethal Violence: The Impact of Poverty and Inequality. *Social Problems* 1996;43(2):131–146.
- McKinlay J, Marceau L. A tale of 3 tails. *American Journal of Public Health* 1999;89(3):295–298. [PubMed: 10076475]
- Menjívar C. Religious Institutions and Teansnationalism: A Case Study of Catholic and Evangelical Salvadoran Immigrants. *International Journal of Politics, Culture and Society* 1999;12(4):589–612.
- Miller W. Researching the Spiritual Dimensions of Alcohol and Other Drug Problems. *Addiction* 1998;93(7):979. [PubMed: 9744129]
- Narrow W, Rae D, Moscicki E, Locke B, Regier D. Depression among Cuban Americans: The Hispanic Health and Nutrition Examination Survey. *Social Psychiatry and Psychiatric Epidemiology* 1990;25:260–268. [PubMed: 2237607]
- Ortega A, Rosenheck R, Alegría M, Desai R. Acculturation and the lifetime risk of psychiatric and substance use disorders among Hispanics. *The Journal of Nervous and Mental Disease* 2000;88(11):728–735. [PubMed: 11093374]
- Pellegrino, A. Migration from Latin America to Europe: Trends and Policy Challenges. *International Organization on Migration*; 2004.
- Pennell B, Bowers A, Carr D, Chardoul S, Cheung G, Dinkelmann K, et al. The Development and Implementation of the National Comorbidity Survey Replication, the National Survey of American Life, and the National Latino and Asian American Survey. *International Journal of Methods in Psychiatric Research* 2004;13(4):241–269. [PubMed: 15719531]
- Phillips J. White, Black, and Latino Homicide Rates: Why the Difference? *Social Problems* 2002;49(3):349–373.
- Powers M, Seltzer W. Occupational Status and Mobility among Undocumented Immigrants by Gender. *International Migration Review* 1998;32(1):21–55. [PubMed: 12321470]
- Rao JNK, Scott AJ. On chi-squared tests for multiway contingency tables with cell proportions estimated from survey data. *Annals of Statistics* 1984;12:46–60.
- Rivera-Sinclair E. Acculturation/Biculturalism and It's Relationship to Adjustment in Cuban-Americans. *International Journal of Intercultural Relations* 1997;21(3):379–391.
- Rogler LH, Cortes DE, Malgady RG. Acculturation and mental health status among Hispanics: Convergence and new directions in research. *American Psychologist* 1991;46:584–597.
- Rumbaut, R. The National Research Council (Ed.), . Hispanics and the Future of America. Washington, DC: National Academies Press; 2006. The making of a people.

- Singer M, Baer H, Scott G, Horowitz S, Weinstein B. Pharmacy Access to Syringes among Injecting Drug Users: Follow-Up Findings from Hartford, Connecticut. *Public Health Reports* 1998;113 (Supplement 1):81–89. [PubMed: 9722813]
- Singh GK, Siahpush M. All-cause and cause-specific mortality of immigrants and native born in the United States. *American Journal of Public Health* 2001;91(3):392–400. [PubMed: 11236403]
- StataCorp. Stata Statistical Software Release 8.2. College Station, TX: Stata Corporation; 2004.
- Suarez-Orozco, C.; Suarez-Orozco, M. *Children of Immigration*. Cambridge, MA: Harvard University Press; 2001.
- Suarez-Orozco C, Todorova I. The social worlds of immigrant youth. *New directions for youth development* 2003;100(Winter):15–24. [PubMed: 14750266]
- Sullivan M, Rehm R. Mental health of undocumented Mexican immigrants: a review of the literature. *ANS Advances in nursing science* 2005;28(3):240–251. [PubMed: 16106153]
- Szalacha L, Erkut S, Garcia CC, Alarcon O, Fields J, Ceder I. Discrimination and Puerto Rican children's and adolescents' mental health. *Cultural Diversity and Ethnic Minority Psychology* 2003;9:141–155. [PubMed: 12760326]
- U.S. Census Bureau. *America's Families and Living Arrangements*. Washington, D.C: Current Population Reports; 2000.
- Vega WA, Kolody B, Aguilar-Gaxiola S, Alderte E, Catalano R, Caraveo-Anduaga H. Lifetime prevalence of DSM-III-R psychiatric disorders among urban and rural Mexican Americans in California. *Archives of General Psychiatry* 1998;55(9):771–778. [PubMed: 9736002]
- Wallen G, Feldman R, Anliker J. Measuring acculturation among Central American women with the use of a Brief Language Scale. *Journal of Immigrant Health* 2002;4(2):95–102. [PubMed: 16228765]
- Wandersman A, Nation M. Urban neighborhoods and mental health. *American Psychologist* 1998;53(6):647–656. [PubMed: 9633265]
- Williams RB, Collins C. U.S. socioeconomic and racial differences in health: patterns and explanations. *Annual Review of Sociology* 1995;21:349–387.

Table 1

Differences in unadjusted and adjusted¹ percentages/means by Latino subgroups

	Unadjusted percentages or means			Test of Differences	Adjusted percentages or means			Test of Differences
	Puerto Rican	Cuban	Mexican		Other Latino	Cuban	Mexican	
Sample								
N	494	576	863	613				
Weighted %	10.1	4.6	56.5	28.8				
Demographics								
% Female	51.2	47.3	46.2	52.4	*	46.9	48.7	48.9
Mean age	41.0	48.8	36.6	38.0	***	38.7	37.8	37.5
Immigration Factors ²								
% US born	55.1	13.9	43.2	38.3	**	58.7	43.8	38.7
Immigrants: % age of arrival 0–6 years	10.4	9.2	5.1	8.3	*	10.3	5.2	8.4
Immigrants: % age of arrival ≥ 7 years	34.6	77.0	51.6	53.4	***	31.0	51.0	52.9
Acculturation factor								
% English language proficiency good or excellent	69.5	40.7	45.7	56.6	***	62.3	45.9	60.7
Enculturation factors								
% Spanish language proficiency good or excellent	68.3	86.6	69.4	73.1	**	70.4	69.8	72.6
Mean Latino ethnic identity scale	0.785	0.850	0.783	0.754	***	0.798	0.785	0.746
Family stressors and social supports								
Mean family support scale	0.668	0.741	0.659	0.644	**	0.684	0.668	0.647
Mean family burden scale	0.328	0.257	0.298	0.324	**	0.303	0.299	0.326
Mean family cultural conflict scale	0.151	0.110	0.130	0.139	**	0.133	0.130	0.146
% Religious attendance: ≥ 1 wk	31.6	21.3	33.8	34.6	NS	32.4	34.8	33.3
% Religious attendance: <1 wk	39.9	47.4	50.1	45.3	*	38.0	49.0	46.2
% Religious attendance: never	28.4	31.3	16.1	20.1	***	29.6	16.2	20.5
Contextual factors								
Mean neighborhood safety scale	0.654	0.787	0.718	0.694	***	0.660	0.718	0.690
Mean discrimination scale	0.193	0.088	0.162	0.168	***	0.192	0.159	0.173
Social status factors								
% Married	39.6	56.2	57.1	45.0	***	39.9	58.0	45.4
% Divorced, separated, widowed	27.0	27.3	14.5	21.9	***	22.8	15.4	20.9
% Never married	33.4	16.5	28.4	33.1	*	37.3	26.7	33.7
% Employed	58.2	60.1	63.3	66.0	NS	56.8	61.0	67.2
% Out of work force	35.2	35.2	29.8	25.4	NS	35.5	32.2	24.6
% Unemployed	6.6	4.6	6.8	8.6	NS	7.7	6.8	8.2
Mean years of education	11.7	12.1	10.0	11.6	***	11.9	9.7	11.6
Mean household income (\$)	56,100	58,600	39,300	53,400	**	54,300	38,800	54,200
Mean perceived social standing in US community scale	0.619	0.639	0.602	0.629	NS	0.633	0.599	0.635

	Puerto Rican	Unadjusted percentages or means			Test of Differences	Adjusted percentages or means			Test of Differences
		Cuban	Mexican	Other Latino		Cuban	Mexican	Other Latino	
12-month disorders									
Any depressive	12.0	8.3	8.4	8.8	NS	8.1	8.7	7.8	NS
Any anxiety	15.8	11.3	9.2	7.8	*	14.0	9.8	7.3	NS
Any substance	3.4	1.7	2.9	2.9	NS	3.4	2.7	3.3	NS
Any disorder	24.3	16.6	15.6	15.2	*	19.8	16.3	14.9	NS

¹ Adjusted by sex, age, nativity, and age of arrival of immigrants.

² Immigrant factors adjusted only for sex and age.

NS, nonsignificant ($p \geq 0.05$).

* $p < 0.05$,

** $p < 0.01$,

*** $p < 0.001$.

Table 2

Comparison¹ of US born, immigrants with age of arrival 0–6 years, and immigrants with age of arrival ≥ 7 years.

	US born (1)	Immigrants age of arrival 0–6 years (2)	Immigrants age of arrival ≥ 7 years (3)	Test of (1) vs. (2)	Test of (2) vs. (3)
Sample					
N	924	203	1419	-	-
Weighted	41.6	6.8	51.6	-	-
Demographics					
% Female	48.6	49.7	48.3	NS	NS
Mean age	36.7	34.3	39.6	NS	***
Acculturation factors					
% English proficiency good or excellent	86.1	83.0	18.5	NS	***
Enculturation factors					
% Spanish proficiency good or excellent	55.1	77.1	80.6	***	NS
Mean ethnic identity scale	0.761	0.773	0.790	NS	NS
Family stressors and social supports					
Mean family support scale	0.686	0.663	0.633	NS	NS
Mean family burden scale	0.362	0.367	0.252	NS	***
Mean family cultural conflict scale	0.149	0.166	0.122	NS	NS
% Religious attendance: ≥ 1 wk	30.9	37.4	34.2	NS	NS
% Religious attendance: < 1 wk	47.0	49.0	48.0	NS	NS
% Religious attendance: never	22.1	13.6	17.8	*	NS
Contextual factors					
Mean neighborhood safety scale	0.723	0.794	0.690	**	***
Mean discrimination scale	0.205	0.198	0.127	NS	**
Social status factors					
% Married	47.4	55.5	54.9	NS	NS
% Divorced, separated, widowed	20.6	17.5	17.5	NS	NS
% Never married	32.0	27.0	27.6	NS	NS
% Employed	64.8	65.6	63.1	NS	NS
% Out of work force	27.0	25.3	31.4	NS	NS
% Unemployed	8.2	9.1	5.5	NS	NS
Mean years of education	12.0	12.7	9.5	NS	***
Mean household income (\$)	56,200	53,800	37,000	NS	**
Mean perceived social standing in US community scale	0.627	0.682	0.595	***	***
12-month disorders					
Any depressive	10.3	8.1	7.8	NS	NS
Any anxiety	10.4	10.5	8.4	NS	NS
Any substance	5.0	2.4	1.1	NS	NS
Any disorder	19.2	18.1	13.5	NS	NS

¹ All factors except sex and age adjusted by sex and age.

NS, nonsignificant ($p \geq 0.05$).

* $p < 0.05$,

** $p < 0.01$,

*** $p < 0.001$.

Table 3
Logistic Regression Models for 12-month Depressive, Anxiety, and Substance disorders

	12-month Depressive Disorders (N=2546)		12-month Anxiety Disorders (N=2112)		12-month Substance Disorders [†] (N=1479)	
	Model 1	Final Model (N=2112)	Model 1	Final Model (N=2112)	Model 1	Final Model (N=1479)
Subethnicity by nativity subgroups						
Mexican in US as child	1	1	1	1	1	1
Puerto Rican in US as child	0.92 [0.59, 1.44]	0.71 [0.41, 1.22]	1.55 [0.94, 2.57]	1.03 [0.57, 1.87]	1.12 [0.52, 2.42]	0.53 [0.15, 1.97]
Cuban in US as child	0.42 [0.19, 0.90] [*]	0.44 [0.12, 1.63]	0.96 [0.43, 2.15]	0.93 [0.30, 2.92]	0.93 [0.36, 2.43]	2.87 [0.62, 13.22]
Other Latino in US as child	0.78 [0.44, 1.39]	0.61 [0.28, 1.33]	0.51 [0.23, 1.14]	0.42 [0.18, 0.97] [*]	1.17 [0.58, 2.36]	1.69 [0.46, 6.23]
Mexican later arrival immigrant	0.54 [0.38, 0.76] ^{***}	0.72 [0.28, 1.87]	0.63 [0.34, 1.18]	1.07 [0.35, 3.32]	0.35 [0.10, 1.30]	0.54 [0.15, 1.94]
Puerto Rican later arrival migrant	1.57 [0.92, 2.65]	1.59 [0.70, 3.62]	1.29 [0.68, 2.43]	1.43 [0.68, 2.99]	0.23 [0.03, 2.00]	0.22 [0.01, 3.26]
Cuban later arrival immigrant	0.88 [0.57, 1.36]	1.33 [0.67, 2.63]	1.09 [0.71, 1.68]	1.97 [0.85, 4.57]	0.55 [0.16, 1.92]	0.89 [0.11, 6.89]
Other Latino later arrival immigrant	0.78 [0.50, 1.21]	0.97 [0.45, 2.11]	0.78 [0.49, 1.26]	1.08 [0.47, 2.50]	0.33 [0.07, 1.53]	0.58 [0.07, 5.06]
Derived estimates:						
Later arrival immigrant vs. In US as child						
Mexican later arrival immigrant vs. in US as child	0.54 [0.38, 0.76] ^{***}	0.72 [0.28, 1.87]	0.63 [0.34, 1.18]	1.07 [0.35, 3.32]	0.35 [0.10, 1.30]	0.54 [0.15, 1.94]
Puerto Rican later arrival immigrant vs. in US as child	1.70 [0.95, 3.06]	2.23 [0.96, 5.22]	0.83 [0.47, 1.48]	1.39 [0.69, 2.81]	0.20 [0.02, 1.73]	0.41 [0.03, 4.75]
Cuban later arrival immigrant vs. in US as child	2.12 [0.97, 4.63]	2.99 [0.78, 11.44]	1.14 [0.54, 2.41]	2.11 [0.69, 6.46]	0.59 [0.12, 2.86]	0.31 [0.04, 2.39]
Other Latino later arrival immigrant vs. in US as child	1.00 [0.60, 1.67]	1.58 [0.69, 3.61]	1.54 [0.74, 3.18]	2.55 [0.92, 7.10]	0.28 [0.05, 1.56]	0.34 [0.02, 7.57]
Gender and Age						
Female	1.73 [1.28, 2.33] ^{***}	1.43 [0.86, 2.40]	1.65 [1.13, 2.41] [*]	1.52 [0.91, 2.52]	0.26 [0.12, 0.52] ^{***}	0.12 [0.04, 0.36] ^{***}
Age (y)						
18–24	0.79 [0.39, 1.61]	0.59 [0.27, 1.30]	1.20 [0.80, 1.82]	0.74 [0.46, 1.21]	1.08 [0.40, 2.90]	0.43 [0.14, 1.31]
25–34	1	1	1	1	1	1
35–49	0.79 [0.49, 1.25]	0.80 [0.49, 1.31]	1.08 [0.76, 1.55]	1.34 [0.84, 2.16]	1.12 [0.59, 2.15]	1.37 [0.66, 2.86]
50–64	0.69 [0.43, 1.12]	0.70 [0.37, 1.30]	1.20 [0.82, 1.76]	1.61 [0.99, 2.63]	0.78 [0.14, 4.42]	1.25 [0.20, 7.96]
≥65	0.87 [0.44, 1.74]	0.89 [0.36, 2.18]	0.69 [0.26, 1.85]	0.64 [0.20, 2.01]		
Immigration factors						
One or both parents US born vs. Average in US as child	1.21 [0.92, 1.58]		1.28 [0.97, 1.68]		1.34 [0.83, 2.17]	
Both parents foreign born vs. Average in US as child	0.63 [0.36, 1.13]		0.56 [0.34, 0.92] [*]		0.76 [0.42, 1.40]	
0–6 vs. Average in US as child	1.17 [0.50, 2.72]		1.23 [0.79, 1.90]		0.52 [0.08, 3.17]	
7–17 vs. Average later arrival immigrant	1.10 [0.70, 1.72]		0.84 [0.58, 1.21]		0.80 [0.27, 2.39]	
18–24 vs. Average later arrival immigrant	1.00 [0.62, 1.62]		1.05 [0.76, 1.43]		1.22 [0.45, 3.33]	
≥25 vs. Average later arrival immigrant	0.92 [0.62, 1.36]		1.13 [0.81, 1.57]			
Acculturation factor						
English language proficiency						
Excellent or good	1.30 [0.58, 2.90]		1.47 [0.63, 3.43]		1.58 [0.44, 5.75]	
Fair or poor	1	1	1	1	1	1
Enculturation factors						
Spanish language proficiency						
Excellent or good	1.13 [0.61, 2.08]		1.32 [0.85, 2.05]		1.03 [0.35, 3.04]	
Fair or poor	1	1	1	1	1	1
Latino ethnic identity scale	0.53 [0.21, 1.37]		0.49 [0.16, 1.49]		2.14 [0.62, 7.38]	
Family stressors and social supports						
Family support scale	0.60 [0.31, 1.18]		0.44 [0.19, 1.04]		0.91 [0.26, 3.22]	

	12-month Depressive Disorders		12-month Anxiety Disorders		12-month Substance Disorders [†]	
	Model 1 (N=2546)	Final Model (N=2112)	Model 1 (N=2546)	Final Model (N=2112)	Model 1 (N=1825)	Final Model (N=1479)
Family burden scale		3.03 [1.25, 7.35] [*]		6.02 [2.39, 15.12] ^{***}		3.03 [0.68, 13.57]
Family cultural conflict scale		2.66 [1.31, 5.40] ^{**}		3.20 [1.56, 6.56] ^{**}		3.18 [0.76, 13.28]
Religious attendance						
1+ per week		1		1		1
<1 per week		0.85 [0.46, 1.60]		0.63 [0.42, 0.95] [*]		1.32 [0.50, 3.49]
Never		0.98 [0.60, 1.59]		1.14 [0.71, 1.83]		3.46 [1.55, 7.72] ^{**}
Contextual factors						
Neighborhood safety scale		0.29 [0.13, 0.62] ^{**}		0.54 [0.20, 1.46]		0.08 [0.02, 0.33] ^{**}
Discrimination scale		3.03 [0.86, 10.62]		4.94 [1.35, 18.02] [*]		4.00 [0.91, 17.60]
Social status factors						
Marital status						
Married		1		1		1
Divorced, separated, widowed		2.04 [1.45, 2.89] ^{***}		1.15 [0.73, 1.82]		0.47 [0.14, 1.55]
Never married		1.56 [0.94, 2.59]		1.58 [1.03, 2.44] [*]		2.39 [1.28, 4.47] ^{**}
Employment status						
Employed		1		1		1
Unemployed		0.93 [0.36, 2.44] ^{**}		1.40 [0.88, 2.23] ^{***}		0.82 [0.20, 3.42]
Out of work force		1.78 [1.17, 2.73] ^{**}		2.69 [1.62, 4.45] ^{***}		2.13 [0.80, 5.62]
Education (y)						
No high school (<9)		1.11 [0.68, 1.81]		0.71 [0.36, 1.40]		0.92 [0.36, 2.38]
Some high school (9–11)		0.91 [0.45, 1.84]		0.76 [0.42, 1.37]		1.29 [0.58, 2.88]
High school graduate (12)		1		1		1
Some college (13–15)		1.09 [0.54, 2.18]		0.69 [0.38, 1.26]		1.11 [0.49, 2.50]
College degree or greater (≥16)		1.76 [0.92, 3.38]		0.55 [0.24, 1.26]		0.76 [0.17, 3.39]
Household income (\$)						
0–14,999		1.04 [0.61, 1.79]		0.59 [0.35, 0.99] [*]		0.67 [0.20, 2.25]
15,000–34,999		0.75 [0.39, 1.45]		0.93 [0.55, 1.57]		1.13 [0.32, 3.96]
35,000–74,999		1		1		1
≥75,000		0.98 [0.46, 2.09]		1.29 [0.73, 2.28] [*]		0.72 [0.13, 4.02] [*]
Perceived social standing in U.S. community scale		0.24 [0.07, 0.78] [*]		0.23 [0.07, 0.71] [*]		0.27 [0.08, 0.92] [*]
Tests						
Differences among eight subethnicity by nativity groups (7 df)	**	NS	NS	NS	NS	NS
Later arrival immigrant vs. in US as child, stratified by subethnicity (4 df)	*	NS	NS	NS	*	NS
Interaction of nativity by subethnicity (3 df)	**	NS	NS	NS	NS	NS

[†] Restricted to respondents ≤ 65 years of age

NS, nonsignificant (p ≥ 0.05).

* p < 0.05,

** p < 0.01,

*** p < 0.001.