



HHS Public Access

Author manuscript

Hisp J Behav Sci. Author manuscript; available in PMC 2015 June 24.

Published in final edited form as:

Hisp J Behav Sci. 2013 September 5; 35(4): 486–509. doi:10.1177/0739986313499004.

The Immigrant and Hispanic Paradoxes: A Systematic Review of Their Predictions and Effects

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Abstract

A survey of the literature indicates that reported advantages of the Immigrant and Hispanic Paradox are inconsistent and equivocal. The *healthy migrant hypothesis* also suggests that current research approaches consider only “healthy” groups. Other methodological concerns include the simple underreporting of deaths, and that commonly used databases may not include all significant attributes and characteristics. We conducted a systematic review, synthesizing and identifying themes not explicitly found in the current literature. We also employ a simple quantitative index to assess the scholarly strength of references. Paradox protection appears uneven and is not generalizable across races, ethnicities, age groups and genders. In addition, acculturation, health behaviors and diet, ethnicity, acculturative stress, adolescence, undocumented and uninsured status, age of arrival in the United States and length of exposure, gender and age appear to be significant in predicting any beneficial effects.

Keywords

immigrant; Hispanic; paradox; protection; erosion; benefits; systematic review

Introduction

The *Immigrant Paradox* is generally applied to Latino, Asian and other racial and ethnic populations who settle in the United States. In certain health-related aspects, non-native-born arrivals who are less acculturated appear to exhibit better outcomes than more acculturated or native-born individuals from the same race or ethnicity, or the White population (Ali, McDermott, & Gravel, 2004; Alvarez, Jason, Olson, Ferrari, & Davis, 2007; Dey & Lucas, 2006; Franzini, Ribble, & Keddie, 2001) The *Hispanic Paradox* (Franzini et al., 2001; Markides & Eschbach, 2005; Palloni & Morenoff, 2001) focuses on immigrants mainly from Mexico, who are of low socioeconomic status, but nonetheless enjoy better-than-expected health and mortality outcomes, at least until middle age (H. Gonzalez et al., 2009).

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Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

In assessing any real advantages, the *healthy migrant hypothesis* (Abraido-Lanza, Dohrenwend, Ng-Mak, & Turner, 1999) seems especially relevant. It posits that epidemiologic risk-factor and demographic variable-based approaches consider only selectively healthy groups, and that findings are not representative of the wider target population (Nalini-Junko, 2011; Palloni & Morenoff, 2001). Immigrants recruited for certain studies may even be selected based on overall, good, self-rated health (Bostean, 2013). Many studies also do not consider health insurance and legal residency status, ethnicity, age or other potentially significant demographic factors such as nativity, race and ethnicity (Crimmins, Kim, Alley, Karlamangla, & Seeman, 2007; Nalini-Junko, 2011). Repositories and databases may also not reflect the general underutilization of health resources by Hispanic males (Teruya, 2009), the undocumented who have no health insurance (Marshall, Urrutia-Rojas, Mas, & Coggin, 2005; Urrutia-Rojas, Marshall, Trevino, Lurie, & Mingui-Bayona, 2006), or those who are otherwise deterred or discouraged from accessing services.

The Hispanic Paradox has been scrutinized in the context of *biological risk profiles* (Crimmins et al., 2007). Foreign-born Hispanics and U.S.-born Whites appear to enjoy similar health, while U.S.-born Mexican Americans are at higher medical and psychological risk. However, any immigrant advantage may result from *migrant health selectivity* (Crimmins et al., 2007), wherein healthy people are seen to naturally migrate into the country, while unhealthy people leave. Other credible factors include the underreporting of deaths among the undocumented (Franzini et al., 2001) and *salmon bias*, in which an immigrant's unreported exit from the country imparts inaccurate longevity (Abraido-Lanza et al., 1999; Bostean, 2013).

In general, paradox protection seems inconsistent and uneven. Mexican immigrants, for example, report significantly better physical functioning than non-Hispanic Whites or Mexican Americans born in the U.S. However, the latter are thought to enjoy better mental health than non-Hispanic Whites or immigrants from Mexico (Farley, 2005). The above factors and other con-trary and inconclusive findings suggested two research questions:

Research Question 1: What are the true benefits, if any, of the Immigrant and Hispanic Paradoxes?

Research Question 2: Which methodological and sociodemographic factors are significant, and should be considered in current and future research?

Method

We applied Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) methods for conducting systematic reviews (EPPI-Centre, 2010), and those found in *The Cochrane Handbook for Systematic Reviews* (Higgins & Green, 2011). We also followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist (Moher et al., 2009), and the *Consort Statement Checklist* (Schulz, Altman, Moher, & The CONSORT Group, 2010) to minimize bias.

Our primary database resource was *PubMed* (US National Library of Medicine National Institutes of Health, 2012), but we also searched *Google Scholar*, *StatRef!*, and *PsychInfo*.

We recorded a list of search terms (see following section), along with the date on, and database in which searches were conducted. “Hits” were first evaluated using study titles and abstracts, and complete documents were obtained and reviewed for those passing this initial assessment.

Relevancy and Eligibility Criteria

We began our search on June 10, 2011 initially using controlled and thesaurus terms “immigrant paradox,” “Hispanic paradox,” “immigrant health,” “ethnicity,” “immigrant health models,” “health disparities,” “selectivity,” “determinants,” “factors,” and “predictors.” We examined peer-reviewed, qualitative and quantitative research, and book chapters, conference abstracts and other supplementary, background and theoretical material. We also considered review articles which did not rely solely on publications already examined in their original form.

With the exception of theoretical or background material, we followed current best practices in only considering sources published within the past 10 years (Creswell, 2010) to ensure their recency and relevance (Shojania et al., 2007). We limited our review to articles which dealt with Spanish-speaking immigrants from Mexico, Central and South America, Cuba and Puerto Rico. However, in the context of the Immigrant Paradox, we also examined non-Latino populations who settled in the U.S. and other countries. Sources were accepted based on (a) methodological quality, (b) methodological relevance and (c) the appropriateness of the study or material in answering our research questions. For abstracts and articles that were initially considered but subsequently excluded, the reason was recorded in a Microsoft Excel spreadsheet. All references were imported electronically or entered by hand into the *EndNote* citation manager, and organized by construct, effect and posited mechanisms in an Excel spreadsheet.

The Cumulative Citation Factor (CCF)

We devised and employ a simple quantitative index—the CCF—to help assess the scholarly strength of articles. The CCF is the average number of “Cited By” references for articles that support specific constructs, factors or predictors thought to be significant in the Hispanic and Immigrant Paradoxes. Articles that represent contrary findings or positions are, of course, not used to derive the CCF. For example, in regard to the fear of deportation as a deterrent in accessing healthcare, Farley (2005) was cited by 6 other PubMed articles, and Urrutia-Rojas et al. (2006) by 9, for a total of 15 “Cited By” references. Dividing this number by 2 yields an average, or CCF, of 7.5. This low-to-moderate weighting (the highest CCF derived in our study was 26, the lowest 2.2) assigns relatively minor significance to the fear of deportation. For completeness, we also report the number of publications (n) along with the CCF value; hence ($n = 2$; $CCF = 7.5$) for the above “fear of deportation” example. Valid criticisms of the CCF include the often small numbers of references (n), although these are all that were deemed eligible and relevant in our review. We recognize that newer articles are also less likely to be cited, regardless of merit.

Although the CCF may appear imprecise, we found internal, statistical consistency in the construct, and clear evidence of association between rank, number of references and CCF.

Having ranked all nine factors found most significant in our review according to the number of references and CCF, we derived a Spearman rank-correlation coefficient of 0.927 (highest possible value 1.0), with $p = .0003$ as to whether this coefficient was significantly different from zero. Thus, “acculturation” and diet/health behaviors were the most significant, and gender and age the least, based on (a) the number of supporting references, (b) the number of supporting articles that cited them, and (c) both.

The CCF was also generally consistent with the literature. For example, that the fear of deportation is *not* significant in accessing healthcare is supported by its relatively low CCF of 7.5, and one article (Cavazos-Rehg, 2007) (CCF = 5) that argues against its importance. The latter article itself is also supported by other studies (Nalini-Junko, 2011; Viruell-Fuentes, 2007) which report that overt or tacit racism and discrimination ($n = 2$; CCF = 11), rather than the fear of being deported, are more significant.

Results

Our search ultimately yielded 117 references, including background and theoretical material, reviews and secondary data sources. We use 46 different references to directly assess and compare constructs, factors, effects and predictors. It should be noted that there is some overlap: Turner (2006), for example, supports gender ($n = 5$; CCF = 10.2) and acculturative stress ($n = 3$; CCF = 5) in paradox protection or erosion. For this reason, the total number of articles (n) in our tables (80) will not equal the number of distinct, supporting references (46).

Commonalities and Differences in the Paradoxes

The Hispanic and Immigrant Paradoxes appear to provide uneven yet distinct benefits to different races and ethnic groups according to different predictors and factors (Table 1).

The Immigrant Paradox

Recent arrivals, especially those who are poor, are seen to enjoy better overall health than native-born peers, or those who have spent more time in the United States (Caplan, 2007; Crimmins et al., 2007; Franzini et al., 2001; Vega, 2011). Homelessness and poverty do not appear to predict negative outcomes (Chiu, Redelmeier, Tolomiczenko, Kiss, & Hwang, 2009; VanGeest & Johnson, 1997); at least one study uncovered a mortality advantage concentrated at lower levels of socioeconomic status, with little or no advantage at higher levels (Turra, 2007). Studies also agree on protection against drug use (Dey & Lucas, 2006; Franzini et al., 2001; Isralowitz & Reznik, 2007; Kornischka, Assion, Ziegenbein, & Agelink, 2008; Veen et al., 2002), which is not limited to Latinos or Asians, but does not appear to extend to adolescents in general.

The literature also reports inconsistent and contradictory outcomes and predictors. For example, immigrants overall appear to be disadvantaged in terms of mental health, including a higher prevalence of conduct problems, phobic fears, and early substance use (Breslau et al., 2011). Income, age, gender and acculturation were identified as significant predictors of wellbeing (P. González, 2008), whereas legal status and years of residency were not (Cuellar, 2004). However, undocumented status may lead to perceptions of the lack of

access to health services (Cavazos-Rehg, 2007), which may seem counterintuitive in that recently arrived Latino immigrants in general appear to enjoy better overall health than those who have spent more time in the United States (Caplan, 2007).

Perhaps the most significant weakness in the Immigrant Paradox is that it does not appear to be generalizable across races. For example, membership in a Mexican immigrant household in itself is seen to provide protection from the risk of low birth weight (Frank & Hummer, 2002). However, foreign-born Mexican American mothers are at increased risk for adverse perinatal out-comes and neonatal mortality, compared with that of immigrant Asian Indian mothers (Gould, 2003).

The Hispanic Paradox

The Hispanic Paradox advantage is reflected numerically in significantly lower rates of mood, anxiety and substance disorders for Mexican American immigrant men and women compared with that of their U.S.-born counterparts (Vega, 2004). Hispanic immigrants were even found to enjoy better oral health than non-Latino Whites (Sanders, 2010). However, the stress of migration in itself may increase the risk of depressive symptoms and anxiety in first-generation Latino immigrants (Mikolajczyk, 2007). Native-born Mexican Americans, in fact, were found to enjoy better mental health functioning than Mexican immigrants (Farley, 2005).

Grant (2004) reports that foreign-born non-Hispanic Whites enjoy better mental health compared with that of the native-born population. For minority youth, though, symptom presentation, biological factors, and family processes are found to vary significantly by ethnic group (Anderson, 2010). Psychiatric morbidity protection among Mexican Americans, for example, does not appear to extend to Puerto Ricans and Cuban Americans, nor even to non-Latino immigrants (Alegria, 2006). Alegria et al. (2008) also found that Puerto Rican immigrants suffer from psychiatric disorders at rates comparable with non-Latino White subjects, leading the authors to conclude no paradox for the former, and to recommend considering country of origin, and at what age they immigrated, in future research.

Death rates were also shown to vary significantly in Latino subgroups defined by nativity and nationality (Mexican, Puerto Rican, and Other Hispanic), as well as by age (Turra, 2007). Puerto Rican and U.S.-born Mexican American women aged 65 years and above were found to have a 25% lower death rate than did their non-Latino, White counterparts (Borrell, 2012). However, younger Puerto Rican women and Mexican American men and women were found to experience a 61% *greater* all-cause death rate than their White, U.S. peers (Borrell, 2009). It is also interesting to note that another study found that Cubans and other non-Mexican Latinos 45 to 64 years of age were much less likely to die than their non-Hispanic White counterparts (Borrell, 2012), despite what might be assumed to be a clear health advantage for Mexican immigrants in terms of lower occurrences of substance use (Borges et al., 2009) and smoking (Blue & Fenelon, 2011) in their native country.

Factors in Paradox Protection and Erosion

The literature appears to support, with some exceptions, at least a statistical health advantage for newly arrived immigrants, and for Mexican immigrants in particular (Table 2).

However, methodological concerns in data collection and approaches, and factors such as salmon bias may compromise such findings. Moreover, studies do not routinely examine specific sociodemographic attributes and factors which may be significant, such as gender, acculturation, health behaviors and diet, ethnicity, acculturative stress, adolescence, undocumented and uninsured status, age and age of arrival in the United States (Table 3).

Methodological Concerns

Studies suggest that the Hispanic Paradox does not exist (Palloni & Morenoff, 2001; Smith & Bradshaw, 2006) in large part because of migrant health selectivity and other process and methodological factors (Abraido-Lanza et al., 1999; Crimmins et al., 2007; Franzini et al., 2001; Nalini-Junko, 2011; National Research Council, 2004; Palloni & Morenoff, 2001; Smith & Bradshaw, 2006; Turra & Elo, 2008). Undocumented and uninsured, adult male Hispanic immigrants, for example, may be underrepresented as a result of limited access to and/or utilization of clinics and common treatment facilities. This could result in the underestimation of disease and conditions among the undocumented (Sullivan & Rehm, 2005) and uninsured, and compromise previous findings for both paradoxes.

In addition, commonly referenced data sets may not include all significant attributes and characteristics. The Center for Disease Control's (CDC) *Substance Abuse and Mental Health Data Archive* (SAMHDA) survey on self-reported drug use (National Survey on Drug Use and Health Series, 2008), for example, does not distinguish between legal and undocumented Hispanic respondents. Every 2 years, the California Health Interview Survey (CHIS) uses random-dial telephone interviews for data collection (CHIS, 2009). However, those without telephones are excluded, as well as those, of course, who do not wish to be surveyed for any number of reasons.

The National Health and Nutrition Examination Survey (NHANES) relies on interviews conducted in respondents' homes. This method will tend to exclude those without permanent residences, and, like CHIS, is self-selective in that it will capture only those who want to be interviewed (Centers for Disease Control and Prevention, 2011). Similarly, the U.S. Census survey protocol uses U.S. Postal Service addresses (United States Census, 2010), and may not capture data from those without permanent homes, who reside at an address on a temporary or informal basis, or who may not wish to be identified, such as undocumented immigrants.

Acculturation

The literature (Abraido-Lanza, Chao, & Florez, 2005; Bhattacharya, 2008; Buchanan & Smokowski, 2009; Caetano, Ramisetty-Mikler, Vaeth, & Harris, 2007; Ceballos, 2011; De La Rosa, 2002; Karriker-Jaffe & Zemore, 2009) indicates that "acculturation" is highly significant in the Immigrant and Hispanic Paradoxes, at least in an abstract sense. For example, North American values and lifestyles in Mexican American childbearing women

have been correlated with poor perinatal outcomes, including low birth weight (Callister, 2002). Those described as lower-acculturated Hispanic immigrants were also found less at risk of substance abuse than U.S.-born and more highly acculturated Hispanic peers (Campos, Podus, Anglin, & Warda, 2008).

However, assessing “acculturation” is problematic, at least in part, because of the lack of universal consensus on its definition and measurement (Campos et al., 2008).

“Acculturation,” “acculturative stress,” and “acculturation-related stress” (Buchanan & Smokowski, 2009; De La Rosa, 2002) are overlapping and often imprecise terms. Criteria include language (Marin & Gamba, 1996), psychosocial adjustment (Kang, 2006), diet (Satia et al., 2001), language spoken at home, country of birth, nationality of both parents, and number of years spent in the United States (Mikolajczyk, 2007). Perhaps as a result, “acculturation” as a proxy for health behaviors and diet, and the eventual loss of culture, language and traditional social networks may be more accurately predictive (Marshall et al., 2005). The reported detrimental effects of acculturation may even be overstated. “Medium” acculturation, for example, was found to have a protective effect against drinking among adult, immigrant Latino males (Karriker-Jaffe & Zemore, 2009).

Health Behaviors and Diet

Diet and lifestyle may be significant predictors for Hispanic immigrants, with the length of exposure to the U.S. (sometimes considered as measure of acculturation) as a possible covariate. Newly arrived immigrants from Mexico appear to have healthier lifestyles and better diets than their U.S.-born peers or Whites, for example, and Mexican American women born in the United States are seen at greater risk of declining dietary quality compared with that of women born in Mexico (Montez, 2008). Dietary patterns, positive and negative, though, are also seen to vary significantly by ethnicity (Neuhouser, 2004).

U.S. Hispanics in general, were found to suffer from low fiber diets (Mainous, Diaz, & Geesey, 2008), to eat fewer vegetables and more rice, beans, and fried foods, and to drink whole milk compared with most other racial groups (Otero-Sabogal, Sabogal, Perez-Stable, & Hiatt, 1995). Highly acculturated Hispanics also eat fewer servings of fruits and vegetables per day compared with the less acculturated (Neuhouser, 2004). It is interesting to note, though, that Hispanics were also found to consume one extra serving of fruits and vegetables per day than non-Hispanic Whites (Neuhouser, 2004).

One study (Ayala, 2008) is especially significant in its findings of no physiological relationship with intake of dietary fat, and percent energy from fat, in less- versus highly acculturated Hispanics. This suggests, among other things, no major physiological or metabolic difference between foreign- and U.S.-born Hispanics, and that poor diet and inactivity may be independent predictors of poorer health outcomes, possibly even as a function of time spent in the U.S. Obesity in Hispanics that is predicted by length of residence in the United States, for example, may be due, in fact, to exposure to and adoption of unhealthy dietary practices and lifestyles common in this country (Kaplan, 2004), in addition to known risks such as smoking (Gordon-Larsen, 2003).

Ethnicity

The absence and erosion of protective effects in the Hispanic Paradox differ significantly between ethnicities and corresponding age groups and genders (Alegria et al., 2008; Anderson, 2010). Specifically, death rates (Borrell, 2009, 2012; Turra, 2007), the prevalence of drug use (Borges et al., 2009), psychiatric morbidity (Alegria, 2006) and even diet (Neuhouser, 2004) and smoking habits (Blue & Fenelon, 2011) are seen to vary among different Latino subgroups. The eventual loss of protective factors such as culture-driven health behaviors, language and traditional social networks for Hispanics (Marshall et al., 2005) may also affect other races and ethnicities in different ways, and to different extents.

“Country of origin,” in fact, appears to be significant even for non-Latino immigrants. Former Soviet Union youth who immigrate to Israel, for example, suffer higher rates of substance abuse than their native-born peers. This is posited to arise from unique emotional and cognitive adjustments and conflicts they experience in adapting to their new country (Isralowitz & Reznik, 2007; Isralowitz, Reznik, Spear, Brecht, & Rawson, 2007). In New York City, adult male immigrants from India were found to have higher rates of depression and substance abuse than U.S.-born peers and Whites (Bhattacharya, 2008), in contrast to lower rates of mental distress and drug use among first-generation Mexican immigrants (Grant, 2004).

Acculturative Stress

A synthesis of the literature reveals that acculturative, or “acculturation-related stress” (Buchanan & Smokowski, 2009; De La Rosa, 2002) may be significant. As the lack of community and success in adjusting to and reconciling familial, cultural and social differences and challenges, acculturative stress is seen to affect all immigrant groups (Caplan, 2007; Turner, Lloyd, & Taylor, 2006). However, acculturative stress was found to be especially significant in drug dependence among immigrant U.S. Hispanics (Turner et al., 2006), who fear that admitting drug use could result in rejection from friends and family (Minior, Galea, Stuber, Ahern, & Ompad, 2003), and in inferior healthcare (Kon, Pretzlaff, & Marcin, 2004).

For immigrant and native-born Hispanic adolescents, the stress that arises in overcoming social, cultural and generational challenges (Soto, 2011) appears formidable. Being a member of an external cultural and racial group, along with overt discrimination, are seen by Hispanic immigrants as pathways through which their health, and the health of their native-born descendants, will erode (Viruell-Fuentes, 2007). In the United States, the academic success of immigrant youth from Mexico was found to be uniquely affected by undocumented status, racism and negative stereotypes about their racial and ethnic groups (Suárez-Orozco, Rhodes, & Milburn, 2009). Perceived discrimination was also one of two significant predictors found in a study of aggression in Latino adolescents (Smokowski, 2006).

Adolescence

Adolescence appears to be a moderately significant predictor in the erosion or absence of paradox protection. Studies have found higher levels of substance abuse among Latino

immigrant adolescents, compared with that among their native-born counterparts (De La Rosa, 2002; Minior et al., 2003). There appears to be some evidence for this risk among all races, though; in Canada, immigrant adolescents in general had higher levels of psychological distress, as well as drug use, compared with native-born peers (Hamilton, Noh, & Adlaf, 2009). As a whole, ethnic minority youth living in the United States appear to suffer from higher rates of depression and anxiety than Whites, with gender differences being consistent across ethnicities (Anderson, 2010).

Exposure to the United States seems to have an especially adverse effect on adolescents. Longer lengths of time living in this country was found to be significantly related to lower self-esteem among Latino adolescents (Smokowski, 2010) and higher rates of conduct disorder (Breslau, 2011). “Length of residence” in the United States is also associated with declining academic achievement and aspirations for immigrant youth (Suárez-Orozco et al., 2009), and the length of time the Latino adolescent spent in the U.S. was found to be related to humiliation and aggression (Smokowski, 2009).

Undocumented and Uninsured Status

As a methodological concern, undocumented and uninsured status can compromise the completeness and accuracy of data gathered at clinics and other study locations, which may be underutilized by immigrant male Hispanics without health coverage or legal status (P. González, 2008; Heilemann, 2002; Turner et al., 2006), for example. Not having health insurance has been shown to be a primary predictor of access to, and the quality of healthcare received (Hubbell, Waitzkin, Mishra, Dombrink, & Chavez, 1991; Marshall et al., 2005), and of negative health status for documented and undocumented immigrants (Marshall et al., 2005; Urrutia-Rojas et al., 2006).

Uninsured persons are also suspected of having greater alcohol and drug dependency (Wu, Kouzis, & Schlenger, 2003) and are at heightened risk for mental health problems (Nalini-Junko, 2011; Sullivan & Rehm, 2005). Uninsured immigrant drug users were also found less likely to enter substance abuse treatment than those who have Medicaid (Bachman, Walter, Kuilan, & Lundgren, 2008). Hispanic immigrants and their families appear to be at very high risk of not having access to healthcare, compared with that of non-immigrant Hispanics and non-Hispanic Whites (Pérez-Escamilla, 2010), and of also not having health insurance (Farley, 2005).

As reported earlier in this article, the literature does not convincingly support the fear of being revealed as an undocumented immigrant and deported as a result to be a significant factor in accessing healthcare (Cavazos-Rehg, 2007; Farley, 2005; Ruiz-Beltran & Kamau, 2001). In one study, only 39% ($n = 56$) of predominantly undocumented Hispanic subjects were concerned about seeking services for fear of deportation (Caplan, 2007). However, undocumented status is also perceived to possibly result in discrimination or recrimination in employment (Nalini-Junko, 2011), and can generate stress and fear in seeking and possibly being denied health services (Cavazos-Rehg, 2007).

Age of Arrival and Amount of Time in the United States

The age of an immigrant's arrival in the United States appears significant, although benefits and risks are mixed and uneven, and the amount of time spent in the United States may be a covariate. Older Mexican women who migrate to the United States, for example, were found to be at increased risk for hypertension (Salinas, Eschbach, & Markides, 2008). Women who spent all of their childhood years in Mexico before coming to the United States, though, were also found to have a lower level of depressive symptoms, and more satisfaction with life, compared with those among peers who were exposed to the United States during childhood (Heilemann, 2002). Compared with non-Latino Whites, Latinos who entered the United States after the age of 21 years were less likely to have lifetime social anxiety disorder (SAD) comorbidity with drug abuse and dependence (Polo, Alegría, Chen, & Blanco, 2011). The amount of time spent in the United States as a child, however, was also found to be more positively related to depressive symptoms than demographic variables such as age, income, or education (Heilemann, 2004).

For all immigrants, it seems that paradox protection is linked to shorter lengths of time in their new country. A study of 1,189 recent arrivals in Toronto, Canada, Chiu et al. (2009) revealed that they are generally healthier and significantly less likely to have drug problems, compared with the native-born population. Newly arrived Latino immigrants are also reported to enjoy better overall health than those who have spent more time in the United States (Caplan, 2007), and years of residency in the United States is not a predictor of well-being (Kaplan, 2004). Older Mexican American immigrants, in fact, appear to enjoy no health advantage over their U.S.-born counterparts (H. Gonzalez et al., 2009). Moreover, Mexican immigrants who returned to their native country exhibited increased levels of substance use corresponding to longer periods of time they spent in the United States, and the type of work performed as an immigrant (Borges, Medina-Mora, Breslau, & Aguilar-Gaxiola, 2007; Borges et al., 2009). Even the amount of time in the United States as a generational measure seems significant; the prevalence of binge eating (Swanson et al., 2012) and conduct disorders (Breslau, 2011) were found to increase dramatically across generations of Mexicans after migration to the United States.

More time in the United States is also linked to some positive outcomes. Along with support from family and teachers, longer stays were seen to reduce the risk of depressive symptoms and anxiety in immigrant adults (Potochnick, 2010). The literature also suggests a process of selectivity that yields positive attributes over time, such as increased height for immigrant Hispanic children who permanently reside in the United States (Crimmins, Soldo, Kim, & Alley, 2005).

For adults, certain contradictory findings may be explained through a construct in which any negative acculturation-health relationship initially encountered by younger immigrant adults becomes a positive relationship in later life (H. Gonzalez et al., 2009). Recent Hispanic arrivals, for example, are likely to experience hardship, acculturative stress and discrimination (Viruell-Fuentes, 2007). In response, they exercise psychological reconciliation and mediating processes that result in significantly higher cognitive functioning scores, and fewer problems in functional activities, than their U.S.-born counterparts (H. Gonzalez et al., 2009). Evidence also suggests that environmental factors

and greater socioeconomic resources contribute to initial and immediate positive outcomes for young and older immigrants (H. Gonzalez et al., 2009).

Gender

Female immigrants appear to have lower rates of lifetime disorders compared with women born in the United States (Viruell-Fuentes, 2007), and enjoy better overall health (Miranda, Siddique, Belin, & Kohn-Wood, 2005). Data from different Spanish-speaking countries even suggest that the Hispanic Paradox's protection against substance abuse is limited to young women (Turner et al., 2006). Two studies also indicate that any inherent health advantage for women manifests mainly in peri- and neonatal protection (Frank & Hummer, 2002; Gould, 2003). However, findings may be derived from data gathered at clinics and other healthcare locations that are underutilized by male Hispanics (P. González, 2008; Heilemann, 2002; Turner et al., 2006), particularly the undocumented and/or uninsured. This population is thought to depend mainly on emergency rooms, and will resort to them only once their medical and mental health conditions become urgent or life-threatening.

Age

The literature indicates that for adult immigrants, the age of the immigrant, and the age at which he or she came to the United States, may be significant, although benefits and risks appear uneven and inconsistent between races and ethnicities. Cuban and other Latino immigrants aged 45 to 64 years were found more than two times less likely to die than their non-Latino White counterparts (Borrell, 2012). However, as immigrants age, they appear to lose much of any statistical health advantage. Any paradox protection against alcohol and drug use, for example, is predicted to erode as Hispanics age (Andrews, 2008), and foreign-born Hispanics appear to achieve health parity with their U.S.-born peers by age 65 (H. Gonzalez et al., 2009).

Discussion

Studies which advocate the validity of the Immigrant Paradox are countered by those which report specific, negative physical and mental health outcomes, and higher rates of substance use, especially among immigrant adolescents. Findings may also be compromised by fundamental methodological concerns such as migrant health selectivity, and approaches that consider only selectively healthy groups. Moreover, the Immigrant Paradox's benefits do not appear to extend evenly and consistently to all races, ethnicities and subgroups. Similarly, the Hispanic Paradox does not protect consistently across all Latino ethnicities, age groups and genders, with Puerto Ricans and Cubans in particular found to enjoy fewer health advantages.

The literature reveals nine sociodemographic factors and possible covariates which appear to be significant predictors in the granting, absence and erosion of paradox protection. Although higher levels of acculturation are seen as significant, underlying mechanisms are not clearly identified and there is wide variation in acculturation's definition and measurement. Health behaviors and diet, though, are more straightforward and specific, and appear equally significant. The factors involved in acculturative, or acculturation-related

stress, are also relatively precise. However, their effects are seen to vary by ethnicity in the Hispanic Paradox, especially in recurrent themes of substance abuse and mental health. Immigrant adolescents in general appear to be the most vulnerable to psychosocial stressors, with Latino populations at greatest risk.

Undocumented and uninsured immigrants are also thought to have less access to care, and suffer poorer health outcomes. The uninsured also appear to suffer disproportionately from substance abuse and mental health problems, and Hispanics are among the least likely of any racial and ethnic group to have health insurance. Gender may also be significant, with females enjoying better health outcomes. However, findings can be inconclusive, in that data may not represent the undocumented and uninsured, particularly male Hispanics.

The age of the immigrant, and the age at which he or she migrated to the United States, possibly as a covariate with years of exposure to this country, appear significant. In short, younger immigrants exhibit better health outcomes than the middle-aged or elderly, excluding mental and drug conditions which disproportionately affect adolescent populations. As Hispanic immigrants age, they appear to lose much of any initial health advantage granted by beneficial environmental factors and greater socioeconomic resources. For all immigrants, however, years of exposure to the United States environment, culture and stressors, and whether this exposure began as an adult or adolescent, together form likely predictors in the erosion of any paradox protection.

“Acculturation” is clearly multifactorial, and its individual determinants and effects should be examined in detail in future studies. Acculturative stress arising from psychosocial stressors is also seen as predictive, and should be fully researched. In addition, the migrant health hypothesis suggests that commonly employed epidemiological and sociodemographic approaches are inadequate when they consider only the “paradoxically healthy,” rather than the entire population, including the sick, undocumented, uninsured, underserved and underrepresented. As such, future clinical and epidemiological research should carefully consider that immi-grant males, as well as the undocumented and uninsured, may be significantly underrepresented or not clearly distinguished in studies and data sets such as NHANES or CHIS. Moreover, these sources may not include all potentially significant attributes and characteristics, such as age, age of arrival in the United States, legal and health insurance status and ethnicity. For future studies, it is important to devise means and methods for collecting and reporting these data to ensure an accurate representation of all immigrant groups and subgroups.

Acknowledgments

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was supported in part by Grant NIH U54 RR026138-01.

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Table 1

Factors and Commonalities in the Immigrant and Hispanic Paradoxes.

	Commonalities			Differing factors and effects	
Immigrant paradox	Research methodology and epidemiological concerns, e. g. migrant health selectivity, underreporting of undocumented immigrant deaths, and the absence of legal status, ethnicity, in commonly used data sets appear to be significant factors/limitations in assessing true effect of both Paradoxes	Protection against drug use appears limited to adult immigrants	Not generalizable across all races and ethnicities	Beneficial effects uneven across races and ethnicities, with possible exception of protection against mental and substance disorders	Age, gender, and stress-inducing factors in acculturation are possible predictors of advantages or decline in beneficial effects
Hispanic paradox			Not generalizable across all "Hispanic," or Latino ethnicities	Mental and substance abuse protection appear limited to Mexican immigrants, not to Cubans, Puerto Ricans et al	Acculturation as a proxy for time spent in the United States appears especially significant for Mexican immigrants

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Table 2

References Which Support and Do Not Support the Immigrant and Hispanic Paradox Construct.

	Number and CCF of references which report statistical advantages	Number and CCF of studies which report specific negative mental and physical health outcomes in adults	Number and CCF of studies which express methodological concerns in data collection and approaches
Immigrant paradox	$n = 8$; CCF = 26	$n = 9$; CCF = 2.2	$n = 6$; CCF = 13
Hispanic paradox	$n = 4$; CCF = 21.8	$n = 9$; CCF = 4	

Note. CCF = cumulative citation factor.

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Table 3

Factors in the Protective Effects of the Paradoxes, and in Their Erosion.

Factors in protective effects in immigrant and Hispanic paradoxes	Number of references and CCF	Rank (number of articles)	Rank (CCF)
“Acculturation”	$n = 10$; CCF = 10.4	1	2
Health behaviors and diet (Hispanic paradox)	$n = 6$; CCF = 22.5	2	1
Variations based on ethnicity (Hispanic paradox)	$n = 5$; CCF = 8.8	3	4
Acculturative stress	$n = 5$; CCF = 10.2	3	3
Adolescence	$n = 5$; CCF = 5.6	3	5
Undocumented and uninsured status (Hispanic paradox)	$n = 4$; CCF = 5	4	6
Age of arrival in the U.S. (Hispanic paradox)	$n = 4$; CCF = 3	4	7
Gender	$n = 3$; CCF = 5	5	6
Age	$n = 2$; CCF = 2.5	6	8

Note. CCF = cumulative citation factor.