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Contextualizing nativity status, Latino social ties, and ethnic enclaves: an examination of the 'immigrant social ties hypothesis'

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Objectives. Researchers have posited that one potential explanation for the better-than-expected health outcomes observed among some Latino immigrants, vis-à-vis their US-born counterparts, may be the strength of social ties and social support among immigrants.
Methods. We examined the association between nativity status and social ties using data from the Chicago Community Adult Health Study's Latino subsample, which includes Mexicans, Puerto Ricans, and other Latinos. First, we used ordinary least squares (OLS) regression methods to model the effect of nativity status on five outcomes: informal social integration; social network diversity; network size; instrumental support; and informational support. Using multilevel mixed-effects regression models, we estimated the association between Latino/immigrant neighborhood composition and our outcomes, and whether these relationships varied by nativity status. Lastly, we examined the relationship between social ties and immigrants' length of time in the USA.
Results. After controlling for individual-level characteristics, immigrant Latinos had significantly lower levels of social ties than their US-born counterparts for all the outcomes, except informational support. Latino/immigrant neighborhood composition was positively associated with being socially integrated and having larger and more diverse social networks. The associations between two of our outcomes (informal social integration and network size) and living in a neighborhood with greater concentrations of Latinos and immigrants were stronger for US-born Latinos than for immigrant Latinos. US-born Latinos maintained a significant social ties advantage over immigrants – regardless of length of time in the USA – for informal social integration, network diversity, and network size.
Conclusion. At the individual level, our findings challenge the assumption that Latino immigrants would have larger networks and/or higher levels of support and social integration than their US-born counterparts. Our study underscores the importance of understanding the contexts that promote the development of social ties. We discuss the implications of these findings for understanding Latino and immigrant social ties and health outcomes.

Keywords: social support; social networks; Latinos; immigrants; nativity; immigrant status; length of time in the USA; ethnic enclaves; neighborhood context; USA

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Introduction

Evidence has suggested that some Latino immigrants have better health outcomes than their US-born counterparts, despite being relatively disadvantaged in terms of socioeconomic status (Vega and Amaro 1994; Escarce, Morales, and Rumbaut 2006). Although sensitive to specific health outcomes, this trend is part of a larger set of patterns, often referred to as the immigrant health paradox or healthy immigrant phenomenon, observed among other selected immigrant populations in the USA and in other countries, whereby recent immigrants appear to experience better health than longer-term immigrants and later generations (Antecol and Bedard 2006; Biddle, Kennedy, and McDonald 2007; Kennedy, McDonald, and Biddle 2006; Razum, Zeeb, and Rohrmann 2000; Singh and Siahpush 2002). In the case of Latinos in the USA, scholars have speculated that one of the main explanations for this phenomenon lies in the strength of social ties and social support among immigrants (Vega and Amaro 1994; Escarce, Morales, and Rumbaut 2006).

According to this explanation – which we call the 'immigrant social ties hypothesis' – social ties among Latino immigrants weaken with greater exposure to the cultural norms and behaviors in the USA, resulting in a loss of social, emotional, and material support that could have deleterious health consequences (Escarce, Morales, and Rumbaut 2006). This argument about the declining strength of social ties among immigrants with greater exposure to the USA suggests both comparisons within and across generations of immigrants.

The 'immigrant social ties hypothesis' has rarely been tested directly, but it rests on a pair of assumptions that appear to have strong face validity. The first assumption is that social relationships are important determinants of health, a claim that is supported by a large set of empirical studies (Berkman and Glass 2000; Heaney and Israel 2002; Smith and Christakis 2008). The second assumption is that social ties among Latino immigrants weaken with more exposure to the USA; on this issue, previous research has been more limited and equivocal. Of the few studies that have examined this issue, some have shown that first-generation Latino immigrants tend to have larger social networks and higher levels of social support than later generations (Vega and Kolody 1985; Zambrana et al. 1997; Landale and Oropesa 2001; Almeida, Molnar, et al. 2009). Others, however, have found the opposite, suggesting that migration disrupts social ties and social support among the first generation, but that ties increase with time in the USA and across generations (Landale and Oropesa 2001; Harley and Eskenazi 2006; Almeida, Molnar, et al. 2009; Franzini and Fernandez-Esquer 2004; Viruell-Fuentes and Schulz 2009).

Our study contributes new knowledge toward a deeper understanding of the contextual factors that shape Latino and immigrant health outcomes by comprehensively investigating the relationships between immigrant status and the strength of social ties and support among Latinos. To this end, we analyzed data from the Chicago Community Adult Health Study (CCAHS). Our study is unique in that it examines a broad range of measures pertaining to social ties, interaction, and support through two types of comparisons: differences across immigrant status, and differences within the first generation based on the length of time spent in the USA. We also investigate the relationship between social ties and neighborhood contexts because scholars have suggested that a Latino health paradox might also be present

at the neighborhood-level, as we discuss further below (Ostir et al. 2003; Patel et al. 2003; Eschbach et al. 2004; Almeida, Kawachi, et al. 2009).

Our analysis indirectly addresses the 'immigrant social ties hypothesis,' although a full treatment of this issue would necessitate an analysis of whether social ties and the resources they generate are related to health, which is beyond the scope of this paper. Our findings indicate that foreign-born Latinos tend to have weaker social ties than their US-born counterparts, thus undercutting one of the main assumptions of the 'immigrant social ties hypothesis.' In the analysis below, we explore whether this counterintuitive result holds up after controlling for (1) key socioeconomic and demographic background factors that differentiate foreign-born and US-born Latinos; (2) aspects of neighborhood context that also vary by immigrant status and are thought to facilitate the formation of social ties; and (3) the length of time that foreign-born Latinos have been in the USA. This last set of controls enables us to compare levels of social ties among immigrants based on the length of time they have lived in the USA. Furthermore, we assessed whether neighborhood context had differential effects on social ties depending on immigrant status.

Social ties and health

Nearly four decades of research has provided robust evidence linking social ties to health (House 1981; House et al. 1988a, 1988b; Williams and House 1991; Berkman and Glass 2000; Heaney and Israel 2002). Social ties, for instance, provide a sense of attachment; facilitate access to tangible and intangible resources; and position individuals within the context of a social group that offers normative social influence. Through these mechanisms, social ties not only influence health behaviors, but also psychological and physiological processes, which have implications for health and well-being (Berkman and Glass 2000). Indeed, 'social ties are associated with such a wide range of health outcomes that they presumably operate through multiple biological pathways and have a general effect of decreasing vulnerability to disease' (Williams and House 1991, 155).

The literature on social relationships and health among Latinos corroborates the importance of social integration and social support. Being integrated into social networks and/or having higher levels of social support have been associated, among other health outcomes, with higher levels of self-reported physical health (Angel and Angel 1992; Finch and Vega 2003); self-rated mental health (Mulvaney-Day, Alegria, and Sribney 2007); improved survival following myocardial infarction (Farmer et al. 1996); enhanced sense of well-being following breast cancer (Galván, Buki, and Garces 2009); and more frequent engagement in health-promoting behaviors (Eyler et al. 1999; Suarez et al. 2000). Greater integration into social networks and/or higher levels of social support have also been associated with lower rates of the following: depressive symptoms (Vega et al. 1991); suicidal ideation (Hovey 1999); stress during pregnancy (Landale and Oropesa 2001); and low birth weight (Sherraden and Barrera 1996, 1997; Weigers and Sherraden 2001).

Although the studies discussed above have documented the importance of social networks on health, there is limited research examining differences in social ties and their protective resources by nativity status and other immigration-related factors. Establishing such differences is central to assessing the validity of the social networks explanation for nativity differences in health.

The few studies that have examined this issue among Latinos have yielded mixed results. Some researchers have reported higher levels of social support and/or social integration among Latino (im)migrants than among their US-born counterparts (Vega and Kolody 1985; Zambrana et al. 1997; Landale and Oropesa 2001; Almeida, Molnar, et al. 2009), while others have found lower or similar levels of social ties among (im)migrants relative to those born in the continental USA (Vega and Kolody 1985; Golding and Baezconde-Garbanati 1990; Landale and Oropesa 2001; Harley and Eskenazi 2006; Rodriguez et al. 2007; Almeida, Molnar, et al. 2009). Several factors might explain the variability in findings among these studies. One is the differences in sampling strategies used; for instance, several studies relied on samples composed mostly of women (Zambrana et al. 1997; Harley and Eskenazi 2006; Almeida, Molnar, et al. 2009), in part because, for some, the goal was to assess the association between social ties and pregnancy outcomes. Another key factor is that many studies, particularly those that focus on Mexicans, have been conducted in the southwest and western USA, especially California (Vega and Kolody 1985; Golding and Baezconde-Garbanati 1990; Zambrana et al. 1997; Harley and Eskenazi 2006; Rodriguez et al. 2007). Therefore, the generalizability of these studies is limited.

In addition, with few exceptions (e.g., Rivera 2007), a review of the literature noted that increased length of residence in the USA, English language preference, and higher levels of so-called acculturation are 'associated with [equal or] higher levels of social integration and social support, rather than the lower levels that would be expected if social networks eroded with increased [exposure to the United States]' (Viruell-Fuentes and Schulz 2009, 12). The weight of the evidence, thus, raises questions about the role of social networks and social support in accounting for the apparent health advantage observed among some Latino immigrants.

Furthermore, scholars have suggested that a deeper understanding of the relationship between social integration, social support, and health requires attention to the larger social contexts in which social networks function (House et al. 1988b; Berkman and Glass 2000; Menjívar 2000; Acevedo-Garcia and Bates 2008). In fact, several have suggested that a Latino health advantage might also be occurring at the neighborhood level, such that, despite the higher levels of socioeconomic disadvantage observed in neighborhoods with higher concentrations of immigrants and/or Latinos, these enclaves may be protective of health (Ostir et al. 2003; Patel et al. 2003; Eschbach et al. 2004; Almeida, Kawachi, et al. 2009). As with the individual-level Latino health patterns, one explanation for the above is that immigrant/ethnic enclaves facilitate the development of health-promoting social relationships (Eschbach et al. 2004; Gresenz, Rogowski, and Escarce 2009; Vega et al. 2011). In addition, scholars have suggested that such enclaves may be particularly beneficial for immigrants (Frank, Cerda, and Rendon 2007; Mason et al. 2010; Osypuk, Bates, and Acevedo-Garcia 2010). However, despite the growing number of studies examining the relationship between neighborhood characteristics and health among Latinos, few studies (e.g., Almeida, Kawachi, et al. 2009; Vega et al. 2011) have directly examined whether higher concentrations of Latinos and/or immigrants are indeed associated with higher levels of social ties and social support.

Our goal is to contribute to a deeper understanding of the mechanisms through which immigration processes impact health outcomes; we do so by examining the relationships between immigrant status, neighborhood contexts, and social ties

among Latinos in Chicago. Specifically, the aims of our study are threefold. First, we test the frequently cited (but seldom tested) assumption that social networks are larger and provide higher levels of social support among immigrant Latinos than among US-born Latinos. Second, we assess the effect of immigrant and Latino neighborhood composition on several social network characteristics, and whether the neighborhood effects on social networks varied by nativity status. Third, we examine the relationship between social network characteristics and the length of time that foreign-born Latinos have been in the USA. To these ends, we analyze the 2002 data from the CCAHS.

Methods

Data

We analyzed cross-sectional survey data from the CCAHS, a multistage cluster probability sample of 3105 adults, aged 18 and older, living in Chicago, Illinois. The sample was stratified into 343 neighborhood clusters (NCs) previously defined by the Project on Human Development in Chicago Neighborhoods (PHDCN) (Sampson, Raudenbush, and Earls 1997). These NCs take into account local knowledge of Chicago's neighborhoods as well as its geographic boundaries, such as freeways, railroad tracks, and parks (Sampson, Raudenbush, and Earls 1997; Morenoff et al. 2007). The resulting NCs typically included two contiguous census tracts that approximated local neighborhoods. Individuals residing in 80 'focal areas' (defined by PHDCN) were oversampled at twice the rate as those in other areas. A clustered sampling design was used to facilitate comparisons within and between neighborhoods. The sample has a mean of 9.1 subjects per NC, with 14.3 persons per NC in focal areas and 7.5 people per NC in nonfocal areas (Morenoff et al. 2007). The data were collected between May 2001 and March 2003 via face-to-face interviews with one individual per household, with a response rate of 71.8%.

The CCAHS included 804 Latinos, 1240 non-Latino Blacks, 981 non-Latino Whites, and 80 people of other races/ethnicities. Our study focused on the Latino subsample. A total of 208 NCs had Latinos living in them. These NCs contained an average of 3.87 Latinos per cluster, with an average of 6.0 Latinos per cluster in focal areas and of 2.98 Latinos per cluster in nonfocal areas. We excluded 12 cases (1.5%) that had missing values on one or more of the outcome variables, yielding a total sample size of 792 Latinos. All data presented below were weighted to account for selection rates, differential coverage, nonresponse rates across neighborhoods clusters, and household size. The resulting weighted sample corresponds to the age, race/ethnicity, and sex distributions in the city of Chicago, as per the 2000 Census. For a fuller description of the CCAHS race/ethnicity classification methods and weighing procedures, see Morenoff and colleagues (2007); for additional documentation on the classification of Latinos, see Viruell-Fuentes, Ponce, and Alegría (2012).

Outcome measures

Our analysis examined five outcome variables: informal social integration; network diversity; network size; number of friends/relatives available to provide instrumental

support; and those available to provide informational support. *Informal social integration* was measured by taking the mean of the reverse-coded responses to two questions related to the frequency in which respondents: (1) get together with friends, neighbors, or relatives and do things like go out together or visit in each other's homes; and (2) talk on the telephone or exchange emails with friends, neighbors, or relatives. The answers were reverse-coded because the original response options to these questions ranged from one to six, with higher values indicating less frequent social contact. With reverse coding, the final index values ranged from one to six, where higher scores indicate higher levels of social integration.

A *social network diversity* index was created by taking the sum of the positive responses to 11 questions regarding different types of personal friends. Respondents were asked whether they had personal friends who: owned a business; were manual workers; had been on welfare; owned a vacation home; had a different religion from their own; were White; were Latino or Hispanic; were Asian; were Black or African-American; were gay or lesbian; or would be described as a community leader. The index, thus, represents the number of diverse types of personal friends a respondent has and which ranges from 0 (no personal friends or none of the above types) to 11 (has all 11 types of personal friends).

Size of social network represents participants' reports of the number of close friends and relatives they have – i.e., people they reported feeling at ease with, being able to talk to about private matters, or people they could call upon for help. Perceived availability of *instrumental support* indicates the number of friends and relatives respondents could turn to if they needed to borrow something like a household object or a small amount of money, or for help with an errand. *Informational support* represents a count of the number of friends and relatives that participants reported they could call upon for advice or information. Appendix 1 provides a description of the original survey questions from which our measures were derived.

Individual-level independent variables

The main individual-level predictor of interest was nativity, which we measured with a dichotomous indicator of whether the person was born outside of the USA. We also included a categorical measure of immigrants' length of residence in the USA in years (less than 5, 5–9, 10–14, and 15 or more). We disaggregated Latino respondents by including two dichotomous variables: Puerto Rican and Other Latino, with Mexican as the reference category. Additionally, we included controls for demographic characteristics and socioeconomic status. We accounted for sex, age (a categorical measure in years), marital status (currently married vs. not), and whether participants had children (yes vs. no). The models also included a categorical measure of educational level in years (less than 12, 12, 13–15, and 16 or more) and a categorical indicator of family income in dollars (less than $10,000, $10,000–29,999, $30,000–49,999, $50,000 or more, and a dummy variable to account for missing values on this variable).

Neighborhood-level independent variables

The main neighborhood variables used in our analyses represent continuous neighborhood-level measures constructed from 20 variables from the 2000 Census via factor analysis, with an orthogonal varimax rotation. The variables included indicators of socioeconomic status, racial/ethnic composition, age composition, family structure, proportion of housing that is owner-occupied, and residential stability. The factors were standardized to have a mean of zero and a standard deviation of one. For more details on the construction of these variables, see Morenoff and colleagues (2007).

The factor representing racial/ethnic/immigrant composition is the main neighborhood variable of interest in our analysis, with higher values indicating an increasing proportion of Hispanic and foreign-born individuals. To parcel out the effects of other neighborhood characteristics, we also controlled for other scales constructed from the factor analysis, representing socioeconomic disadvantage, affluence/gentrification, and age composition. The neighborhood socioeconomic disadvantage measure is characterized by low family incomes; few owner-occupied homes; and high levels of poverty, public assistance, unemployment, female-headed families, and never-married adults. The neighborhood affluence/gentrification measure represents greater concentrations of people with high levels of education and in professional/managerial occupations; higher concentrations of residentially mobile young adults; and fewer children under the age of 18. The older-age composition factor captures higher concentrations of people over 50 and lower concentrations of young adults and of never-married individuals.

Analytic strategy

After presenting descriptive statistics on our outcomes and independent variables in Table 1, we present results from multivariate analyses of nativity differences in social ties among Latinos. We do so in three stages. First, in Table 2, we examine nativity differences in social ties, and present results from ordinary least squares (OLS) regression models for each of our five measures of social ties. Two models are shown for each outcome. The first model estimates social ties differences between foreign-born and US-born Latinos, adjusting for Latino subgroup, gender, age, marital status, and whether respondents had children or not. In the second model, we add controls for education and income to examine the extent to which immigrant differences in social ties may be attributable to differences in socioeconomic status.

In the next stage of our analysis, presented in Table 3, we use multilevel mixed-effects regression models to estimate the association between neighborhood socio-demographic composition and social ties. Therein, we also examine whether adjusting for neighborhood context changes our estimates of the individual-level nativity status differences in social ties. Table 3 presents two models per outcome. The first model includes all of the individual-level covariates plus the four neighborhood factors (Latino/immigrant composition, disadvantage, affluence/gentrification, and older-age composition). The first model also contains a neighborhood-level random effect for the model intercept.[1] The second model adds a cross-level interaction term between individual-level nativity (foreign-born vs. US-born) and the neighborhood-level Latino/immigrant composition factor score to

Table 1. Weighted summary statistics by race/ethnicity, CCAHS 2002.

	All Latinos ($n=792$)		Foreign-born Latinos ($n=502$, 63%)		US-born Latinos ($n=290$, 37%)	
Variable	Mean/ Proportion	(SE)	Mean/ Proportion	(SE)	Mean/ Proportion	(SE)
Social network characteristics						
Informal social integration	4.35	(0.06)	**4.14**	**(0.07)**	**4.73**	**(0.08)**
Diversity index	4.82	(0.14)	**4.14**	**(0.15)**	**5.98**	**(0.20)**
Network size	6.02	(0.23)	**5.33**	**(0.27)**	**7.21**	**(0.42)**
Instrumental support	5.14	(0.21)	**4.70**	**(0.24)**	**5.89**	**(0.39)**
Informational support	5.08	(0.20)	**4.66**	**(0.24)**	**5.81**	**(0.30)**
Latino Subgroup						
Mexican	0.67	(0.03)	**0.71**	**(0.03)**	**0.61**	**(0.04)**
Puerto Rican	0.15	(0.02)	**0.11**	**(0.02)**	**0.23**	**(0.03)**
Other Latino	0.17	(0.02)	0.18	(0.02)	0.16	(0.03)
Time in the USA						
0–4 yrs	-	-	0.09	(0.02)	NA	NA
5–9 yrs	-	-	0.13	(0.02)	NA	NA
10–14 yrs	-	-	0.15	(0.02)	NA	NA
15 or more yrs	-	-	0.52	(0.03)	NA	NA
Missing	-	-	0.12	(0.02)	NA	NA
Male	0.49	(0.02)	0.50	(0.03)	0.47	(0.04)
Age						
18–29 yrs	0.35	(0.02)	**0.24**	**(0.02)**	**0.54**	**(0.04)**
30–39 yrs	0.28	(0.02)	**0.32**	**(0.03)**	**0.22**	**(0.03)**
40–49 yrs	0.16	(0.01)	**0.19**	**(0.03)**	**0.11**	**(0.03)**
50–59 yrs	0.10	(0.01)	**0.13**	**(0.03)**	**0.05**	**(0.01)**
60–69 yrs	0.07	(0.01)	0.08	(0.03)	0.04	(0.02)
70+ yrs	0.05	(0.01)	0.05	(0.03)	0.04	(0.02)
Married	0.54	(0.03)	**0.66**	**(0.03)**	**0.35**	**(0.04)**
Has children	0.75	(0.02)	**0.83**	**(0.02)**	**0.62**	**(0.03)**
Education						
Less than 12 years	0.45	(0.02)	**0.56**	**(0.03)**	**0.25**	**(0.03)**
12 years	0.25	(0.02)	**0.20**	**(0.02)**	**0.32**	**(0.03)**
13 to 15 years	0.21	(0.02)	**0.14**	**(0.02)**	**0.32**	**(0.03)**
16 years or more	0.10	(0.01)	0.10	(0.02)	0.11	(0.02)
Income						
< $10,000	0.09	(0.01)	0.08	(0.01)	0.11	(0.02)
$10,000–29,999	0.34	(0.02)	0.36	(0.03)	0.30	(0.04)
$30,000–49,999	0.21	(0.02)	0.20	(0.02)	0.23	(0.03)
$50,000 or more	0.19	(0.02)	**0.16**	**(0.02)**	**0.23**	**(0.03)**
Missing	0.18	(0.02)	**0.21**	**(0.02)**	**0.12**	**(0.02)**
Neighborhood factors						
Concentrated Latinos/ Immigrants	0.84	(0.06)	**0.97**	**(0.06)**	**0.63**	**(0.07)**
Concentrated disadvantage	−0.23	(0.05)	**−0.20**	**(0.06)**	**−0.30**	**(0.06)**

Table 1 (*Continued*)

Variable	All Latinos ($n=792$) Mean/ Proportion	(SE)	Foreign-born Latinos ($n=502$, 63%) Mean/ Proportion	(SE)	US-born Latinos ($n=290$, 37%) Mean/ Proportion	(SE)
Concentrated affluence	−0.29	(0.09)	***−0.34***	***(0.09)***	***−0.20***	***(0.10)***
Older age composition	−0.34	(0.08)	**−0.43**	**(0.08)**	**−0.19**	**(0.10)**

Note: Boldface indicates $p<0.05$ for the US- vs. foreign-born comparison, and boldface with italics indicates $0.05<p<0.10$.

assess whether the association between immigrant status and social ties varies across neighborhood contexts. Put differently, the interaction term estimates whether the association between the Latino/immigrant neighborhood concentration and social ties varies, depending on whether the individual was born inside or outside the USA. This model includes neighborhood-level random effects on both the intercept and the cross-level interaction term.[2]

In the final stage of our analysis, presented in Table 4, we probe more deeply into the pattern of Latino immigrant differences in social ties by replacing the dichotomous measure of being born outside the USA with a set of dummy variables measuring the length of time that first-generation immigrants have spent in the USA, and by continuing to use multilevel mixed-effect models that control for all of the individual-level and neighborhood-level covariates (but no cross-level interactions). All our analyses were conducted using Stata, version 12.

Results

Table 1 presents descriptive statistics for the Latino sample, broken down by immigrant status (foreign- vs. US-born). Most Latinos in our sample were foreign-born (63%), and most (67%) were of Mexican origin. The mean values of the five social ties outcomes were significantly lower for foreign-born than for US-born Latinos. Foreign-born Latinos also differed from US-born Latinos in having lower levels of education, and a higher probability of having children and of being married. In addition, compared to the US-born, foreign-born Latinos were significantly more likely to live in neighborhoods characterized by a larger concentration of immigrants and Latinos, and higher levels of concentrated disadvantage. In contrast, US-born Latinos were more likely to live in more affluent neighborhoods, and in neighborhoods with greater concentrations of older-aged individuals, than immigrants.

In Table 2, we present OLS models that examine some of the factors that could explain why foreign-born Latinos have lower levels of social ties. Two models are presented for each outcome: the first (odd-numbered models) controls for Latino subgroup, sex, age, marital status, and whether the person has children; and the second (even-numbered models) adds controls for education and income. Immigrant status was the most consistent predictor of social ties, as foreign-born Latinos had significantly lower levels of social ties compared to their US-born counterparts on all outcomes in the initial model. Adding controls for education and income reduced the

Table 2. OLS regressions of social ties on nativity and controls: CCAHS Latino subsample ($n = 792$).

	Informal social integration				Network diversity				Total network size				Instrumental support				Informational support			
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)	
Covariates	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)
Foreign-born	**−0.41**	**(0.11)**	**−0.30**	**(0.12)**	**−1.63**	**(0.28)**	**−1.15**	**(0.29)**	**−1.88**	**(0.56)**	**−1.48**	**(0.55)**	**−1.38**	**(0.53)**	***−1.02***	***(0.53)***	**−0.78**	**(0.38)**	−0.53	(0.40)
Latino subgroup (Mex = ref)																				
Puerto Rican	−0.25	(0.15)	−0.28	(0.15)	**0.67**	**(0.32)**	0.60	(0.31)	0.98	(0.72)	0.85	(0.69)	−0.54	(0.63)	−0.63	(0.61)	0.87	(0.65)	0.73	(0.61)
Other Latino	0.14	(0.12)	0.02	(0.12)	0.33	(0.31)	−0.10	(0.30)	0.20	(0.53)	−0.36	(0.53)	−0.07	(0.67)	−0.60	(0.66)	0.33	(0.44)	−0.32	(0.42)
Male	**−0.29**	**(0.09)**	**−0.32**	**(0.09)**	**0.76**	**(0.24)**	**0.63**	**(0.23)**	**0.42**	**(0.45)**	0.51	(0.44)	**0.94**	**(0.41)**	**0.97**	**(0.42)**	0.33	(0.40)	0.38	(0.40)
Age (70 + = ref)																				
18–29 yrs	0.37	(0.22)	0.21	(0.20)	0.30	(0.57)	−0.27	(0.62)	**1.53**	**(0.74)**	0.78	(0.79)	***1.42***	***(0.79)***	0.95	(0.89)	**2.05**	**(0.55)**	**1.62**	**(0.69)**
30–39 yrs	0.19	(0.23)	−0.02	(0.21)	0.30	(0.56)	−0.49	(0.61)	**1.82**	**(0.74)**	0.82	(0.81)	**1.66**	**(0.82)**	1.02	(0.90)	**2.15**	**(0.56)**	1.52	(0.71)
40–49 yrs	0.02	(0.24)	−0.17	(0.22)	***0.98***	***(0.58)***	0.29	(0.62)	***1.55***	***(0.82)***	0.72	(0.86)	1.16	(0.75)	0.63	(0.82)	**1.71**	**(0.65)**	1.21	(0.75)
50–59 yrs	−0.24	(0.26)	−0.43	(0.24)	0.68	(0.61)	−0.10	(0.65)	**2.13**	**(0.90)**	1.20	(0.93)	***1.44***	***(0.84)***	0.80	(0.91)	***1.27***	***(0.70)***	**0.64**	**(0.77)**
60–69 yrs	−0.28	(0.35)	−0.33	(0.33)	0.25	(0.77)	0.01	(0.74)	**4.88**	**(1.49)**	**4.60**	**(1.43)**	**3.41**	**(1.52)**	3.20	(1.44)	**3.05**	**(1.09)**	**2.94**	**(1.12)**
Married	0.06	(0.11)	0.00	(0.11)	***−0.52***	***(0.27)***	**−0.70**	**(0.26)**	0.29	(0.53)	0.13	(0.51)	0.19	(0.50)	0.10	(0.46)	−0.32	(0.40)	−0.34	(0.39)
Has children	**−0.48**	**(0.12)**	**−0.40**	**(0.13)**	−0.38	(0.31)	−0.07	(0.30)	−0.99	(0.64)	−0.43	(0.62)	−0.24	(0.58)	0.22	(0.54)	−0.71	(0.44)	**−0.22**	**(0.42)**
Education (16 + = ref)																				
< 12 yrs	–	–	**−0.49**	**(0.13)**	–	–	**−1.76**	**(0.46)**	–	–	**−2.75**	**(0.83)**	–	–	**−2.56**	**(0.81)**	–	–	**−3.30**	**(0.82)**
12 yrs	–	–	−0.18	(0.14)	–	–	***−0.90***	***(0.49)***	–	–	**−2.08**	**(0.77)**	–	–	**−1.86**	**(0.79)**	–	–	**−2.58**	**(0.80)**
13–15 yrs	–	–	−0.23	(0.14)	–	–	−0.50	(0.45)	–	–	−0.72	(0.82)	–	–	−0.88	(0.97)	–	–	−2.10	(0.82)
Income	–	–			–	–			–	–			–	–			–	–		
(50k + = ref)	–	–			–	–			–	–			–	–			–	–		
<$10,000	–	–	−0.24	(0.21)	–	–	−0.84	(0.47)	–	–	0.03	(0.99)	–	–	−0.33	(0.75)	–	–	−0.18	(0.53)
$10,000–29,999	–	–	−0.21	(0.15)	–	–	**−1.11**	**(0.34)**	–	–	−0.67	(0.76)	–	–	−0.38	(0.66)	–	–	−0.17	(0.50)
$30,000–49,999	–	–	0.08	(0.15)	–	–	−0.12	(0.35)	–	–	0.06	(0.72)	–	–	−0.35	(0.70)	–	–	0.31	(0.54)
Missing	–	–	−0.12	(0.15)	–	–	**−1.09**	**(0.35)**	–	–	0.57	(0.81)	–	–	−0.07	(0.74)	–	–	0.13	(0.62)
Constant	**4.96**	**(0.23)**	**5.47**	**(0.23)**	**5.46**	**(0.62)**	**7.57**	**(0.78)**	**5.58**	**(0.87)**	**7.85**	**(1.18)**	**4.22**	**(1.05)**	**6.31**	**(1.41)**	**4.01**	**(0.69)**	**6.61**	**(1.07)**
R^2	0.14		0.18		0.15		0.23		0.07		0.11		0.05		0.08		0.05		0.10	

Note: Boldface indicates $p < 0.05$; boldface with italics indicates $0.05 < p < 0.10$.

Table 3. Multilevel mixed effects linear regressions of social ties on nativity, neighborhood characteristics, and controls: CCAHS Latino subsample (n=792).[a]

	Informal social integration				Network diversity				Total network size				Instrumental support				Informational support			
	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)		(10)	
Covariates	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)
Foreign-born	**−0.33**	**(0.12)**	−0.16	(0.16)	**−1.20**	**(0.28)**	**−1.01**	**(0.37)**	**−1.50**	**(0.58)**	−0.61	(0.67)	***−0.95***	***(0.53)***	−0.61	(0.74)	−0.61	(0.38)	−0.32	(0.51)
Neighborhood characteristics																				
Concentrated Latino/ immigrants	**0.21**	**(0.07)**	**0.34**	**(0.09)**	***0.24***	***(0.14)***	***0.35***	***(0.21)***	**0.70**	**(0.34)**	**1.24**	**(0.45)**	0.12	(0.32)	0.32	(0.45)	0.30	(0.27)	0.46	(0.31)
Concentrated disadvantage	−0.07	(0.07)	−0.05	(0.07)	−0.01	(0.15)	0.01	(0.15)	−0.24	(0.35)	−0.17	(0.33)	0.05	(0.33)	0.07	(0.33)	0.18	(0.26)	0.20	(0.27)
Concentrated affluence	−0.01	(0.07)	−0.02	(0.07)	**0.36**	**(0.14)**	**0.35**	**(0.14)**	0.44	(0.28)	0.36	(0.28)	0.23	(0.29)	0.20	(0.30)	0.17	(0.31)	0.15	(0.32)
Older-age composition	0.08	(0.06)	***0.10***	***(0.05)***	−0.04	(0.13)	−0.04	(0.13)	0.14	(0.27)	0.16	(0.26)	0.01	(0.30)	0.01	(0.29)	0.22	(0.26)	0.22	(0.26)
Interaction																				
Foreign born × Concentrated Latino/Immig			***−0.24***	***(0.13)***			−0.25	(0.27)			***−1.14***	***(0.61)***			−0.43	(0.56)			−0.35	(0.40)
Variance																				
Level-1	1.01		0.98		5.46		5.45		21.13		21.07		16.60		16.63		14.18		14.18	
Level-2	0.11		0.08		0.72		0.69		2.73		2.45		2.64		2.57		2.69		2.68	
%Variance Explained[b]																				
Level-1	16.27%		18.56%		22.72%		22.84%		6.50%		6.77%		3.96%		3.83%		8.56%		8.59%	
Level-2	38.19%		53.11%		32.48%		35.59%		41.46%		47.47%		28.78%		30.72%		20.40%		20.87%	

[a]All models additionally control for Latino subgroup, age, sex, marital status, whether participants had children, education, and income.
[b] The percentage of variance explained at each level was calculated as follows: $[(V_u\text{-}V_m)/V_u)*100]$, where V_u is the respective variance component from the unconditional model (i.e., a model with no covariates) and V_m is the variance component for the respective model presented in the table.
Boldface indicates $p<0.05$; boldface with italics indicates $0.05<p<0.10$.

Table 4. Multilevel mixed effects linear regressions of social ties on time in USA and controls: CCAHS Latino subsample (n=792).[a]

	Informal social integration		Integration network diversity		Total network size		Instrumental support		Informational support	
	(1)		(2)		(3)		(4)		(5)	
	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)	Coefficient	(SE)
Time in USA										
0–4 years	0.00	(0.19)	**−0.91**	**(0.37)**	−0.81	(0.96)	**−1.50**	**(0.73)**	−0.55	(0.67)
5–9 years	−0.12	(0.15)	**−0.97**	**(0.37)**	**−1.35**	**(0.67)**	**−1.67**	**(0.59)**	**−1.35**	**(0.55)**
10–14 years	−0.06	(0.16)	−0.03	(0.31)	−0.87	(0.69)	−0.52	(0.66)	−0.08	(0.61)
15+ years=reference	–	–	–	–	–	–	–	–	–	–
Born in USA	**0.30**	**(0.14)**	**0.84**	**(0.33)**	***1.24***	***(0.68)***	0.39	(0.67)	0.45	(0.46)
Missing	0.00	(0.22)	−0.69	(0.46)	1.03	(0.90)	−0.37	(0.75)	0.78	(0.81)
Variance										
Level-1	1.01		5.38		20.90		16.40		14.02	
Level-2	0.11		0.72		2.74		2.65		2.69	
%Variance explained[b]										
Level-1	16.50%		23.94%		7.54%		5.15%		9.59%	
Level-2	36.67%		32.97%		41.29%		28.68%		20.60%	

[a]All models additionally control for Latino subgroup, age, sex, marital status, whether participants had children, education, income, neighborhood Latino/immigrant concentration, concentration of disadvantage, concentration of affluence, and older age composition.
[b] The percentage of variance explained at each level was calculated as follows: $[(V_u\text{-}V_m)/V_u)*100]$, where V_u is the respective variance component from the unconditional model (i.e., a model with no covariates) and V_m is the variance component for the respective model presented in the table.
Boldface indicates $p<0.05$; boldface with italics indicates $0.05<p<0.10$.

magnitude of the social ties differential between foreign- and US-born Latinos, but the gap remained statistically significant in the models predicting informal integration, network diversity, and network size, and it was still marginally significant for instrumental support. Only in the case of informational support was the nativity gap fully 'explained' by socioeconomic factors.

There were also other significant predictors of social ties. Gender differences were significant in four of the five outcomes (all except informational support), but whereas men had lower levels of informal social integration than women, men had higher levels of network diversity, network size, and instrumental support. Higher levels of education were associated with higher levels of all social ties outcomes, but there was no significant relationship between income and social ties.

The next step in our analysis was to assess the effects of neighborhood context and whether the immigrant-status differential in social ties could be explained by differences in neighborhood context. Table 3 presents estimates of individual-level differences between foreign- and US-born Latinos and associations between neighborhood-level factors and social ties from multilevel mixed-effects models. The models presented in Table 3 also controlled for the full set of individual-level covariates (including socioeconomic characteristics), but to simplify the presentation of results, we only show the results for the nativity variable, the four neighborhood-level factors, and the cross-level interaction between foreign-born and neighborhood Latino/immigrant concentration. The first model for each outcome (odd-numbered models) estimates the main effects of the neighborhood-level factors on social ties, while the second model (even-numbered models) adds the interaction term. One notable finding is that neighborhood Latino/immigrant concentration significantly predicted three of the five outcomes (informal social integration, network diversity [significant at the 0.10 level], and network size). That is, unlike individual-level immigrant status, living in a neighborhood with more Latinos and immigrants was associated with higher levels of social ties. There were only two other significant associations between neighborhood-level factors and social ties outcomes: living in a more affluent/gentrifying neighborhood was associated with having more diverse network ties, and living in a neighborhood with an older-aged population was marginally associated (significant at the 0.10 level) with higher levels of social integration. Adjusting for neighborhood-level factors (in the odd-numbered models in Table 3) did not change the strength, direction, or significance of the association between immigrant status and social ties found in the individual-level (even-numbered) models in Table 2. That is, the estimated differences in social ties between immigrant and US-born Latinos remained when controlling for neighborhood-level factors.

To examine the proposition that immigrants may be more likely to benefit from living in ethnic/immigrant enclaves and to further explore why individual-level immigrant status was negatively associated with social ties, while at the same time neighborhood-level Latino/immigrant concentration was positively associated with social ties, we added a cross-level interaction between these two variables to each of the outcome models. The results revealed a consistent pattern of interactions, in which the positive effect of living in a neighborhood with a greater concentration of Latinos and immigrants was substantially larger for US-born compared to foreign-born Latinos, but this interaction only approached significance in the models for informal social integration ($p = 0.07$) and network size ($p = 0.06$).[3] To facilitate the

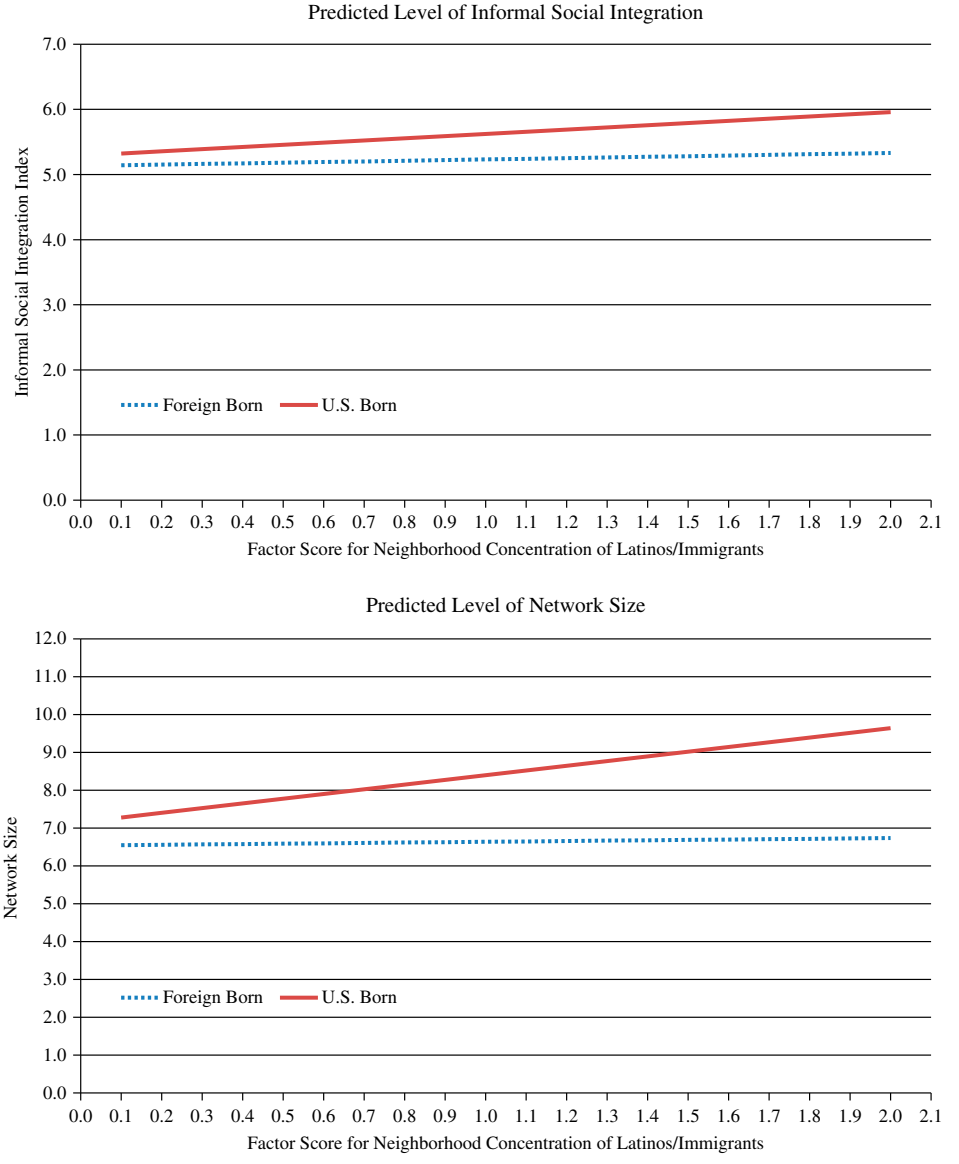

Figure 1. Predicted values of informational social integration and network size by level of neighborhood Latino/immigrant composition and individual immigrant status.

interpretation of these interactions, Figure 1 presents graphs of the predicted values for (1) informal social integration and (2) network size by the level of neighborhood Latino/immigrant composition. Each graph plots values from the 10th to the 90th percentile of Latino/Immigrant concentration. The results show that the gap in predicted level of social ties between US- and foreign-born Latinos grew wider in neighborhoods with greater concentrations of Latinos/immigrants. Moreover, the positive association between Latino/immigrant concentration and social ties was only significant among US-born immigrants.

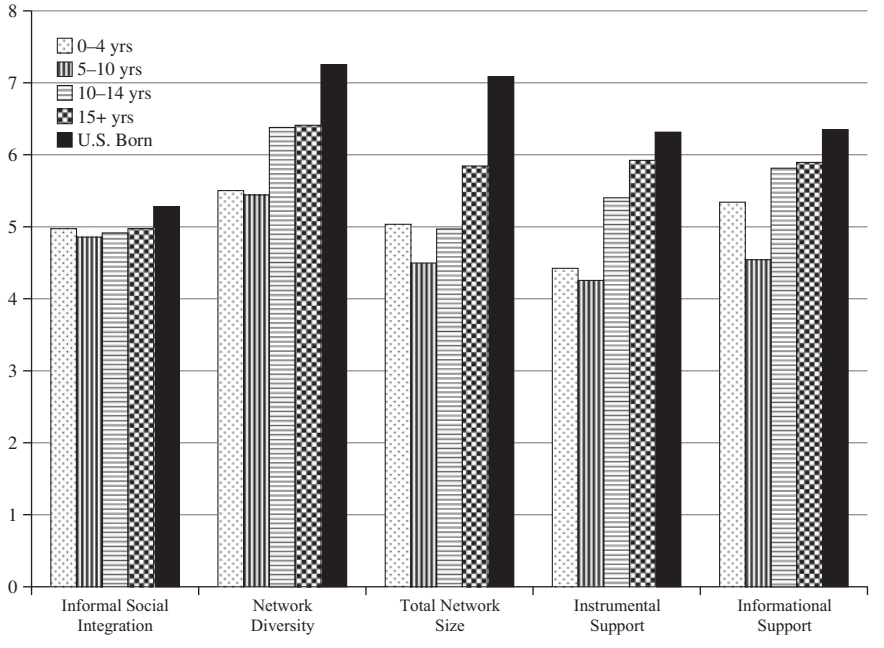

Figure 2. Predicted level of social ties by time in USA for Latinos.

The final stage of the analysis examined how levels of social ties varied among foreign-born Latinos based on the length of time they had resided in the USA. Table 4 presents estimates of this association (from multilevel mixed models), adjusted for all of the individual- and neighborhood-level covariates used in prior models. To facilitate the interpretation of these results, we graphed, in Figure 2, the predicted values of each outcome by time spent in the USA. The results show that the relationship between time in the USA and social ties was nonlinear, with social ties being highest among US-born Latinos, followed by foreign-born Latinos who had been living in the USA for at least 15 years (the reference category). The level of social ties was lowest among Latinos who had resided in the USA from five to nine years. The coefficients in Table 4 show that the disparity in the level of social ties between immigrants who resided in the USA for at least 15 years and those who have been in the USA for 5–9 years was statistically significant for four out of the five outcomes (all except informal social integration). Supplemental hypothesis tests (not reported in Table 4) revealed that US-born Latinos maintained a significant social ties advantage over all foreign-born Latinos, including those who had been living in the USA for at least 15 years, on three of the five outcomes (informal social integration, network diversity, and network size).

Discussion

In this paper, we examined the relationship between immigrant status and several social network characteristics. We were particularly interested in testing the often-cited assumption that Latino immigrants have higher levels of social support and larger social networks than their US-born counterparts. In addition, we assessed the effects

of immigrants' length of residence in the USA as well as the effects of neighborhood context on the social ties of Latinos. We further investigated whether such neighborhood effects varied by nativity status. After controlling for individual- and neighborhood-level characteristics, we found that immigrant Latinos are less likely to report being socially integrated, and that they have smaller and less diverse social networks than their US-born counterparts. Even though the perceived availability of instrumental and informational support was higher among the US-born than among immigrant Latinos, the differences mostly disappeared once socioeconomic factors were taken into account in the individual-level models. In short, with respect to structural network characteristics, our study provides evidence that counters the assumption in the literature, of immigrants having access to higher levels of social ties than US-born Latinos. As such, our study suggests that the particular measures we examined are unlikely to explain nativity differences in health among Latinos.

Immigration and the structure and functioning of Latino networks

Our findings suggest multiple processes that may underlie the ability of Latinos to maintain and build social ties. In terms of network structure, our findings lend support to the perspective that immigrant status exerts a toll on the social networks of Latinos. Scholars have long documented the importance of social networks for facilitating migration and settlement (Massey et al. 1987; Hondagneu-Sotelo 1994). Yet, by necessity, the processes of migration involve disruptions of social ties, as individuals geographically separate from kin and nonkin networks in the communities of origin. Although immigrants often endeavor to maintain social ties across borders (Viruell-Fuentes 2006; Viruell-Fuentes and Schulz 2009; Levitt and Glick Schiller 2004), and also build new social ties in their new destinations, doing so requires, among other things, time. We, thus, investigated the association between immigrants' length of residence in the USA and social-network characteristics. We found a nonlinear association between length of time in the USA and social ties. Still, even immigrants who had lived in the USA for 15 years or longer not only had significantly lower levels of social integration, but they also had significantly less diverse and marginally significant smaller networks than US-born Latinos.

That immigrants report having fewer social ties, lower levels of social integration, and less diverse networks may be a reflection of the constraints they face in building their networks. Their ability to build social networks in their destination communities, as scholars have suggested, is influenced by the specific social and economic contexts in which their lives unfold (Menjívar 2000; Viruell-Fuentes and Schulz 2009). For instance, studies have shown that limited access to transportation, economic demands, and undocumented status are factors that constrain the ability of immigrants to (re)build their social networks (Vega et al. 1991; Hondagneu-Sotelo 1994; Chavez 1998; Menjívar 2000; Viruell-Fuentes and Schulz 2009). Furthermore, it is also likely that the fear and distrust that current anti-immigrant environment engenders pose additional challenges as immigrants seek to build communities of support (Viruell-Fuentes, Miranda, and Abdulrahim 2012). Future research is necessary to assess the impact of anti-immigrant policies and actions on the structure and functioning of immigrant social ties, and how these factors intersect to impact health outcomes.

Our findings converge with those of other studies showing lower levels of social relationships and support among the foreign-born (Landale and Oropesa 2001; Harley and Eskenazi 2006; Franzini and Fernandez-Esquer 2004; Almeida, Molnar, et al. 2009; Viruell-Fuentes and Schulz 2009). But they diverge from others that report higher levels of social support among the foreign-born than among the US-born (Vega and Kolody 1985; Zambrana et al. 1997; Landale and Oropesa 2001; Almeida, Molnar, et al. 2009). One reason for this divergence appears to be differences in the measures used to assess social support. Most notably, a recent study by Almeida, Molnar and colleagues (2009), which was also conducted in Chicago, found that foreign-born Latinos reported higher levels of perceived support from family but lower levels of perceived support from friends than their US-born counterparts. Due to data limitations, we were unable to assess differences in sources of support in our study. Future studies that distinguish types of support from sources of support, and assess directly the extent to which source and/or type impact immigrant and Latino health outcomes are necessary.

Neighborhood contexts and social networks

Our analysis indicates that Latino and immigrant neighborhood composition is positively related to Latinos being socially integrated and having larger and more diverse social networks; it is, however, not significantly related to instrumental or informational social support. This finding lends partial support to the proposition advanced by some scholars, that living in ethnic/immigrant enclaves may, in part, be protective of Latino health, because they provide opportunities to foster social relationships (Eschbach et al. 2004; Gresenz, Rogowski, and Escarce 2009; Vega et al. 2011). Our study converges with that of Almeida, Kawachi and colleagues (2009) in showing that immigrant and/or Latino enclaves are associated with larger social networks among Latinos. That is, living in an immigrant and/or Latino neighborhood appears to influence the structure of Latinos' social ties. However, given the importance of functional dimensions of social networks for health, such as social support, a fuller assessment of this proposition requires that future studies specify which aspects of social relationships may be operating to influence health and under which particular neighborhood contexts.

Because scholars have suggested that ethnic/immigrant enclaves might be particularly beneficial for immigrants, as compared to the US-born (Frank, Cerda, and Rendon 2007; Osypuk, Bates, and Acevedo-Garcia 2010), we examined whether the relationship between immigrant and Latino neighborhood composition and social network characteristics differed by nativity status. For most of our outcomes, the Latino/immigrant composition of the neighborhood had the same impact on social networks of both US- and foreign-born Latinos. However, we found a statistically significant interaction between nativity status and Latino/immigrant neighborhood composition for informal social integration and network size, which was counter to that suggested by the literature. That is, in our study, US-born Latinos derived higher benefits in terms of their network structure (i.e., social integration and network size) from living in neighborhoods composed of immigrants/Latinos than the foreign-born. This finding, though not as robust as others in the paper, is difficult to reconcile with theories suggesting that, relative to their US-born counterparts, immigrants are more likely to draw health-related benefits from

living in communities with high concentrations of co-ethnics and other immigrants. More research and theoretical development are in order to flesh out the impacts on health of living in ethnic/immigrant enclaves and the pathways through which they may exert their influence. Perhaps some of the benefits that individuals derive from living in such areas involve their ties to neighbors and neighborhood institutions (e.g., local businesses and community organizations) that take time to cultivate and possibly are passed down through generations.

Implications for immigrant and Latino health outcomes

The health implications of lower levels of social integration as well as of smaller and less diverse network structures among immigrants may lie in that these network characteristics are likely to limit immigrants' access to certain types of resources, resulting in possible negative consequences for their health, as compared to the US-born. For instance, 'weak ties' can facilitate access to health-promoting resources that may not be readily available among those with whom one has regular, close contact (Granovetter 1983). Weak ties are more likely to be found within heterogeneous networks. That immigrant networks appear to be less heterogeneous than those of the US-born means that immigrant access to weak ties is likely to be limited. Furthermore, the demands migration places on immigrant social ties are more likely to be felt among immigrants whose networks are small and composed of members who share similar socioeconomic and immigration constraints (Menjívar 2000; Viruell-Fuentes and Schulz 2009).

An underlying assumption behind the social networks explanation for immigrant health outcomes is that immigrants should have higher levels of social support and larger social networks. Our findings are not consistent with this expectation, thereby casting doubt on the individual-level social ties explanation for the Latino immigrant health advantage. At the neighborhood level, the structure of Latino' social networks was stronger for those who lived in neighborhoods with higher concentrations of immigrants and Latinos, which appears to lend support for the neighborhood-level social ties explanation for the Latino immigrant health advantage. However, contrary to expectation, the association between Latino/immigrant neighborhood concentration and two of our outcomes (informal social integration and network size) varied by nativity status in favor of the US-born. This finding suggests that the neighborhood-level social ties explanations for the immigrant health advantage observed among some Latinos may not necessarily hold.

Limitations and directions of future research

Our study suffers from a limitation common in the immigrant health literature: it is based solely on cross-sectional data collected at the point of destination for immigrants. This design prevents us from disentangling whether the differences we found between immigrants and the US-born reflect generational or cohort effects (Landale and Oropesa 2001; Waters and Jiménez 2005). As others have suggested, studies with longitudinal and transnational research designs are necessary to better understand how pre- and post-migration factors affect social ties and health (Landale and Oropesa 2001; Viruell-Fuentes and Schulz 2009; Acevedo-Garcia et al. 2012). For instance, a transnational research design in which data are collected

from nonmigrants (or would-be migrants) in the communities of origin as well as from immigrants and their US-born co-ethnics would enable a fuller assessment of the role of migration in shaping the structure and functioning of social ties. In addition, our study is based on one city in the USA, with its particular mix and history of Latino immigration; future research is necessary to determine whether our findings can be generalized to other locales. As with other neighborhood studies, ours is subject to selection bias. Therefore, we included an expanded set of both neighborhood- and individual-level covariates to help account for unmeasured characteristics that may be related both to the residential options of participants and to our outcomes.

Immigration scholars have noted that immigrants, and to an extent the US-born generations, engage in transnational practices that enable them to maintain social ties in their communities of origin (Levitt and Glick Schiller 2004). However, for the most part, research that examines social ties and health among Latinos has focused on social relationships at the local point of destination and has rarely assessed transnational social ties (Viruell-Fuentes and Schulz 2009; Acevedo-Garcia et al. 2012). This limitation is also present in our study, as our measures prevent us from disentangling the local-versus-transnational dimensions of Latino social ties. Future research that assesses the contribution of both local and transnational social ties on immigrant health outcomes is necessary.

Furthermore, it should also be noted that nativity is a variable that may have an ambiguous meaning for Puerto Ricans. Puerto Rico is a commonwealth of the USA, and Puerto Ricans – including both those born in the USA mainland and on the island of Puerto Rico – are citizens of the USA. As Landale and Oropresa (2001) argue, in the context of examining social ties, the experience of Puerto Ricans migrating from the island to the mainland may be considered to be similar in many respects to that of Latin American immigrants, in that such migration, for instance, is influenced by family connections and involves the stress of relocation. We recognize the importance of the sociohistorical context of Puerto Rico and that Puerto Ricans are US citizens who may experience internal migration, as opposed to international migration.

While our findings regarding time in the USA are informative, 12% of our immigrant sample had missing data on this variable. The majority of the missing data was concentrated among Latinos born in US territories, primarily Puerto Ricans. The patterns we detected, therefore, do not fully capture the experiences of Puerto Ricans in our sample; as such, we recommend caution in interpreting the results with respect to length of time in the USA, especially for this population.

Our research moves the field forward by empirically testing various claims that are often cited but rarely examined in the literature. Further, unlike other studies, we were able to assess multiple aspects of social ties, namely those related to structural network characteristics and social support. Our study was not intended to directly test whether social networks explain nativity differences in health. While our findings strongly cast doubt on the social ties explanations for the Latino immigrant health advantage, it is possible (though unlikely) that the 'immigrant social ties hypothesis' could still be valid despite our findings. This would be the case if any of the following were true: (1) social ties were more strongly associated with better health outcomes among foreign-born than among US-born Latinos; (2) social ties were not associated with health; or (3) social ties were associated with

worse health outcomes among US-born Latinos. In the last case, the higher level of social ties that US-born Latinos reported could actually work against them. Future works are necessary to directly evaluate the importance of various features of social ties in explaining disparities in a wide range of health outcomes between immigrant and US-born Latinos.

Key messages

(1) Scholars have documented the worsening health status in the USA for various immigrant groups, and have highlighted the importance of identifying the factors that contribute to such disparities.
(2) Many have suggested the role of social ties as a potential explanation for the observed health advantage among some immigrants, relative to their US-born co-ethnics. However, at the individual level, we did not find evidence consistent with this proposition.
(3) Our study contributes evidence of the importance of understanding the contexts that promote the development of social ties, thus helping inform policies that create the 'conditions for networks to thrive' (Menjívar 2000, 242) and promote the health and well-being of Latinos and immigrants.

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Notes

1. All of the multilevel mixed effects models were estimated via maximum likelihood with sampling weights and robust standard errors to adjust for neighborhood clustering.
2. We assumed that the covariance matrix for the random effects on the intercept and interaction term had an independent structure, meaning that each random effect had a distinct variance but zero covariance between them. We also obtained similar results from models using an unstructured covariance matrix, but these would not converge on all of the outcomes.
3. Neighborhood Latino/immigrant concentration was centered around its grand mean, such that the foreign-born coefficients in the even-numbered models in Table 3 were evaluated at the average level Latino/immigrant concentration.

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Appendix 1: Survey questions used to construct network characteristic measures, CCAHS

Network characteristic	Survey question
Network size	How many close friends and relatives do you have (people that you feel at ease with, can talk to about private matters, and can call on for help)?
Instrumental support	How many friends and relatives do you have to whom you can turn when you need to borrow something like a household object or a small amount of money or need help with an errand?
Informational support	How many friends and relatives do you have who you can ask for advice or information?
Informal social integration index	How often do you get together with friends, neighbors, or relatives, and do things like go out together or visit in each other's homes? Would you say more than once a week, once a week, 2 or 3 times a month, about once a month, less than once a month, or never? In a typical week, about how often do you talk on the telephone or exchange emails with friends, neighbors, or relatives? Would you say more than once a day, once a day, 2 or 3 times a week, about once a week, less than once a week, or never?
Diversity index	Thinking now about everyone that you would count as a personal friend, not just your closest friends – do you have a personal friend who . . . Owns their own business? Is a manual worker? (e.g., works in a factory, as a truck driver, or as a laborer.) Has been on welfare? Owns a vacation home? Has a different religion than you? Is White? Is Latino or Hispanic? Is Asian? Is Black or African American? Is Gay or Lesbian? That you would describe as a community leader? Respondents had the opportunity to choose all the options that applied