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Communication flows and the durability of a transnational social field

Ashton M. Verdery(1), **Ted Mouw**(2), **Heather Edelblute**(3), and **Sergio Chavez**(4)

(1)Department of Sociology and Criminology, The Pennsylvania State University

(2)Department of Sociology, The University of North Carolina at Chapel Hill

(3)Department of Sociology, University of Texas at San Antonio

(4)Department of Sociology, Rice University

Abstract

We draw on unique data on communication flows between migrants and non-migrants in a bi-national, cross-border social network to test competing theories of the process of social incorporation. While advocates of the assimilation perspective argue that social incorporation is largely a one-way street, a recent literature on immigrant transnationalism challenges this view by arguing that changes in communication technologies and reductions in travel costs have made it possible for migrants to retain meaningful connections to their origin communities. In the context of this debate, we argue that communication flows—as measured by a combination of the number of social ties and the frequency of communication with them—provide an empirical test of the potential durability of cross-border networks. In our analysis, we find mixed support for both transnationalism and assimilation: while the classic assimilation perspective is correct that the strength of migrants' ties to origin attenuates as time in the destination increases, we also find evidence of a striking persistence in cross-border communication that is reinvigorated by migrant return visits, consistent with an attenuated view of transnationalism.

Keywords

Migrant Networks; Transnationalism; Communication Flows

Introduction

Reductions in communication costs, expanded access, and new communication media have prompted some authors to argue that it is now easier for migrants to "live dual lives" (Portes, Guarnizo, and Landolt 1999, 217), maintaining close ties to origin areas while living abroad. This concept of transnationalism, wherein "social life increasingly takes place across

Correspondence to: Ashton M. Verdery.

borders," has important implications for migration theory (Levitt and Jaworsky 2007, 129). The long history of assimilation research (Park, Burgess, and Janowitz 1921) and contact theory more generally (Allport 1979) posit that as migrants spend more time in destinations, their origin ties fade and destination ties increase, especially to destination natives (Ryan 2015). If migrant networks are transnational, however, the persistence of origin ties may challenge this model of social incorporation, uniting transnationalism with other theories about migrant networks, such as the perpetuation and expansion of migration streams (Massey et al. 1993) and the existence of "social remittances" – the diffusion of ideas, information, and practices from destination to origin (Levitt 1998; Levitt and Lamba-Nieves 2011; Levitt and Lamba-Nieves 2013).

Transnationalism is frequently disputed in the literature (Vertovec 1999; Guarnizo and Smith 1998; Boccagni 2011; Guarnizo, Portes, and Haller 2003; Portes, Guarnizo, and Landolt 1999; Waldinger 2010). For instance, many question its novelty (Lucassen 2006; Alba and Nee 2009; Waldinger and Fitzgerald 2004), asking whether it represents something new about migration or if it simply reflects a broader intellectual current away from "methodological nationalism" that takes the nation-state as a natural unit of analysis (Wimmer and Schiller 2002). Complementing this historical debate, an empirical critique questions the prevalence of contemporary transnationalism. This stream of research seeks to delineate so-called "transmigrants" from other types, defining transmigrants as those who engage in multiple transnational activities such as frequent cross-border communication, remittance sending, return visitation, asset ownership, political engagement, religious involvement, and media consumption (Soehl and Waldinger 2010). Such research consistently finds that migrants who engage in multiple transnational activities are a rare subset of migrants overall, and that most migrants selectively engage in just one or two: "some send remittances; others may travel; others will stay in touch by phone" (Waldinger 2008; Waldinger 2015, 64).

Nonetheless, an alternative view is that the applicability of the transnationalism perspective does not merely rest on the prevalence of transmigrants partaking in multiple transnational activities. The concept of a "transnational social field" of overlapping and interlocking networks traversing origin and destination communities extends the perspective's relevance to the full social network in which migrants are embedded (Levitt and Glick Schiller 2004). This network comprises migrants who engage in many cross-border activities as well as migrants who engage in just some. It also includes "those who move and those who stay behind" (ibid.) and "can easily be extended to the receiving society context" (Soehl and Waldinger 2010, 1491), where it considers ties between migrants in multiple destinations, between migrants from multiple origins, and between migrants and destination natives. Such an emphasis reveals transnationalism's contribution to the broader migration literature: by looking "beyond the direct experience of migration into domains of interaction where individuals who do not move themselves maintain social relations across borders through various forms of communication" (Levitt and Glick Schiller 2004, 1009), it avoids "focusing on the cross-state experiences of the immigrants… [at the expense] of the feedbacks between sending and receiving sides – precisely the most important contribution that this new literature has generated" (Waldinger 2015, 25).

A key consideration of the social field perspective on transnationalism is that it emphasizes the importance of studying not only the community of migrants themselves, but also non-migrants on both sides of the border who are connected to the migrants through direct or indirect social ties that facilitate the flow of communication, ideas, and peer influence. In this paper we argue that network sampling and network data are central to the study of a transnational social field because "social networks *cut across* discrete communities and other entities – are 'interstitial' – even though in certain cases they may also congeal into bounded groups and clusters" (italics sic; Emirbayer 1997, 299). As such, network sampling and network data can be used to a) recruit members of the relevant set of non-migrants who comprise the transnational social field, and b) to measure how migrants and non-migrants are connected each other within this field. Transnational social fields cannot be comprehensively studied with individual level data without consideration of individuals' position and degree of participation in the border-spanning social network generated by migration (Mouw et al. 2014, 330). The first step is to understand the architecture of migrant networks, how the number and intensity of its interaction pathways between and among various groups structure the potential for communication flows. This underlying structure of cross-border ties that embeds a migrant population within both its origin and destination communities is doubly important because it also forms the basis upon which other indicators of transnationalism, such as remittances and travel, are predicated (Soehl and Waldinger 2010, 1498–99).

In this paper, we examine communication flows within and between origin and destination areas in a bi-national social network. In doing so, we respond to criticism of social networks and social capital in the migration literature that questions the conceptual vagueness of these measures (Goss and Lindquist 1995; Krissman 2005; Collyer 2005; Elrick and Lewandowska 2008; Hellermann 2006; Thieme and Siegmann 2010). Our approach contrasts with typical studies of social networks and migration, which tend to use indirect measures of network ties, such a sending community's migration history (e.g., Taylor, Rozelle, and de Brauw 2003), or conceptualizations of networks limited to co-resident close kin (Palloni et al. 2001; Bras and Neven 2007; Constant and Massey 2002; Constant and Massey 2003; Curran and Rivero-Fuentes 2003; Kanaiaupuni 2000). We first structurally describe the embeddedness of a transnational social field at different levels of communication frequency, finding that a large and cohesive core connects the network across the border through frequent communication. This raises the question: what explains the network's cross-border embeddedness? We examine both the numbers of ties linking respondents, as well as their levels of communication frequency, which jointly determine potential information flows. We test how time in the destination affects levels of communication between friends, acquaintances, and family in a transnational social field, asking which ties fade, emerge, or remain strong, and whether transnational ties have an especially durable character. Doing this provides a clear assessment of the classic assimilation model's predictions about migrant social networks, and clarifies exactly how the existence of transnationalism challenges, complements, and extends this model.

Prior Literature

To understand transnational communication flows, it helps to first consider the prevalence of bi-national network ties. Half of Mexicans living in Mexico have a relative living in the United States but only 16% "regularly write to, telephone, or visit" them (Waldinger 2015, 69). The reverse question – what proportion of Mexican immigrants in the United States have relatives in Mexico? – has not been directly asked, but Waldinger estimates that 60% of Latin American immigrants have close kin in origin areas. However, evidence suggests that the typical Mexican migrant in the U.S. is about as likely to call home weekly (27%) as never or rarely (29%; Soehl and Waldinger 2010, 1502). Research in other countries suggests transnational interaction of a similar magnitude. For instance, the social support networks of Polish, Turkish, and Kazakh migrants living in Germany contain many transnational ties (29% live outside of Germany), and communication happens more frequently across the border than within it (Bilecen and Sienkiewicz 2015). Likewise, German migrants in Great Britain derive more emotional support from transnational ties than other types (Herz 2015). Despite knowledge of these broad tendencies, the relational features that explain such connections remain understudied: "we still know surprisingly little about the long distance interactions between migrants and their kin" (Waldinger 2015, 73).

Return visits home help to "keep the network alive" for planned eventual permanent return (Duval 2004, 58). For instance, a longitudinal study of the personal networks of Argentinean migrants in Spain found that one quarter of respondents reactivated family ties by travelling home between interviews (Lubbers et al. 2010). While most Latino migrants in the United States report travelling home, about 30% of them have never returned since arrival in the destination (Waldinger 2015). Non-returners, overwhelmingly concentrated among recent undocumented Mexican migrants (Donato and Armenta 2011), highlight why transnational communication is so key to measuring transnationalism in the contemporary Mexico-U.S. migration stream. Owing to border restrictions and the challenges of returning without papers, migrants from Mexico cannot rely on return trips to keep the network alive.

In addition to return visits, it is possible that the advent, broad adoption, and declining costs of new forms of technology, particularly cellular telephones and the internet, facilitate frequent, long-distance interaction between migrants and their kin (Waldinger 2015; Levitt 2001). Migrants who use email communicate substantially more frequently with origin members of their networks, often using it as a supplement to the phone (Wilding 2006); however, lack of affordable internet and cell phone access in both the origin (Hamel 2009) and destination (Waldinger 2015) has been shown to impede communication in migrant networks. Communicating is not a mere matter of technological ability, however, as "communication depends on both means *and* motivation" (italics sic, Waldinger 2015, 68). Motivation comes from various facets of international life, such as managing international assets like homes and businesses as one third of Latin American migrants do (Waldinger 2015, 59), and through separation from spouses, children, and other loved ones at origin (Rindfuss et al. 2012; de Miguel Luken et al. 2015; Ryan 2007; Ryan and Mulholland 2014).

Although they can retain transnational ties, migrants may feel that occasional return visits and frequent calls, emails, or even video-conferencing home poorly substitutes for local friendship networks in the destination (Ryan 2015). A key benefit to looking at ties on both sides of the border through a transnational lens is that there may not be a clear, linear process whereby migrants substitute ties to individuals in the destination in the place of lost ties to those in the origin, as is frequently assumed in the assimilationist perspective by early scholars (Park, Burgess, and Janowitz 1921) and by its more modern incarnations like segmented assimilation (Portes and Zhou 1993), which is typically defined as assimilation into marginalized groups. Looking only at the destination, in a study of Sri Lankan migrants in Italy, researchers find that most migrants have personal networks composed of co-nationals living in the destination who hail from nearby places in the origin, but the longer they are in the destination, the larger proportion of Italians they nominate (Comola and Mendola 2015). While this finding suggests support for the assimilation perspective in that time in destination leads to greater contact with destination communities, it is, we would argue, an incomplete test of assimilation because it doesn't assess the degree to which migrants maintain ties to their origin community. This is a generalized indictment: assimilation research typically focuses on factors related to destination and ignores other parts of the transnational social field.

Another dimension of incorporation ignored by the classic assimilation perspective is whether and how migrants form broader networks in the destination that transcend the local nature of their ties to the origin community. For example, to what degree do Mexican migrants in the U.S. form new ties with fellow Mexicans that go beyond origin-city or origin-state level friendship? In addition, if they form ties with non-Mexicans in the U.S., to what degree is this consistent with assimilation towards a "pan-ethnic" identity and homophily with fellow Latinos? Existing work on migrants' loss of ties to origin and to co-ethnics yields consistent results regarding how length of time in the destination affects these parts of the transnational social field. In one study, only migrants who do not marry native born individuals retain ties to origin and co-ethnics regardless of time in the destination (de Miguel Luken et al. 2015). In another, researchers find that co-ethnic ties in the destination declined precipitously over time but ties to the origin did not (Bolíbar, Martí, and Verd 2015). Similar results hold for Salvadorian migrants in the United States, out-migrants from rural Scotland, and Arab Americans in Detroit (Menjivar 1994; Stockdale 2002; Waldinger 2015). Indirect measures of migrants' "sense of community" with sending areas, co-nationals, and destination areas point in the same direction (Maya-Jariego and Armitage 2007) – conational origin-based ties appear to fade with increasing time in destination.

The final factor thought to influence communication flows in migrant networks is gender, which has both direct and indirect effects (Tubergen 2015; Curran et al. 2005; Kanaiaupuni 2000). A long history of research has highlighted how women are "kin keepers" (Hagestad 1986) and do more "network maintaining work" with both kin and friends than men (Wellman 1984, 17). Gendered living arrangements structure network density and the potential returns to communication with people of different genders (Korinek, Entwisle, and Jampaklay 2005). There is some evidence that men are more likely to make friends in the destination and let go of ties (Jerusalem, Hahn, and Schwarzer 1996), but this may owe to the ways gender structures employment and occupational sorting. Unemployed migrants may be less likely to communicate with those at origin, because they have less need to coordinate remittance sending and less news to report (Dreby 2010; Pribilsky 2007;

Waldinger 2015). Entrepreneurs and other small business owners, occupations in which men are overrepresented, are more likely to engage in cross-border communication (Soehl and Waldinger 2010). Owing to the nature of the work, female domestic service workers tend to have smaller networks at destination when compared to male construction workers in the U.S. (Hagan 1998; Hondagneu-Sotelo 1994), and such patterns may affect English language ability, which independently influences communication by affecting shared understandings with both the native born and those who remain at home (Soehl and Waldinger 2010).

Conceptual Framework

We define a transnational social field appropriate to our case according to the conceptual diagram presented in Figure 1. We delineate migrant networks broadly, looking at groups of people in both the origin (shaded boxes) and destination (hollow boxes) and the ties within and between these places. We include ties among non-migrant and return migrant members of an origin community (lines labeled A), which we disaggregate because of the different experiences and motivations for return vs. non-migrants to retain cross-border ties, and ties from those groups in the origin to migrants in a particular destination (lines B). We also examine ties among those in the destination, including among those from the same origin community (line C), from that community's migrants to destination natives (hereafter, "native born"[1]; line D) and to migrants from other origin areas (line E). Finally, we examine links back to the origin community, to both non-migrants (line F) and return migrants (line G). We recognize that these processes can be conceived in other ways, especially in contexts outside of the Mexican-U.S. migration stream that we study. For instance, for migrants from origin areas that send to multiple destinations, the conceptual framework should include ties to the origin area's migrants living in different destinations (such ties are less relevant in the Mexican-U.S. context). Unfortunately, the literature has not given each of these components of migrant networks equal coverage.

Each of these relations or combinations of them can be thought to influence aspects of the migration process. Simple formulations of the transnationalism perspective focus on the maintenance of ties along lines B, F, and G; in other words, maintenance of a transnational social field depends on cross-border communication between migrants and those at origin (Waldinger 2015). By contrast, the many variants of assimilation theory focus on ties in the destination. A classic assimilation model holds that ties to the origin represented by lines F and G will fade the longer a migrant is in the destination, while ties to the native born in the destination represented by line D will increase and strengthen (Comola and Mendola 2015). Alternatively, ethnic enclaves may emerge where migrants are overwhelmingly embedded in networks of co-ethnics from the same or a similar origin area, which in our framework would be reflected by increased communication along lines C and E as time in the destination increases (Schwartz et al. 2006). Such differences in focus can help to resolve potential incongruities between the assimilation perspective and transnationalism (Bommes, Michael 2005). A transnational social field perspective can also shed light on processes occurring in origin areas, where, for example, the "culture of migration" hypothesis ties to

[1]Since our sample, described below, focuses on adults in a new immigrant destination in the United States, native born in our empirical results below would consist of non-Hispanic white and black populations; we found few links to such communities.

line A, where non-migrants in origin communities come to expect and be expected to migrate abroad because it is normative and return migrants are lauded and cherished (Kandel and Massey 2002; Ali 2007). We argue that the entire system of relations depicted in Figure 1 is necessary to understand the theoretical impacts of transnationalism.

Data, Methods, and Measures

We argue above that understanding the extent and impact of transnationalism in migrant social networks requires measuring linked networks within and between origin and destination areas. However, collecting this data is difficult. Multi-sited surveys do not show how people are connected to one another across sites (e.g., Landale, Oropesa, and Gorman 2000; see also Breslau et al. 2007; Parrado and Flippen 2005; Mazzucato 2008), and prior attempts to collect linked transnational samples have had mixed success. An early effort failed because respondent references were unable to overcome lack of community trust (Grasmuck and Pessar 1991, 58); other studies report obtaining less than half a referral per person (Bilsborrow and CEPAR 2016; McKenzie and Mistiaen 2009). Even with referrals, however, collecting such samples remains difficult: research on a subset of the Migration between Africa and Europe (MAFE) surveys reports that only 5% of origin-provided contacts for migrants at destination yielded interviews (Beauchemin and González-Ferrer 2011). At the same time, other studies have had more success (cf. Witoelar 2011; Rindfuss et al. 2007; Friberg 2010; Arenas et al. 2009).

The Network Survey of Immigration and Transnationalism (NSIT) is a bi-national survey (N=607 respondents) collected in 2010–2011 of a transnational immigrant community that spans three regions: a) the Raleigh-Durham-Chapel Hill area of North Carolina, b) Houston, Texas, and c) Guanajuato, Mexico. The U.S. is by far the most common destination of Mexican migrants (97% of Mexican migrants abroad are in the United States; United Nations, Department of Economic and Social Affairs 2015). The NSIT is ideally suited to the task of analyzing the structure of migrant networks because of its extensive survey questions about social network affiliations, and their communication frequency and relationship type between all nominated and sampled individuals. The NSIT also collected many questions related to migration history and assimilation, among other topics. The sampling universe is migrants, return migrants, and non-migrants from a small city in Guanajuato, Mexico who have migrated to either the Raleigh-Durham-Chapel Hill area of North Carolina or Houston, Texas or remained in the origin city in Guanajuato.

Setting: North Carolina, Houston, and Guanajuato

North Carolina is a new destination area for Mexican migrants (Durand, Massey, and Capoferro 2005). Its migrant population is among the fastest growing in the U.S. (Griffith 2005, 56; Kasarda and Johnson 2006). Many North Carolina Hispanics migrated directly from abroad (38%), while the plurality (40%) came from elsewhere in the United States (e.g., Riosmena and Massey 2012). Most Mexican migrants in North Carolina work in food processing (Passel and Center 2005) or construction (Mouw and Chavez 2012); among those in our sample, painting is the dominant source of employment. Many in North Carolina, both working adults and their families, are undocumented (Passel and Center 2005). For these reasons, a distinctive feature of North Carolina's Mexican immigrant community is that adult migrants tend to be first generation, born in Mexico. Community leaders and ethnographic fieldwork suggest that the target population of our North Carolina sample has a total size of at most 250–300 adults.

In contrast to North Carolina, Texas has long received Mexican migration (Massey and Capoferro 2008), with Houston an especially popular destination. We included it because it represents a more urban and more traditional area for Mexican migration with a much larger Hispanic community and closer economic, political, and geographic proximity to Mexico. The Houston data supplements our North Carolina results with those that might be obtained in more traditional migrant-receiving areas, those where the community is likely older and more embedded.

Most of the Mexican migration to the United States over the past century has originated from the West-Central region of Mexico, including Guanajuato, where our origin-area study site is located (Durand, Massey, and Zenteno 2001). The city we focus on in Mexico, whose migrant communities comprise the target populations in North Carolina and Houston, has a current population of 45,000 according to the Mexican census.

Sampling design

We collected the NSIT data in three stages using a "link-tracing" sampling approach starting in the destination. Overall, the success of the NSIT in collecting network data from a hard to reach migrant population led to additional work on improving the precision and accuracy of network-based sampling methods (Mouw and Verdery 2012; Merli et al. 2016). The first phase of the survey began in North Carolina in spring 2010 by interviewing 10 original "seeds" from the origin city in Guanajuato who were selected from contacts obtained during prior ethnographic fieldwork within this community. Throughout the survey, we undertook measures to protect participants' privacy and gain their trust (Chavez et al. 2012), including hiring and training community members for data collection, which helped to spread information about the survey, obtain referrals, and yield a high response rate (85% in the U.S. and 97% in Mexico). We interviewed 146 individuals in North Carolina, 51 in Houston, and 410 in the Guanajuato origin community.

Because in-depth network questions can generate respondent fatigue and biases (Fischer 2009), we asked them at the beginning of the survey. We first showed migrants a simple social network graph and explained the purpose of network analysis to them. After assuring participants we would not ask about their immigration status or that of their friends, acquaintances, or family, we explained our approach for maintaining confidentiality by only asking for partially identifying information (see below). We then asked respondents to nominate members of their social networks ("alters") on several specific rosters, guided by the following name generator prompt, depending on ego location, alter location, and alter type (full Spanish and English language rosters are available on request):

> In this part of the survey, we are going to ask you about your contacts and social connections. This information will allow us to observe how people remain connected to their communities. We are doing this survey to understand how people

> remain connected. For example, this map shows how residents are connected after completing 18 interviews. [sociogram shown]. To better understand social connections, we need to ask you about your friends and acquaintances… The **[type of alters]** you include in this list do not have to be very close. You can include any person whom you know. Write down **[type of alters]** over 18 who live in **[location of alters].**

In the survey, respondents in both the U.S. and Mexico were asked to fill in several different network rosters that correspond to theoretically relevant differences among the types of ties. Based on pilot testing of the survey, we found that dividing the network questions into different rosters helped the interviewers prompt the respondents for additional information and improved the overall response rates for the network. In addition, each of the network rosters had a limit on the number of ties that could be listed (typically 5–6), which was done to prevent respondent fatigue and improve the quality of data collection. The maximum number of ties for each roster types is listed in Appendix Table A1. As described in detail below, we incorporate the constraints on tie counts resulting from the network rosters directly into our analysis by estimating censored Poisson count models in Table 6 and by including dummy variables for the tie type in our models of communication flows in Table 7. For the U.S. based survey, respondents were asked to fill in 6 network rosters (A through F). For ties in the destination, these were (A) all adult household members, (B) non-household family members and (C) non-household friends or acquaintances currently residing in their location (either North Carolina or Houston).[2] For cross-border ties to the origin community, U.S. respondents were also asked to about (D) family and (E) friends or acquaintances living in Guanajuato, and (F) return migrants.

The second stage of data collection was conducted in Guanajuato, Mexico. We initiated this stage of the survey by starting with 17 "seeds," that were drawn from the cross-border ties from the first-stage of data collection in North Carolina described above (rosters D, E, and F). In Mexico, we asked respondents to fill in 5 network rosters: (G) a complete household roster, (H) non-household relatives currently living in Guanajuato, (I) friends or acquaintances in Guanajuato, and friends, acquaintances, or family members currently living in either (J) North Carolina or (K) Houston. In Mexico, we used targeted snowball sampling to obtain a range of alters stratified by proximity to migrants; greater details on this procedure are provided in prior published work (Mouw et al. 2014). The third phase of data collection occurred in Houston, where we drew a list of three seeds nominated by those living in Guanajuato and began snowball sampling in early 2011.

Creating the network

In addition to basic demographic information on their alters, we asked respondents to list the first four letters (to help protect confidentiality) of each alter's first and last names, as well as their place of origin, how many years they had known each other, and how frequently they communicate. Missing attribute reports were infrequent, with more than 99% reporting a first and last name, and 95% reporting age. We use these data to identify unique individuals

[2]Importantly, we did not instruct respondents to limit nominations in roster C of those in the United States to members of the origin community, or Mexicans more generally.

in the NSIT who were nominated by multiple sample participants (more details available in Mouw et al. 2014), allowing for reporting and coding errors in the first name, last name, nickname, and demographic attributes. The network contains nominations between sampled respondents, as well as from sampled respondents to nominated but unsampled alters.

Methods and Measures

Our goal is to test for the relative importance of the assimilation and transnationalism perspectives on the durability of cross-border communication networks using data on network structure, tie counts, and communication frequency from the NSIT. We start with descriptive analyses. We first graph the network of connections among sampled and nominated members of the transnational social field captured by the NSIT. We employ a structural cohesion analysis (Moody and White 2003; White and Harary 2001) that looks at the embeddedness of the cross-border network at different levels of communication frequency, with a special emphasis on the amount of information that could flow across the border. After considering its structural properties, a network's capacity for information flow is jointly determined by the number of ties and the "bandwidth" of those ties (Aral and Van Alstyne 2011), i.e., how much information they can transmit. We examine nomination counts by roster according to the conceptual framework outlined above, and then we focus on communication frequencies as a measure of bandwidth. We operationalize bandwidth with responses to the following question: "How frequently do you communicate with this person?", which we coded as an ordered scale ascending as "Less than each year" (reference category), "Every year", "Every month", "Every week", "Every day".

In the first stage of the analysis we estimate censored Poisson models estimating the counts of respondents' ties by type to test the assimilation perspective's assertion that increasing time in the destination is associated with fewer cross-border ties and more within-border ties. We measure time in the destination by the log years U.S. respondents have spent in the U.S. or the log years spent by the alter in the U.S. for Mexican respondents (we calculate this as $\ln(years+1)$ to make it a positive function and we code non-migrants in Mexico to 0). Guided by the prior research reviewed above, we also examine how ego's age, gender, English language skills, and recent trips to the origin affect numbers of nominations of each type. To account for dependencies in the social network data, we also control for the average number of nominations on that roster for each of the ego's alters. Because, as mentioned above, the network rosters in the NSIT survey had different limits on the number of alters that could be nominated, we use censored Poisson models (Hilbe and Judson 1999; Raciborski 2011) to analyze the tie counts where the dependent variable is considered right censored if the respondent reached the maximum number of ties for a particular network roster. We impute missing data using the ICE command in Stata 14.0 and 10 separate imputations for each sample (Royston 2007; the number of non-missing cases for each variable is shown in column 1 of Table 4, below). Our sample contains no missing data on the dependent variables (tie counts and communication frequency), and the imputation model includes both the dependent and independent variables used in the analysis. In addition to multiple imputations, we estimated each model separately with non-imputed data using case-wise deletion to check for consistency (full results are available on request).

In the second stage of the analysis we model the communication frequency of these ties using ordered probit models with network autocorrelation. In this analysis, cases represent dyads and the dependent variable is the level of communication between members of the dyad. We divide the analysis up into separate models based on the location of the ego and the type of the tie (i.e., cross-border or within border), as is described in detail below in reference to Table 7. We examine how time in the destination, return visits, email use, age, gender, and English language ability affect communication frequencies. In terms of the debate between the assimilation and transnationalism perspectives on immigration, the crucial question is how the frequency of communication changes as the length of time since migration increases.

A key methodological aspect of the ordered probit models is the use of an autocorrelation term to account for network-related dependencies in the data combined with cluster-robust standard errors to account for the fact that respondents contribute multiple cases to the analysis. Several authors have discussed modeling network dependencies with spatial autocorrelation approaches (Doreian 1989; Leenders 2002; Fujimoto, Chou, and Valente 2011; O'Malley and Marsden 2008), where the network distance between cases determines correlations between them (LeSage and Pace 2010). We adopt a similar approach in this paper, using spatial ordinal probit regression models (Wilhelm and de Matos 2013) to incorporate the possibility of network autocorrelation among the error terms in the analysis. The autocorrelation term is estimated as a function of the inverse distance between respondents in the network.[3] In addition, because each respondent contributes multiple dyads to the analysis, we use a cluster-robust bootstrap resampling approach for the standard errors (Cameron and Miller 2015). We implement this bootstrap approach to the standard errors as follows: If there are N egos in a specific model, we draw a bootstrap sample of N egos, sampling with replacement from the set of egos that are in the model. Each time an ego is added to the bootstrap sample, all of its dyads (of the particular tie type specified by the model) are added to the sample as well. Then we estimate the model using the bootstrap sample, and save the coefficient results. We repeat this process 200 times to derive the bootstrap standard errors, which are calculated by taking the standard deviation of the coefficient estimates across these 200 replications.

Results

Panel A of Figure 2 graphs the NSIT network's largest weakly connected component[4] using the Force Atlas 2 layout in Gephi 0.9.1 (www.gephi.org). The network contains 8,769 social ties (8,070 for which communication frequency was recorded[5]) among 5,236 unique individuals. We depict the 607 individuals we interviewed with large circles, while we show unsampled but nominated individuals with smaller circles. We use black nodes for individuals located in North Carolina, light gray nodes for those in Guanajuato, Mexico, and dark gray nodes for those in Houston, Texas. Respondents nominated 1,018 individuals in

[3]The inverse distance is set to 0 for dyads from the same ego.

[4]The sampled nature of the data we collected requires us to limit our analyses to weakly connected components. From here on, we refer only to connected components for simplicity.

[5]For those with no communication reported, we treat them as "less than yearly" in the descriptive analyses in Figure 2 and Table 1, but drop them in the multivariate analyses that follow.

North Carolina (146 interviewed), 603 in Houston (51 interviewed) and 3,594 in the origin city in Guanajuato, Mexico (410 interviewed). We exclude 21 nominated but unsampled individuals reported as living in multiple locations (20) or not reported in a location (1).

Connected components are an important measure of a network's structural cohesion (Moody and White 2003), a concept that links network structure to traversibility (White and Harary 2001). Two nodes are members of the same connected component if they can reach each other through chains of arbitrary length along the network's edges. Within a component each person can reach every other person, but between components there are no ties. Most networks, especially human social networks, tend to exhibit one large component that clearly dominates the others (often referred to as the giant component; Strogatz 2001). In the context of social networks and migration, the size of the largest connected component is a primary measure of cohesion because it bounds the network's capacity for information diffusion: the maximum number of people that can be reached by information with one introduction point that spreads only through social ties is the size of the largest component.

Panels B through D of Figure 2 show how the NSIT's giant component changes as we focus on ties at different communication thresholds. Across panels, we fix nodal positioning, but we selectively remove nodes that are not in the giant component formed by edges that meet or exceed different levels of communication frequency. For instance, Panel B shows only nodes remaining in the giant component after deleting edges that communicate less than yearly; the cohesive core of the network endures at this communication frequency, knitting together respondents from both sides of the border. This cohesion persists through panel C, where we look only at the giant component formed among those communicating monthly or more frequently. Even panel D, the giant component created among those speaking at least weekly, contains respondents on both sides of the border linked through many bridging ties.

Table 1 quantifies Figure 2. Working along the first row, we examine nodes that are in the giant component considering ties of any communication frequency. The first two columns show the number (5,069) and percentage (96.8%) of such nodes. The next two show the number (3,445) and percent (95.7%) of individuals in Mexico in the giant component. Next, we show the number (1,624) and percent (99.3%) of network members in the US linked to the giant component. Multiplying these two proportions (0.968×0.993=0.951) gives us the final column of the table, which we label cross-border diffusion capacity. One way to think about this measure is as a lower bound on the network's capacity for diffusion across the border. This measure, though imperfect[6], proxies the possible extent to which information given to a random person in Mexico could reach a random person in the United States through the transnational social network. Looking at all network ties, we find that information has a 95.1% chance of reaching said individuals along ties of any communication frequency.

The remaining rows of Table 1 present giant component memberships and cross-border diffusion capacities of the network when looking at increasingly strict thresholds of

[6]With the sampled data we examine, there may be ties that were unobserved among the nominated but unsampled nodes in the network. Such ties could expand the connectivity of the network and increase the size of the giant component. Nonetheless, the estimates here represent a lower bound: we know at least this much connectivity exists as observed.

communication frequency. This analysis is similar to an evaluation of the higher-order structural cohesion of a network (Moody and White 2003), except we look at connectivity defined by minimum levels of communication frequency instead of numbers of node independent paths. These results contextualize panels B through D of Figure 2 by providing lower bound estimates of connectivity at each threshold of communication frequency. One finding is that network members in the United States drop from the giant component more quickly than members in Mexico as we increase communication thresholds, especially at weekly or more frequent communication. For instance, approximately double the percentage of network members in Mexico (25.2%) persist in the giant component formed by ties with daily frequency as the percentage in the US (12.4%). At the same time, lower bound estimates of the cross-border diffusion capacity of the network remains robust even at the monthly and weekly minimum communication frequency thresholds. Assuming perfect edge-wise transmission, these levels suggest that information obtained by a random migrant in the United States could reach a random person in Mexico 56% of the time through ties where respondents are speaking every month or more. A job seeker in Mexico, for example, would have a 28% chance of being connected to a job holder in the United States through ties where respondents are speaking at least weekly. An alternative way of thinking about this measure is that, were all ties less frequent than weekly to fade and no longer exist, two randomly chosen individuals on each side of the border would still be connected more than a quarter of the time. Such structural cohesion underscores the importance of social networks in migration theory by providing evidence of the robust connectivity of a transnational social field and the potential for the rapid transmission of information through communication flows. The question that remains, however, is what features are associated with the network's cohesion? Because communication flows are determined by both the volume of ties and their bandwidth, we next look at respondent's numbers of nominations of each type, then we examine predictors of dyadic communication frequency. Finally, we put both elements together to consider how different scenarios – e.g., increasing time in the destination or increases in migrant return visitation – might affect the network's structural cohesion.

Table 2 shows the overall number of ties in the NSIT by tie location and type (friends and acquaintances vs. family members). Row 1 of Table 2 lists the number of observed ties in the U.S. by whether they were family or friend/acquaintance ties and where the alter was born. A key result is that while there were many friend and acquaintance nominations for U.S. respondents (n=1,393), the majority (953; 68.4%) were to friends or acquaintances from the origin community. U.S. respondents nominated 371 friends and acquaintances who were born elsewhere in Mexico, and only 69 born in the U.S. (41) or other countries (28); we combine these latter three groups in the remaining analyses. While the broader question of social incorporation in the destination involves the accumulation of native born friends and acquaintances, so few were nominated in the NSIT that the empirical question is one of social incorporation into a broader community dominated by conational Mexican immigrants. The remaining rows of Table 2 show the breakdown of different cross-border ties as well as ties among Mexican respondents.

In our third set of descriptive analyses, we study communication frequency as the dependent variable, which we conceive of as measuring the bandwidth of ties. In Table 3, we report differences in the frequency of communication based on the location and type of tie. In Row 5 of Table 3, for instance, 45.05% of within-border friend and acquaintance ties in Mexico communicated daily. In contrast, in Row 6, 47.89% of cross-border ties to return migrants in Mexico communicated less than once per year. Although the movement of information between individuals, over space, and across borders has long been a central tenet of the idea that networks matter for migration, it has rarely been examined directly. We find that, in general, the frequency of communication with cross-border ties is lower than that of within-border ties.

Table 4 shows summary statistics for the individual level variables for both the U.S. and Mexican samples. The number of non-missing cases for each variable is listed in the first column of each sample. Row 1 of Table 4 shows that respondents in the U.S. sample have been in the U.S. for an average of 11.52 years with substantial variability around that (SD=9.48), so while this is an active migrant community with new members arriving from and returning to Mexico, the typical migrant has been in the U.S. for an extended period of time. Rows 17 and 18 in Table 4 show the average number of cross-border and within-border friendship ties that respondents' alters nominated. For example, in Row 17, we see that the average alter of U.S. based respondents nominated 1.0 cross-border friends and acquaintances. In our Poisson models of respondent's tie counts, we include these measures as a test of the transnationalism perspective on cross-border interaction, as described below in reference to the results in Table 6.

Table 5 shows additional dyad level variables used in the communication frequency analysis. The average values for the length of time that the respondent has known his or her alter is high, across all of the different tie types. This suggests that, in general, we are talking about the maintenance of long-standing social ties in this community. Second, the indicator variable for same gender ties shows a high degree of gender homophily for friendship and acquaintanceship ties; 79% of friendship or acquaintanceship ties in Mexico are same gender, as are 70% of ties to same origin friends and acquaintances in the U.S.

Table 6 shows results estimated with the censored Poisson models predicting counts of nominations by tie type and location. Cases are right censored if they reach the maximum roster size for each type; the maximum number for each model is listed at the bottom of the table.[7] Overall, we find results consistent with the assimilation perspective's assumption that ties to the origin are replaced by ties to the destination the longer a migrant lives abroad. We see a small but significant negative effect of time in the destination on ties to origin (Model 1), and a strong positive effect on non-origin friends and acquaintances (Model 3), who, we note, are dominated by conational ties (see Table 2). Ties from migrants in the destination to return migrants do not appear to be affected by time in the destination (Model 2), nor are ties to origin friends and acquaintances (Model 4) or family (Model 5). Looking from the other side of the border, we find a positive effect of time in the U.S. (for return migrants) for tie counts from Mexico to the U.S. (Model 6). We experimented with other functional forms of modeling the duration of migration with little difference in the qualitative interpretation (results available upon request).

[7]The count for Models 3 and 4 comes from the same roster, so the combined maximum is 10.

In contrast to the effect of the duration of migration, the measures of each respondent's alter average number of nominations has an effect in all of the models, a result that is consistent with the transnationalism perspective. These are the average number of nominations—of the same type as the dependent variable for the model—that were recorded by other respondents to the survey who were nominated on the network roster by the respondent. This result illustrates one of the benefits of the NSIT survey which goes beyond the egocentric network data typical in many migration surveys to include the ability to connect the alters on the network roster to actual respondents. The fact that these variables have significant effects for all of the models in Table 6 is consistent with a network-based perspective on transnationalism: being around peers who are actively maintaining their ties to cross-border friends, acquaintances, and family in Models 1, 2, and 6 is positively correlated with a respondent's cross-border tie counts. Similarly, in Models 3, 4, and 5 local friend and acquaintances and family counts are positively correlated with average alter counts. We note that this is not necessarily a causal effect of peer nominations (Shalizi and Thomas 2011); but, whether it is causal or whether it reflects clustering based on homophily based preferences, it suggests that conventional tests of the assimilation perspective, which routinely ignore the connections and ties among migrants, may miss how these ties are informative about the trajectories of social incorporation.

Regardless of how many ties migrants nominate, the strength of those ties may attenuate the longer they have been abroad. To complement our analysis of numbers of ties, we now turn to the second stage of our analysis in Table 7, which consists of ordered probit models of communication frequency. Here, cases consist of ego-alter dyads and the models incorporate network dependencies in their estimation of both coefficients and standard errors. Similar to Table 6, Table 7 presents separate models for different tie types. For models that include relatives, dummy variables are included for all of the types of relatives listed in Appendix Table 1. In contrast to the findings in Table 6, there are large and significant negative effects of log years in the U.S. for all three models using cross-border dyads (Models 4, 5, and 6) in Table 7. We experimented with other functional forms and found comparable results (not shown; available on request). These findings mean that the longer respondents have been in the U.S., the more likely the frequency with which they communicate with peers will decrease, which is consistent with the assimilation perspective on immigrant incorporation because the communication intensity of the cross-border ties appears to decline as time since immigration increases. However, unlike the results we found for tie counts, we see no increase in communication frequency from migrants to non-origin friends and acquaintances in the destination as the duration of migration increases, providing support for only half of the assimilation perspective.

In contrast to the effect of time in the U.S. on cross-border communication, a return visit to the origin community within the past four years has a positive effect on communication to return migrants (Model 4 in Table 7) and non-migrants in the origin (Model 5). In both models, the magnitude of the effect of return visits is large compared to the effect of time. For example, in Model 5 the coefficient on return visits is +0.300, while the effects of ln(years), which have diminishing returns, is −0.207. The effect of a return visit to the origin likely reflects the impact of renewing connections between friends, acquaintances, and family in the origin (Lubbers et al. 2010), but it may also reflect the fact that individuals who want to maintain those connections are more likely to visit home. At the same time, one of the important characteristics of many immigrant populations in the U.S. (including this one) is a large proportion of the migrants may not be able to return home because they are undocumented (Donato and Armenta 2011; Dreby 2010). In many cases, this makes the cost of a return visit prohibitive, and has a negative effect on the ability to maintain social connections to the origin.

The average communication level of the respondent's alters who were also sampled is modeled in Table 7 as the "network lagged DV". We include this variable as a test of the transnationalism perspective, similar to the use of average number nominations made by alters in the Poisson models in Table 6 above. If one's structural location in the network affects the intensity of cross-border communication, then this would be evidence in favor of a "social fields" interpretation of the way that cross-border networks operate. In all of the models in Table 7, the coefficient on this variable is positive but not significant at the $p<.05$ level. In addition, we note that the value of the autocorrelation term Rho is positive and significant in all of the models, indicating that there is a positive relationship between the error terms on cases that are closer to each in the network.

It is interesting to note that the log of the number of years the ego has known the alter decreases the frequency of communication for friendship ties in the U.S., and cross-border ties from Mexico to the U.S. We expect that this result is obtained because respondents are likely to nominate those they have known for a long time, even if they rarely communicate with them. In addition, a poor ability to speak English reduces the frequency of communicating with non-origin friends in Model 3, which is to be expected because English language proficiency is a critical occupational sorting characteristic that will directly affect opportunities for interaction with non-origin alters. Frequent email use is correlated with increased communication frequency for U.S. to Mexico ties, which is consistent with prior literature and theoretical expectations about the role played by changing technologies in the maintenance of cross-border ties even in the absence of direct face-to-face communication.

In order to get a sense of the magnitude of the effect of time since migration, Figure 3 provides results that show the predicted number of cross-border communication events per month for cross-border U.S. to Mexico, as a hypothetical respondent's time in the U.S. goes from 0 to 20 years holding all other values at their means. We obtain the number of cross-border communication events per month by predicting the number of ties a migrant has (Model 1 from Table 6) and the communication frequencies they have with them (Model 5 from Table 7), weighting frequencies by number of expected events per month (e.g., daily communication would imply 30 events per month, monthly would imply 1). For presentation purposes, we focus on three scenarios that help to decompose the relative contributions of tie counts and communication frequencies on levels of cross-border communication. In the first scenario ("both vary"), we calculate the predicted number of cross-border communication events a migrant would have per month if we vary the effects of time in the U.S. on both tie counts and communication frequencies. In the second ("counts vary"), we estimate the number of events if time in the U.S. varies for our predictions of tie counts but is fixed at its mean when assigning communication frequencies to them. In the third ("frequencies vary"), we do the opposite, varying time in the U.S. in the predictions of frequency but not tie counts. Comparing across these scenarios clearly demonstrates that communication frequencies – the bandwidth of ties – matter more for cross border communication levels than number of cross-border contacts. While we see a slight decline in the “counts vary” scenario, it is dwarfed in magnitude by the “frequencies vary” scenario, which accounts for the vast majority of the effects of time in the “both vary” scenario.

In the final part of our analysis, we evaluate the overall durability of the transnational network by combining the results from Table 7 with the existing structure of the cross-border ties presented above in Figure 2 to estimate the cross-border diffusion capacity of the network under several different scenarios. We focus on the effects of communication frequencies rather than tie counts because they account for the vast majority of change over time in communication events, as shown in Figure 3. This analysis is similar to the analysis discussed earlier in Table 1, except that now we use the results from Table 7 to predict the level of communication frequency based on the length of time migrants have lived in the U.S. and the time since their most recent visit home. Although the results in Table 7 indicate that time since migration has a negative effect on dyad-level communication levels, our analysis here illustrates the benefit of using network sampling data by estimating the effect on a global measure of communication flows. As with before, we focus on the lower bounds of structural connectivity in the network at different communication thresholds. These measures proxy the extent to which information can be passed through the network through ties of a given communication frequency, or, alternatively, can be thought of as indexing how connected the network would remain if ties lower than a given communication frequency threshold were to fade and be lost from the network. We conduct this analysis in several steps: First, we use the results from Table 7 to predict the level of communication frequency within dyads under several different scenarios. For each scenario, we draw 100 random networks from predicted probabilities and calculate the proportion of network members in the largest weakly connected component on each side of the border and the network’s cross-border diffusion capacity using different minimum thresholds of communication frequency between individuals to define a tie, similar to the analysis in Figure 2 and Table 1. Finally, we average the diffusion measures across the 100 randomly generated networks for each scenario.

Table 8 shows that when we set all migrants to be recent arrivals who recently visited home (i.e., ln(years+1)=0 and recent visit=1), two of our most important predictors of communication frequency, the network is highly connected. Overall, the cross-border diffusion capacity declines slowly from 93.5% when considering ties that are in contact at least yearly until we begin considering cross-border diffusion capacity through ties that are in weekly or more frequent contact. In general, a network formed by recent arrivals who recently visited home is much more structurally cohesive than we found in our empirical data and showed in Table 1.

We next consider two scenarios, both reflecting what the network would look like if all destination members were there for 10 years: in scenario 2, we examine those who did not have a recent visit home (i.e., ln(years+1)=2.39 and recent visit=0); in scenario 3, we examine those who did have a recent visit home (i.e., ln(years+1)=2.39 and recent visit=1). We note that the values obtained in this table will differ from the empirical results in Table 1 because we collapse the empirical variability seen in duration of migration (mean=11.52, SD=9.48; see Table 4) in order to focus on predicted effects of different scenarios. It is instructive to compare the results in these scenarios to the means found in scenario 1. Here, we find that the network's cohesion is remarkably robust. Whereas it had a 64.5% cross-border diffusion capacity through monthly or more frequent ties when all network members were recent arrivals who had recently visited home, we find that monthly cross-border diffusion capacities above 50% when destination members have been gone for 10 years. We see a similar robustness at all communication frequencies. In general, the difference between networks where destination members have recently visited home (scenario 3) compared to those where they have not (scenario 2) in terms of cohesion is small, on the order 2–4%. Thus, while recent visits home strongly affect the maintenance of dyadic, cross-border communication frequency (see table 7), they do little to alter the structural cohesion of the network because the network is very durable with or without recent visits.

Conclusion

This paper tests a basic assumption from the assimilation literature that migrants replace ties to the origin with ties to destination members, particularly native-born destination members, the longer they reside in the destination. We outline a theoretical framework from the recent literature on transnationalism that elaborates how transnational social fields challenge, complement, and extend classic assumptions about assimilation and the theorized role of migrant networks in processes of social incorporation, the expansion and maintenance of migration streams, and the diffusion of social remittances. To date, debates about assimilation and transnationalism have suffered from a lopsided approach, looking primarily at the prevalence of so-called "transmigrants" in the destination to the neglect of other relevant questions and conceptualizations of transantionalism. Using bi-national social network data, we add a unique layer to this debate. Specifically, we examine the structure of a transnational social field, which we argue can only be explored with network sampling methods and network data, and how it is supported by ties to, from, and between migrants and other members of the social field as well as the frequency of communication along those ties. Within this framework, the questions then become: how is a transnational social field connected, and what factors support its maintenance?

Our results show that time in the destination affects communication flows in the expected direction – driven by a decline in frequency of contact more strongly than number of contacts – but we also found a striking durability of cross-border ties among migrants. Ties between migrants and residents of the origin fade, but do so slowly, and they are reinvigorated by return visits home. Even a small number of individuals can keep a large network well-connected, and they need not all be current migrants. In contrast to a destination focused study, we find that individuals on both sides of the border help to maintain communication flows. We found limited support for the classic assimilation assumption that ties to the origin are replaced by ties to the native born in the destination. Rather, we see increased numbers of ties to a broader, pan-Mexican immigrant community as migrants spend more time in the destination. Together, these results suggest that at both the dyadic level and the level of a network's social structure, there is surprising robustness to transnational social fields that may help to explain the capacity of migrant networks to diffuse information across borders, thereby influencing social remittances and the expansion and persistence of migration streams, and affect social incorporation in the destination. Such results highlight the importance of taking the transnationalism perspective seriously, using network sampling methods and network data, and building on its insights.

Our paper contributes to the network literature more broadly as well. The structuralist tradition in sociology holds "studying a communication network mapped on some human population" as a goal (Mayhew 1980, 338). We build on that idea by directly considering such a network, but expanding it beyond the bounded nature of traditional network studies (Laumann, Marsden, and Prensky 1989). Indeed, we argue that the transnationalism and the migration literature more generally have much to offer scholars of social networks as they allow researchers to situate clusters of human interaction in a time and place, and to study the connections across times and places. The challenge of collecting direct measures of migrant social networks, and unbounded social networks more generally, loom large, but in this paper we present a pioneering attempt to do so that was successful. Without data on the complete network linking migrants to origin, to each other, and to others at destination, researchers underestimate the role of social networks in the migration process. Collecting such data, and further theorizing what it can tell us about the processes of migration and immigrant incorporation, as well as social networks more generally, is a vital direction for future research to pursue. The social networks and migration literatures deserve further integration.

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Appendix A. Additional Tables

Table A1

Descriptions of Rosters.

Roster type	Location of the tie	Maximum number of ties
US based survey		
A. Household members	Destination	5
B. Non-household family members	Destination	5
C. Friends or acquaintances	Destination	10
D. Family	Origin	3
E. Friends or acquaintances	Origin	3
F. Returned migrants	Origin	5
Mx based survey		
G. Household members	Origin	6

Roster type	Location of the tie	Maximum number of ties
H. Non-household Family members	Origin	6
I. Friends & acquaintances	Origin	6
J. Friends and family in North Carolina	Destination	6
K. Friends and family in Houston	Destination	6

Table A2

Communication Frequency by Relationship Type (Row Percentages)

	Communication Frequency					
Relationship Type	**1.yearly**	**2.yearly**	**3.monthly**	**4.weekly**	**5.daily**	**N**
Friend and acquaintances	12.6	11.5	19.9	28.9	27.1	4,351
Spouse	6.7	3.3	3.3	36.7	50.0	30
Child	0.0	2.2	12.2	38.7	47.0	181
Sibling	2.4	4.3	21.4	37.2	34.8	979
Parent	3.5	2.0	16.0	47.5	31.0	200
Grandchild	0.0	8.7	52.2	17.4	21.7	23
Parent in law	6.3	0.0	21.9	25.0	46.9	32
Cousin	10.8	17.1	19.3	33.6	19.2	766
Uncle/aunt	9.5	17.5	21.0	32.7	19.3	590
Other relative	12.0	13.4	22.5	30.6	21.5	917

Highlights

1. Draws on unique data on communication flows between migrants and non-migrants in a bi-national, cross-border social network.
2. Tests competing theories of transnationalism and assimilation in the process of social incorporation.
3. Finds mixed support for both the transnationalism and the assimilation models.
4. Ties to the origin fade, but do so very slowly, and they are easily reinvigorated by return visits.
5. The loss of ties to the origin are not replaced by ties to the native born at destination, but rather are substituted by ties to a broader, pan-Mexican immigrant community.

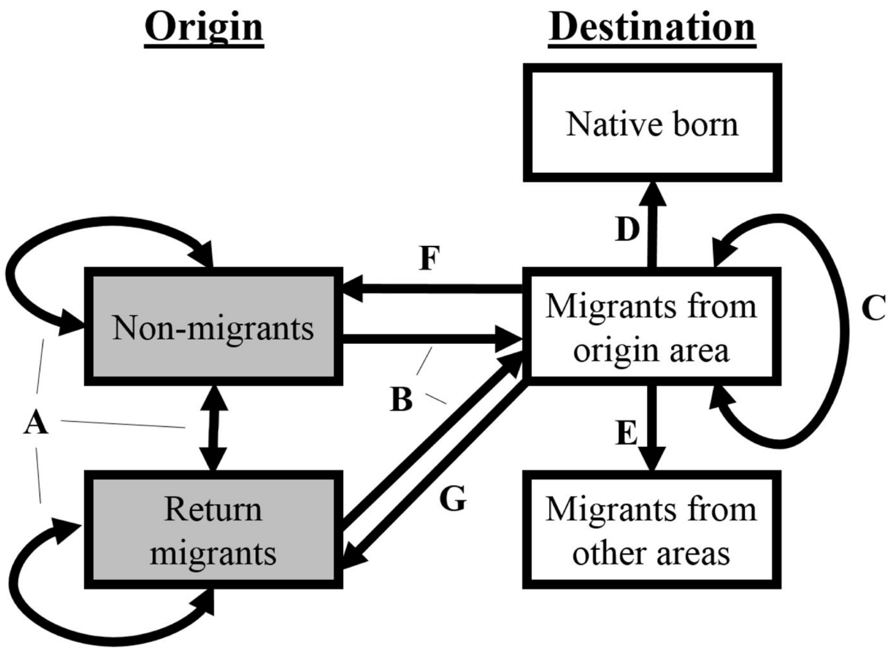

Figure 1.
The transnational social field studied in this paper.

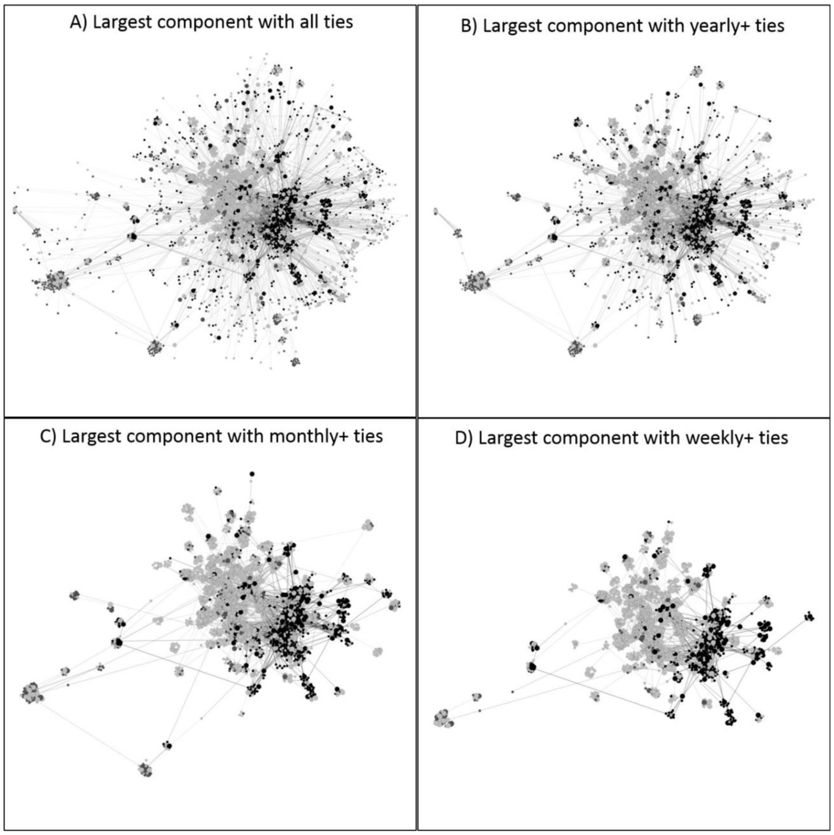

Figure 2.
Largest weakly connected component among respondents linked by ties of increasing communication frequency. Panel A shows those connected by all communication frequencies; B shows at least yearly communication; C shows at least monthly; and D shows at least weekly. Nodes are colored by location (NC=black, Houston=dark gray, Mx=light gray) and sized by where sampled or only nominated (sampled=large, nominated=small).

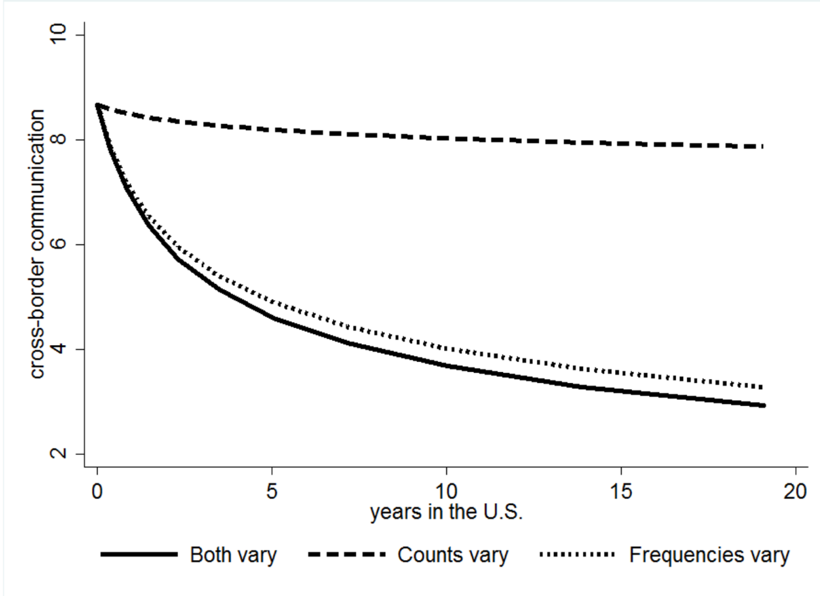

Figure 3.

Predicted cross-border communication events per month under three scenarios, by time migrants spend in the U.S..

Notes: Cross-border communication events per month are defined by predicting the counts of cross-border contacts a respondent has (see Table 6) and their communication frequency with each (see Table 7). In the "both vary" scenario, we predict events per month by varying the time in the U.S. effect on both counts and frequencies. In the "counts vary" scenario, we only vary the time in the U.S. effect in the counts model. In the "frequencies vary" scenario, we only vary it for the frequencies model.

Table 1

Weakly connected component sizes at increasingly frequent minimum thresholds of communication, overall and by country.

	Number of nominees in largest component						Cross-border diffusion capacity
	All		In Mx		In US		
	Freq.	%	Freq.	%	Freq.	%	
Overall	5,069	96.8%	3445	95.7%	1624	99.3%	95.1%
By frequency							
Yearly+	4,605	88.0%	3166	88.0%	1439	88.0%	77.4%
Monthly+	4,023	76.9%	2877	79.9%	1146	70.1%	56.0%
Weekly+	2,967	56.7%	2229	61.9%	738	45.1%	28.0%
Daily	1,110	21.2%	908	25.2%	202	12.4%	3.1%

Table 2

Counts of Ties Observed, by Tie Type

	Tie type					
Tie location	**Family**	**Friend & acquaintances from origin community**	**Friend & acquaintances from Mx, not origin community**	**Friend & acquaintances born in the US**	**Friend& acquaintances non-Mexican immigrants**	**Total**
1. US	650	953	371	41	28	2,043
2. US->Mx (ret. migs.)	235	262	0	0	0	497
3. US->Mx	585	374	0	0	0	959
4. Mx->US	580	402	0	0	0	982
5. Mx	1,669	1,920	0	0	0	3,589
6. Totals	3,718	3,911	371	41	28	8,069

Table 3

Communication Frequency, by Tie Type (Row Percentages)

		Communication Frequency (%)					
Location	**Type of Tie (Figure 1)**	**1.<yearly**	**2.yearly**	**3.monthly**	**4.weekly**	**5.daily**	**N**
Within-Border							
1. US	Family (C)	4.01	6.78	17.41	38.67	33.13	649
2. US	Origin friends& acquaintances (C)	10.39	7.76	33.26	32.63	15.95	953
3. US	Non-origin friends & acquaintances (D)	4.55	2.95	22.27	39.32	30.91	440
4. Mx	Family (A)	1.26	1.68	13.96	40.98	42.12	1,669
5. Mx	Friends & acquaintances (A)	1.04	1.72	14.74	37.45	45.05	1,920
Cross-Border							
6. US->Mx	Return Migrants (E)	47.89	21.73	17.91	8.25	4.23	497
7. US->Mx	Family (B)	10.43	16.07	35.73	32.31	5.47	585
8. US->Mx	Friends & Acquaintances (B)	40.11	35.29	14.71	6.42	3.48	374
9. Mx->US	Family (B)	16.38	32.59	25.69	22.07	3.28	580
10. Mex.->US	Friends & Acquaintances (B)	25.62	48.51	19.9	4.73	1.24	402

Table 4

Summary statistics of individual level variables used in the analysis

	US Sample.			Mx Sample.		
	(N)	Mean	Std. Dev.	(N)	Mean	Std. Dev.
Variable:						
1. No. years in the US: current migrants	197	11.52	9.48			
2. No. years in the US: return migrants[1]				70	4.28	4.65
3. Age	189	36.4	12.30	391	39.1	16.28
4. Recent visit to Mx (in the last 4 years)	173	0.37				
5. Female	198	0.45	0.50	410	0.55	0.50
6. Poor English ability	194	0.75	0.44	407	0.93	0.26
7. Frequent use of email to communicate with cross-border contacts	190	0.22	0.42	390	0.12	0.32
Network roster variables:						
11. No. other sampled respondents R nominated	197	3.96	3.20	410	2.96	2.98
12. No. nominations R made in network roster	197	18.4	5.96	410	12.07	6.06
13. Within-border family nominations	196	3.32	1.94	407	4.10	1.71
14. Within-border friend and acquaintances nominations	196	7.11	3.46	407	4.72	1.84
15. Cross-border family nominations	196	2.98	1.13	407	1.43	1.89
16. Cross-border friend and acquaintances nominations	196	1.91	1.31	407	0.99	1.76
Alter average of:						
17. Cross-border friend and acquaintances nominations	170	1.00	0.70	310	0.67	1.33
18. Within-border friend and acquaintances nominations	170	6.43	2.42	310	3.94	1.27

Notes

[1] There are 70 return migrants in the data. The number of years in the US is 0 for the non-migrants in the Mx sample

[2] The network communication variables are the log sum of the communication frequencies. See the text for an explanation.

Table 5

Summary Statistics for Dyad Variables, by Tie Type

Direction	Type of Tie (Figure 1)	Years known	Same gender	N
Within-Border				
US	Family (C)	16.57	0.56	649
US	Origin Friend and acquaintances (C)	14.31	0.70	953
US	Non-origin friends & acquaintances	9.15	0.79	440
Mx	Family (A) (D)	18.15	0.61	1,669
Mx	Friends & acquaintances (A)	15.68	0.79	1,920
Cross-Border				
US->Mx	To return migrants (E)	19.07	0.67	497
US->Mx	Family (B)	29.84	0.54	585
US->Mx	Friends & acquaintances (B)	19.98	0.79	374
Mx->US	Family and acquaintances (B)	25.06	0.53	580
Mx->US	Friends & acquaintances (B)	17.66	0.65	402

Table 6

Censored Poisson Models of the Number of Nominated Ties, by Type

Model	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Tie type	**US → Mx**	**US → Mx**	**US → US**	**US → US**	**US → US**	**Mx → US**
	All	**Ties to return migrants**	**Friends & acquaintances, non-origin**	**Friends & acquaintances, origin**	**Family**	**All**
Log years in the US	−0.0947*	0.0184	0.191**	0.0237	0.0161	0.248***
	[0.0380]	[0.0517]	[0.0590]	[0.0366]	[0.0472]	[0.0446]
Alter average number of nominations	0.0848*	0.154***	0.0844*	0.107***	0.121**	0.108***
	[0.0351]	[0.0387]	[0.0375]	[0.0169]	[0.0376]	[0.0203]
Recent visit to origin	−0.0378	−0.157	−0.445**	−0.0626	0.0211	
	[0.0901]	[0.132]	[0.139]	[0.100]	[0.100]	
Speaks English poorly	0.352***	0.110	−0.564***	0.520***	−0.0254	0.0325
	[0.0916]	[0.119]	[0.110]	[0.0948]	[0.0996]	[0.127]
Age	−0.0113	0.0257	0.0169	−0.00875	0.0206	0.00330
	[0.0162]	[0.0197]	[0.0182]	[0.0126]	[0.0190]	[0.0125]
Age Squared	0.000153	−0.000280	−0.000102	0.0000964	−0.000305	−0.0000362
	[0.000194]	[0.000237]	[0.000202]	[0.000137]	[0.000231]	[0.000135]
Female	−0.0853	−0.222*	0.406***	−0.145*	0.0469	−0.00369
	[0.0735]	[0.0956]	[0.103]	[0.0693]	[0.0841]	[0.0716]
Constant	1.542***	0.100	0.0908	0.826**	0.520	0.485
	[0.361]	[0.394]	[0.380]	[0.268]	[0.379]	[0.260]
(Max ties on roster)	6	5	10	10	5	12
N	196	196	196	196	169	407

Notes: standard errors in brackets;

* p<0.05,

** p<0.01,

*** p<0.001.

Table 7

Ordinal Network Probit Models of Communication Frequency Along Nominated Ties, by Type.

Model	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Tie type	**US → US**	**US → US**	**US → US**	**US → Mx**	**US → Mx**	**Mx → US**	**Mx → Mx**
	family (non-household)	**origin friends &acquaintances**	**non-origin friends & acquaintances**	**to ret.migs.**	**all**	**all**	**all**
Log years in US	0.143	0.017	0.070	−0.281**	−0.207***	−0.283***	
	[0.077]	[0.078]	[0.090]	[0.087]	[0.061]	[0.068]	
Ret. mig., log years US						0.190**	−0.019
						[0.070]	[0.045]
Recent visit to US	−0.121	0.128	0.311	0.508*	0.300*		
	[0.114]	[0.143]	[0.172]	[0.217]	[0.138]		
Speaks English poorly	−0.165	−0.115	−0.333*	0.036	−0.072	0.289	−0.126
	[0.141]	[0.203]	[0.155]	[0.219]	[0.128]	[0.218]	[0.159]
Age	0.022	−0.041	−0.010	−0.110***	−0.019	−0.015	0.000
	[0.031]	[0.031]	[0.023]	[0.033]	[0.015]	[0.021]	[0.011]
Age squared	−0.00049	0.00046	0.00007	0.00121**	0.00022	0.00012	0.00000
	[0.00040]	[0.00040]	[0.00026]	[0.00039]	[0.00016]	[0.00028]	[0.00013]
Same sex	0.189**	0.319**	0.026	0.014	−0.178*	−0.052	0.155**
	[0.072]	[0.106]	[0.144]	[0.183]	[0.090]	[0.071]	[0.052]
Frequent email use	0.117	−0.020	0.147	0.136	0.322*	0.239	−0.021
	[0.177]	[0.181]	[0.185]	[0.225]	[0.149]	[0.171]	[0.079]
Log of years known		−0.198***	−0.391***	−0.012	0.018	−0.161***	0.029
		[0.060]	[0.081]	[0.077]	[0.175]	[0.048]	[0.046]
Indicator variables for relationship?[a]	Yes	No	No	Yes	Yes	Yes	Yes
Degree	−0.010	0.031	0.055*	0.065	−0.005	0.036	0.022
	[0.056]	[0.026]	[0.023]	[0.050]	[0.046]	[0.021]	[0.016]
Network Lagged DV	0.201	0.092	0.274	0.441	0.397	0.114	0.250

Model	1	2	3	4	5	6	7
Tie type	**US → US**	**US → US**	**US → US**	**US → Mx**	**US → Mx**	**Mx → US**	**Mx → Mx**
	family (non-household)	**origin friends &acquaintances**	**non-origin friends & acquaintances**	**to ret.migs.**	**all**	**all**	**all**
	[0.151]	[0.331]	[0.164]	[0.227]	[0.262]	[0.173]	[0.132]
Rho	0.687***	0.838***	0.515***	0.646***	0.798***	0.710***	0.521
	[0.045]	[0.022]	[0.151]	[0.056]	[0.060]	[0.034]	[0.343]
Intercept	−0.694	0.723	0.280	1.415	−0.775	0.794	−0.472
	[0.808]	[1.457]	[0.748]	[0.773]	[0.989]	[0.598]	[0.619]
Number of Dyads	649	953	440	497	959	926	3,589
Number of Egos	169	162	103	151	188	241	405

Notes: Standard errors in brackets;

* $p<0.05$,

** $p<0.01$,

*** $p<0.001$.

[a] Because of the large number of relationship categories, the coefficients for these variables are not presented, but they are available upon request. Kin nearly uniformly exhibited higher levels of communication frequency in these models than friends and acquaintances.

Table 8

Predicted weakly connected component sizes at increasingly frequent minimum thresholds of communication under three scenarios, overall and by country.

	Number of nominees in largest connected component		Cross-border diffusion capacity
	In Mx	**In US**	
Scenario 1: Recent arrivals, recent return			
Overall	96.0%	98.7%	94.8%
By frequency			
Yearly+	95.5%	97.9%	93.5%
Monthly+	93.1%	93.2%	86.8%
Weekly+	84.4%	76.4%	64.5%
Daily+	54.1%	36.7%	19.9%
Scenario 2: Ten years in destination, no recent visit back			
Overall	96.0%	98.7%	94.8%
By frequency			
Yearly+	93.0%	96.0%	89.3%
Monthly+	87.2%	86.4%	75.4%
Weekly+	77.2%	67.7%	52.2%
Daily+	49.4%	31.3%	15.5%
Scenario 3: Ten years in destination, recent visit back			
Overall	96.0%	98.7%	94.8%
By frequency			
Yearly+	94.4%	96.9%	91.5%
Monthly+	89.7%	88.0%	79.0%
Weekly+	79.8%	70.4%	56.2%
Daily+	50.7%	35.0%	17.8%

Note: Results averaged over 100 random networks probabilistically drawn from predicted probabilities.