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Communication Hotspots: How Infrastructure Shapes People's Health

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ABSTRACT

Informed by communication infrastructure theory (CIT) and the social capital approach to health, this study focused on the role played by communication hotspots: physical places in a community (e.g., parks, churches, or restaurants) where health information is shared between network actors. By analyzing survey data that included information about communication infrastructure, frequency of health conversations, as well as the size and diversity of respondents' social networks, this study illustrates how communication hotspots may reduce perceived barriers to healthcare among Latinas in the greater Los Angeles area (N = 780). The results suggest that communication hotspots can influence people's health by facilitating information-sharing activities. In addition, communication hotspots may reduce perceived barriers to healthcare by bringing together diverse network actors. We conclude by considering future health interventions and policy planning to leverage and enhance community members' interactions at communication hotspots.

Although the health communication literature is replete with evidence that individual-level constructs (e.g., self-efficacy, prior attitudes, issue-involvement, stages of change) and community-level constructs (e.g., social capital, social norms, collective efficacy) can impact behavior, fewer theoretical frameworks and communication models attempt to incorporate individual and community factors into a unified frame-work (but see Rimal, Ratzan, Arnston, & Freimuth, 1997; Yamamoto, 2018; Young, Hinnant, & Leshner, 2016). Communication infrastructure theory (CIT; Kim & Ball-Rokeach, 2006) and the social capital approach to health (Kawachi, Subramanian, & Kim, 2008) represent two popular frameworks that attempt to bridge individual- and community-level change. In broad strokes, CIT offers a normative perspective on communication and community health, investigating how "neighborhood communication patterns are intertwined with the health of communities and their residents" (Wilkin, Katz, Ball-Rokeach, & Hether, 2015, p. 611). While this approach identifies a variety of factors that can facilitate community health by increasing resident connectedness, the theory places less emphasis on the particular information-sharing mechanisms that mediate the relationship between communication infrastructure (e.g., presence of meeting and greeting places, quality of local services) and health outcomes. This gap is partially addressed by the social capital approach to health, which emphasizes the specific types of information-sharing mechanisms within individuals' social networks (e.g., size and diversity of the social network, as well as the frequency of health conversations) that are likely to lead to desirable health outcomes (Kawachi et al., 2008).

Integrating insights from the CIT and the social capital approach to health, the current study advances the concept of communication hotspots, defined as *public spaces in communities, such as parks or coffee shops, where people share health-related information*, to better account for the ways in which communication infrastructure can facilitate information-sharing behavior within people's social network, ultimately affecting people's health. Using the challenging context of Hispanic/Latino health, a minority population that suffers from the highest uninsured rates of any racial or ethnic group in the U.S. (U.S. Department of Health & Human Services, 2019), the current study investigates the interplay between communication hotspots in the greater Los Angeles metropolitan area and local residents' health. In the following sections, we first review related work regarding barriers to healthcare among Hispanic/Latino populations, and then introduce the concept of communication hotspots, as well as the social capital mechanisms that can either facilitate or inhibit community health.

Literature review

Barriers to healthcare among the Hispanic/Latino population

Research has repeatedly demonstrated that individuals who think that they will have to confront many obstacles (e.g., too expensive, too painful, too time-consuming) are less likely to seek medical treatment (Rosenstock, 1974). According to Champion and Skinner (2008), "a kind of nonconscious, cost-benefit analysis occurs wherein individuals weigh the action's expected benefits with perceived barriers – It could help me, but it may be expensive, have negative side effects, be unpleasant, inconvenient, or time-

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consuming." (2008, pp. 47–48). When it comes to barriers to healthcare, the Hispanic/Latino[1] population emerges as a highly important and challenging case study. The rapid growth in the Hispanic/Latino population represents one of the most dramatic and consequential demographic trends in the U.S. (Escarce, Morales, & Rumbaut, 2006). According to the Centers for Disease Control and Prevention (CDC), about one in six people living in the US are Hispanic/Latino and by 2035, this is projected to be nearly one in four (CDC, 2015). In terms of access to healthcare, Hispanic/Latino individuals have the highest uninsured rates, with nearly 20% of the population not covered by health insurance, as compared to the 6.3% of the non-Hispanic white population (U.S. Department of Health and Human Services, 2019).

Beyond the high level of uninsured individuals, Hispanics/Latinos also suffer from lower levels of health literacy and health knowledge (CDC, 2017). Similarly to racial/ethnic identity, knowledge of health information has received substantial attention as a prime predictor of perceived barriers to healthcare (e.g., Kim & Keefe, 2010). In fact, a systematic review of the literature found lower levels of health knowledge (together with the related concept of low health literacy) to be linked with poorer health outcomes, including intermediate disease markers, measures of morbidity, general health status, and use of health resources (DeWalt, Berkman, Sheridan, Lohr, & Pignone, 2004).

As a minority population in the U.S., mainstream, usually English-speaking, communication sources may be ineffective in providing health-related information to the Hispanic/Latino population (Wilkin & Ball-Rokeach, 2006). Indeed, a growing body of evidence identifies limited English proficiency as a major barrier to effective healthcare among this population (Cheong, 2007; Genoff et al., 2016). Additionally, studies have repeatedly shown that *fatalismo* (fatalism) deters Latinos from engaging in various health promotion and disease detection behaviors (Abraído-Lanza et al., 2007; Espinosa de los Monteros & Gallo, 2011). The combination of limited English proficiency and fatalistic attitudes may lead Hispanic/Latinos to be less aggressive in gaining screening and finding solutions to health needs (e.g., Eggleston, Coker, Das, Cordray, & Luchok, 2007). Because these individuals are less likely to actively search for information by themselves, health-related conversations with family and friends are critical. In addition, technology and health literacy among community members, many of whom are first- or second-generation immigrants, is low (Shaw, Huebner, Armin, Orzech, & Vivian, 2009). As concluded in a study that investigated Hispanics' exposure to health communication resources, ethnically targeted television and interpersonal communication with family and friends were the preferred sources of health information, especially among the uninsured (Cheong, 2007). Thus, for this oral culture, the ability to obtain relevant and accessible information from community members may go a long way in reducing barriers to healthcare.

Communication infrastructure theory and communication hotspots

One of the most common theories being used to address the interplay between racial/ethnic minorities, the communities they inhabit, and residents' health is the communication infrastructure theory (CIT; Ball-Rokeach, Kim, & Matei, 2001; Wilkin, 2013). The CIT is an ecological approach that explores the relationship between community-level resources and people's problem-solving capacities in their everyday lives in neighborhood contexts (Ball-Rokeach et al., 2001; Kim & Ball-Rokeach, 2006). To this end, the theory places emphasis on the ability of communication infrastructure (e.g., public parks, local organizations) to affect positive change by creating a more integrated and connected community (Kim, Moran, Wilkin, & Ball-Rokeach, 2011). One category of communication infrastructure that focuses explicitly on health information is the communication hotspot (Moran et al., 2017). Broadly defined as *physical public spaces where people feel comfortable talking about health with others*, the availability of communication hotspots is likely to encourage an exchange of health information between community members. By the same token, the lack of communication hotspots – e.g., parks, restaurants, or quality grocery stores – is likely to make it more difficult for residents to obtain and share relevant information (Ball-Rokeach et al., 2001).

Previous studies have successfully applied CIT in order to explain health disparities, including access to healthcare (Wilkin & Ball-Rokeach, 2011), health knowledge (Kim et al., 2011), and exposure to ethnic media for medical information (Wilkin, Gonzalez, & Tannebaum, 2015). With that in mind, however, although CIT identifies a variety of communication resources that can influence health outcomes (Wilkin, 2013), it is largely silent on the specific information-sharing mechanisms that mediate the relationship between residents' access to communication infrastructure, or communication hotspots, and reduced health disparities. Borrowing from the social capital approach to health, the present study addresses this gap by focusing on the potential ability of communication hotspots to reduce barriers to healthcare by increasing the frequency of conversations about health, as well as the size and diversity of social networks.

Health information-sharing in social networks

One of the chief sources of health information is an individual's social network. An individual's social network can affect access to health information and establish social capital needed to positively influence health-related decisions (Moore, Shiell, Hawe, & Haines, 2005). In part, the strength of the social capital approach to health lies in the testable assumption that "the social structure of the network itself is largely responsible for determining individual health outcomes by shaping the flow of resources which determine access to opportunities and constraints on behavior" (Cené & Southwell, 2018, p. 527).

Within a social network, the *frequency of discussions about health* has been shown to play a crucial role in enabling health information dissemination and ultimately

affecting health-related outcomes (Geary et al., 2007; Southwell & Yzer, 2007). For instance, in the context of smoking cessation, findings have demonstrated that health campaigns can expand their influence if they are able to augment the number of discussions about smoking cessation, as these conversations increase intentions to quit smoking (van den Putte, Yzer, Southwell, de Bruijn, & Willemsen, 2011). Similarly, Hendriks, de Bruijn, and van den Putte (2012) found an indirect effect of health message exposure on intention to refrain from binge drinking. After viewing an anti-alcohol message, participants reported significantly more negative conversations about alcohol. Subsequently, more negative conversational valence about alcohol-increased intention to refrain from binge drinking. Outside the context of health campaigns, the critical role-played by the frequency of health-related conversations has also received substantial support. For instance, a recent study found that Latinas who did not have conversations with family/friends about their abnormal mammograms reported elevated psychological distress (Molina, Beresford, Constant, & Thompson, 2017). Based on these findings, it stands to reason that more frequent discussion about health in one's networks could reduce perceived barriers to healthcare.

When closely looking at the link between frequency of health-related discussions and health outcomes, however, the story appears to be more complicated. Namely, while some studies find the frequency of discussions to be positively associated with a healthier lifestyle (e.g., Atkins, Oman, Vesely, Aspy, & McLeroy, 2002), others find that frequent conversations with others can carry deleterious implications for one's health (Wen, Van Duker, & Olson, 2009). To some extent, these inconsistent patterns of results were resolved in an integrative review that looked more closely at people's social networks (McPherson et al., 2013). Two relevant social network attributes were found to account for the relationship between interpersonal discussions and health – network size and network diversity.

The *size of the health social network* is likely to influence perceived barriers to healthcare as increase in the number of people with whom an individual talks about their health, ultimately increases the likelihood of exposure to relevant and non-redundant information (Glanz, Rimer, & Viswanath, 2015), as well as creating a larger support system (Aldrich & Meyer, 2015). To this end, scholars have predicted that as the number of individuals in a network increases, the level of network homogeneity will decline (Campbell, Marsden, & Hurlbert, 1986). This assumption was recently supported in a study that examined network size as an antecedent of obesity and hypertension (Walter, Robbins, Murphy, & Ball-Rokeach, 2019). In particular, Walter, Robbins, et al.'s (2019) results demonstrated that increase in health-related social ties predicted lower likelihood of obesity and hypertension. Similarly, Beller and Wagner (2018) found that social network size positively predicted physical and cognitive health among German older adults. Likewise, higher levels of social network size among LGBT individuals have been associated with lower likelihoods of poor general health, disability, and depression (Fredriksen-Goldsen, Kim, Shiu, Goldsen, & Emlet, 2015). Though the role-played by network size in health is far from established, some have argued that "social network size robustly predict[s] mental and physical health" (Segerstrom, 2007). Either due to limited exposure to essential information (Valente, 2012), decline in social engagement (Huxhold, Fiori, & Windsor, 2013), loneliness or reduced self-esteem (Cornwell & Laumann, 2015), smaller health-related social networks often lead to a decline in health.

Beyond social network size and frequency of conversations about heath, the *level of diversity in the network* should also be considered. Diversity, commonly operationalized as network brokerage (Burt, 2005), is associated with social structures where people are linked to otherwise unconnected others. Simply put, in a health social network, diversity is negatively associated with social cohesion. "Compared with already connected people, unconnected people are more likely to have different ideas and resources … [and] the more disconnected the contacts in a focal person's network, the more the focal person is exposed to diverse opinions and practices" (Shen, Monge, & Williams, 2014, p. 5). In contrast to highly homogenous networks where alternative thinking is often suppressed and there are excessive obligations placed on individuals to comply with existing norms (Kim, Subramanian, & Kawachi, 2006; but see Coleman, 1988), network diversity is associated with exposure to nonredundant information. Given the ability of diverse networks to bring together previously unconnected actors, it is not surprising that diverse networks can "provide diverse perspectives, opinions, and practices, result[ing] in a relatively heterogenous information flow (Walter, Robbins, et al., 2019, p. 4).

In the context of health communication, network diversity contributes to well-being (Eagle, Macy, & Claxton, 2010), community solidarity (Coleman, 1988), social support (Müller, Nordt, Lauber, & Rössler, 2007), greater exposure to health information (Meng, Chung, & Cox, 2016), decreased risk for the recurrence of cancer (Helgeson, Cohen, & Fritz, 1998), reduced likelihood of perpetrating sexual violence (Kaczkowski, Brennan, & Swartout, 2017), and lower risks of ischemic heart disease (Barefoot, Grønbæk, Jensen, Schnohr, & Prescott, 2005). For example, Walter, Murphy, Frank, and Ball-Rokeach (2019) found that social network diversity (operationalized as network brokerage) indirectly affected Pap test intentions by enhancing self-efficacy and influencing perceived social norms. Similarly, others found that, after controlling for age, sex, education, and employment status, individuals in more diverse networks report on better mental health than those in more homogeneous and restricted networks (Windsor, Rioseco, Fiori, Curtis, & Booth, 2016).

In sum, the CIT literature points to communication hotspots as potential facilitators of community connectedness and the social capital approach to health identifies frequency of health discussions, health social network size, and diversity as predictors of health behavior. Notably, though frequency of health conversations, network size and diversity are ostensibly related, previous studies have underlined their independent nature, showing that size and diversity can have distinct effects on health-related outcomes (e.g., Beller & Wagner, 2018). Thus, there is a need to analyze their independent presumed influence on barriers to healthcare.

Following this introduction, we pose the following hypotheses:

H1: *The existence of a communication hotspot will reduce perceived barriers to healthcare, by enhancing (a) the frequency of discussions about health; (b) the size of the health social network; and (c) the diversity of the health social network.*

H2*: The level of comfort in a communication hotspot will reduce perceived barriers to healthcare, by enhancing (a) the frequency of discussions about health; (b) the size of the health social network; and (c) the diversity of the health social network.*

Finally, given the variety of potential communication hotspots, including community parks and churches, among many others, it would be beneficial to examine whether the different types of communication hotspots have distinct effects on social networks and health. Thus, we explored the research question below:

RQ1: *Will different locations of communication hotspots have distinct effects on perceived barriers to healthcare, through (a) the frequency of discussions about health; (b) the size of the health social network; and (c) the diversity of the health social network?*

Method

Study design

This study employed a cross-sectional survey design to gather data from Latinas around the LA metropolitan area. Recruitment took place at clinics and local public spaces. Although non-probabilistic sampling methods are associated with a limited ability to generalize the results, they can be appropriate when targeting specific and difficult-to-reach populations (Wilkin & Ball-Rokeach, 2006, 2011). To collect the most accurate data and encourage participant comfort, the research staff administered the survey in either English or Spanish, based on participants' preference.

Participants

As part of a larger study that dealt with health barriers among Hispanic or Latina females, survey respondents between the ages of 21 and 50 were recruited and paid $20 as an incentive for participating in a face-to-face interview (N = 1,595). After consenting to participate in the study, respondents answered a battery of questions including health status, neighborhood infrastructure, social network measurements, as well as socioeconomic and demographic items. In order to allow a statistically meaningful analysis of participants' data regarding health social networks, respondents with a network that included less than two individuals were screened out, reducing the sample size in the current study to 780.

Measures

Perceived barriers to healthcare

Based on previous conceptualizations and measurements (Carrillo et al., 2011; Nikiema, Haddad, & Potvin, 2012), respondents were introduced to 10 different scenarios and were instructed to answer whether any of the scenarios "has ever kept [them] from getting medical care." The specific scenarios included "your usual place for medical care is no longer available" and "you don't have enough money to pay for visits." Later, the number of agreements was summed up to provide a single score of perceived barriers to healthcare, ranging from 0 to 10 (M = 3.13, SD = 2.73).

Frequency of health discussions

To gauge the frequency with which respondents discuss issues related to health, interviewers posed the following question: "how often do you have discussions with other people about your or their health?" The answer options ranged from 1 "never" to 10 "all the time" (M = 4.90, SD = 3.14).

Size and diversity of the health social network

Using the traditional ego-network name generator (Campbell & Lee, 1991), respondents' health social network size was assessed with the following prompt: "Looking back over the last year, who are the people with whom you discussed women's health issues? Please tell me their first name … You may name up to five people." After respondents provided the names of their health-related links (or alters), the questionnaire also collected data on the relationships among the people in their network ("are they strangers, just friends, or especially close?"). Thus, the size of the health social network was established by summing up the number of health-related links between a respondent and her network (M = 2.84, SD = 0.94). The level of diversity was gauged with a transitivity measurement. In particular, the network transitivity score was calculated as the number of actual links between people in the network divided by all possible links (Hanneman & Riddle, 2011). Thus, transitivity ranged from 0 = no fully connected triangles in the health network (i.e., high level of diversity) to = 1 all triangles are fully connected (i.e., low level of diversity) (M = .64, SD = .29). Finally, to estimate the level of network diversity, transitivity scores were reverse-coded such that higher values indicated greater network diversity (and lower transitivity).

Availability of and comfort in communication hotspots

The availability of communication hotspots was measured in several steps. First, respondents were asked an open-ended question: "what is one place in your community where people get together and chat?" If respondents mentioned private places, e.g. other people's homes, interviewers asked them to think of a more public space. Then, respondents were requested to share the name and location of this place. Finally, respondents were instructed to rate on a scale from 1 ("very uncomfortable") to 10 ("very comfortable"), how comfortable would they be talking about health at the place they just named (M = 7.26, SD = 2.89). Later, all named communication hotspots were categorized into several groups,

including parks (36.8%), restaurants/coffeehouses (9.7%), churches (6.8%), schools (6.5%), and other (10.6%[2]). When respondents were not able to name a single public space where they get together and chat (n = 230), their answer was recorded as "no communication hotspot."

Analysis

The analysis included a series of independent sample t–tests and chi-square tests to compare respondents who were able to name a communication hotspot and those who were not able to name such a place. The dependent variables for these analyses focused on sociodemographic and health-related constructs that were previously identified as related to perceived barriers to healthcare among Latinas. To better understand the interplay between the main research variables, the analysis also produced a zero-order correlation matrix that tested the relationships between network and health-related measures. Research hypotheses were tested with PROCESS, using a series of simple OLS regression mediation models (Model 4), providing unstandardized coefficients with a 95% confidence interval (set at 10,000 bootstrapped samples; Hayes, 2018). Given previous research on predictors of health barriers, all analyses included several control variables such as age, years living in the community, having son/daughter, health literacy[3], employment status, and marital status.

Results

As indicated in Table 1, on average, the sample comprised adult women with moderate levels of health literacy and high school education. Further, most respondents reported that they have a romantic partner and children. At the time of the survey, on average, respondents had lived for 12 years in their communities. The vast majority of the sample were not employed full time and their annual income ranged from 10 k to 20 k. When directly comparing respondents who were able to name at least one communication hotspot with those that did not, several notable differences emerge. Namely, compared to those who were not aware of the existence of communication hotspots in their community, Latinas who identified communication hotspots tended to have more years of schooling, higher health literacy, and greater income. These findings have two direct implications for the conceptualization and measurement of communication hotspots. First, the link between communication hotspots and markers of social-economic status (SES) highlights the need to broaden our attention to include a variety of demographic and social factors that can simultaneously influence access to communication hotspots, as well as impact health literacy and perceived barriers to medical care.

Second, on a methodological level, the significant differences recorded in Table 1 suggest that the testing of hypotheses should control for a number of relevant SES variables, including education, income, and health literacy.

Table 2 provides a zero-order correlation matrix for all the theoretical research constructs. As the bivariate relationships between the study variables illustrate, the size of respondents' health social network was positively correlated with the frequency of discussions about health, as well as the level of comfort of health discussions at communication hotspots; however, there was no significant relationship between the size of the social network and its diversity or the level of perceived barriers to medical care. Similarly to network size, respondents with diverse health social networks tended to engage in more frequent discussions about health and feel more comfort when talking about health at their communication hotspots, as well as report on fewer barriers to medical care. Further, the frequency with which respondents engaged in conversations about health was also positively correlated with the level of comfort in a communication hotspot. Notably, though research variables were statistically related, the majority of correlations were relatively weak. In fact, the only two relationships that can be classified as having moderate-levels of magnitude were between the frequency of health discussions and the size of the social network (r = .22, p = .001), as well as between discussion comfort and perceived barriers to medical care (r = −.31, p = .001).

The hypothesis (H1) that the existence of communication hotspots reduces perceived barriers to healthcare through frequency of health discussions, size of health network, and diversity of health network, was tested with a mediation model in PROCESS (Model 4 with 10,000 bootstrapped samples; controlling for age, years living in the community, having son/daughter, health literacy, employment status, and marital status), treating the existence of hotspots as a binary predictor. As the unstandardized coefficient of the direct predictors in Figure 1 suggest, having health communication hotspots within one's community positively predicted respondents' frequency of health discussions (b = 1.68, SE = .24, p = .001, CI [1.21, .2.15]), health network size (b = .24, SE = .08, p = .001, CI [.10, .38]), and health network

Table 1. Means, standard deviations (in parentheses), and chi-square/t-tests for research variables, by communication hotspot existence.

Communication hotspot existence			
Variable	*Yes*	*No*	χ^2/t
Age	37.97 (8.39)	37.77 (8.77)	0.29
Having partner	77.8%	76.1%	0.28
Having daughter	61.1%	61.7%	0.03
Having son	60.9%	66.1%	1.85
Full-time employment status	21.5%	24.3%	0.78
Years in community	12.21 (8.60)	11.76 (8.53)	0.68
Health literacy	3.60 (1.00)	3.37 (1.04)	2.93**
Combined income			20.91*
Less than $10 k	37.2%	49.1%	–
Between $10 k and $20 k	33.6%	35.8%	–
Between $20 k and $30 k	15.8%	7.3%	–
Between $30 k and $40 k	6.9%	1.8%	–
Above $40 k	6.4%	6%	–
Education	11.63 (5.89)	10.62 (5.95)	2.19*
N	550	230	–

*p< .05; **p< .01; ***p< .001, N = 780.

Table 2. Bivariate correlations among research variables.

Variable	1	2	3	4	5
1.Network size	–				
2.Network diversity	−.01	–			
3.Discussion frequency	.22***	.11**	–		
4.Discussion comfort	.12**	.15**	.20***	–	
5.Perceived barriers	−.01	−.07*	.07	−.31***	–

*p < .05, **p < .01, ***p < .001; N = 780.

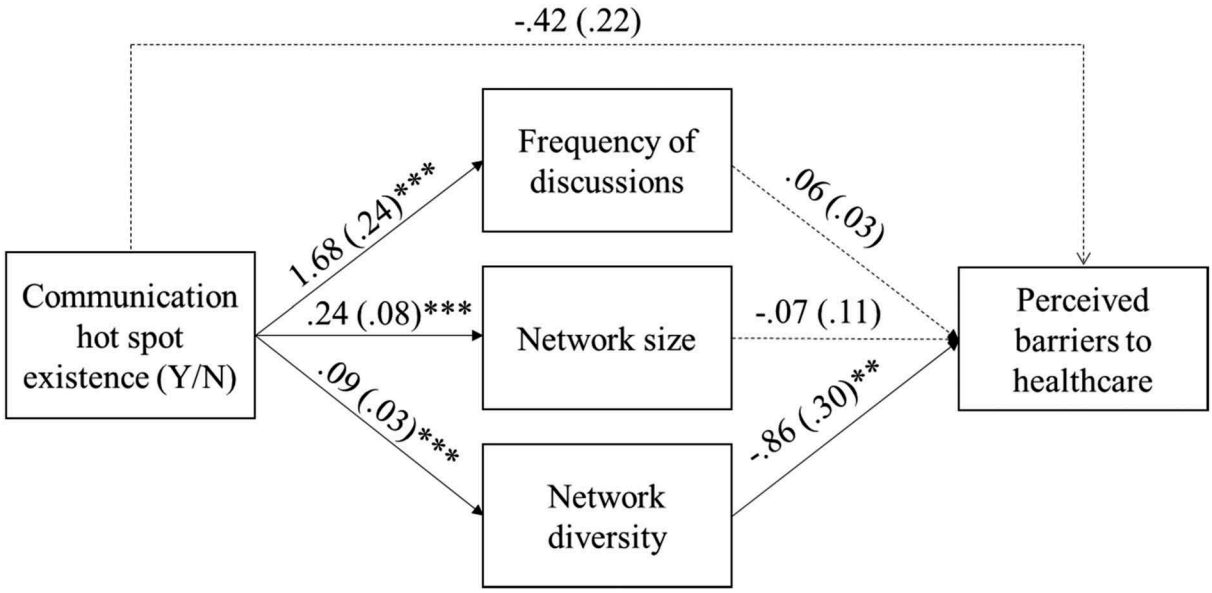

Figure 1. Mediation analysis model showing the relationship between respondents' ability to list a hotspot in their community ("what is one place in your community where people gather and chat?") and perceived barriers to healthcare. The three mediating variables are frequency of health-related discussions, the size of the health social network, and the diversity of the health social network. The direct effect between ability to list a hotspot and perceived barriers to healthcare is described at the top of the figure.

diversity (b = .09, SE = .03, p = .001, CI [.04, .14]). In turn, network diversity reduced perceived barriers to healthcare (b = −.86, SE = .30, p = .005, CI [−1.45, −.26]), whereas health network size had a negative nonsignificant effect on perceived barriers to healthcare (b = −.07, SE = .11, p = .52, CI [−.29, .15]). Interestingly, frequency of health discussions emerged as a positive and borderline significant predictor of barriers to healthcare, meaning that increase in frequency of discussions enhanced people's perception that they cannot get access to healthcare (b = .06, SE = .03, p = .09, CI [−.01, .12]). The analysis also retrieved a significant mediation through health network diversity (b = −.08, SE = .04, CI [−.16, −.02]).

Additionally, there was a borderline significant effect of hotspots existence on perceived barriers to healthcare (b = −.42, SE = .22, p = .058, CI [−.86, .01]) such that the knowledge regarding a communication hotspot in one's environment was negatively linked with perceived barriers to healthcare. With regard to the control variables, only health literacy emerged as a significant covariate of barriers to healthcare (b = −.46, SE = .10, p = .001, CI [−.66, −.27]). In total, the model was able to explain 5.4% of the variance in perceived barriers to healthcare (F(11,768) = 7.34, p = .005).

The hypothesis (H2) that comfort in communication hotspots reduces perceived barriers to healthcare through frequency of health discussions, size of health network, and diversity of health network, was tested with a mediation model in PROCESS (Model 4 with 10,000 bootstrapped samples). This analysis included only respondents who identified a communication hotspot (n = 550). Similar to the previous analysis, this model controlled for age, years living in the community, having son/daughter, health literacy, employment status, and marital status. In line with our expectation, comfort in a communication hotspot positively predicted respondents' frequency of health discussions (b = .18, SE = .05, p = .001, CI [.09, .27]), health network size (b = .03, SE = .01, p = .022, CI [.01, .06]), and health network diversity (b = .02, SE = .01, p = .001, CI [.01, .03]). In turn, network diversity reduced perceived barriers to healthcare (b = −.83, SE = .33, p = .015, CI [−1.49, −.16]), whereas health network size had a nonsignificant effect on perceived barriers to healthcare (b = −.15, SE = .13, p = .23, CI [−.40, .10]). Interestingly, echoing the results for existence of hotspots, frequency of health discussions emerged as a positive and borderline significant predictor of barriers to healthcare (b = .08, SE = .04, p = .056, CI [−.01, .15]) (See Figure 2 for an outline of the results). The analysis also retrieved a significant mediation through health network diversity (b = −.02, SE = .01, CI [−.03, −.01]).

Additionally, the model recorded a significant negative direct effect from comfort of health communication hotspots to perceived barriers to healthcare (b = −.33, SE = .04, p = .005, CI [−.41, −.24]). With regard to the control variables, again, health literacy emerged as a significant predictor of barriers to healthcare (b = −.28, SE = .12, p = .016, CI [−.51, −.05]). In total, the model was able to explain 14.9% of the variance in perceived barriers to healthcare (F(11,538) = 8.56, p = .005).

To test the research question (RQ1) regarding potential differences between distinct categories of communication hotspots, we used a mediation model in PROCESS (Model 4 with 10,000 bootstrapped samples; controlling for age, years living in the community, having son/daughter, health literacy, employment status, and marital status), treating type of hotspot as a multicategorical predictor (i.e., park, church, school, restaurant/coffeehouse), with park, the largest group, as a reference category. Overall, the analysis did not record any significant differences between categories of hotspots, with respect to their influence on frequency of health discussions ($bchurch$ = −.72, SE = .46, p = .12, CI [−1.62, .19]; $bschool$ = −.52, SE = .46, p = .26, CI [−1.43, .39]; $brestaurant$ = .14, SE = .40, p = .73, CI [−.65, .92]), health network size ($bchurch$ = .15,

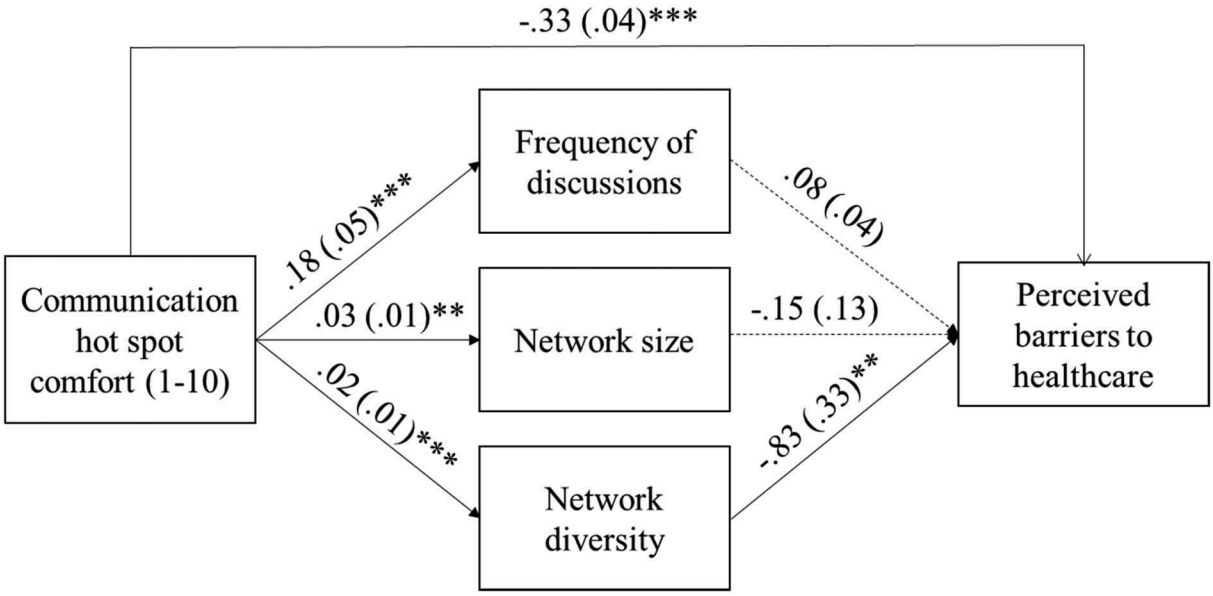

Figure 2. Mediation analysis model showing the relationship between respondents' comfort discussing health topics at their described communication hotspot, and perceived barriers to healthcare. The three mediating variables are frequency of health-related discussions, the size of the health social network, and the diversity of the health social network. The direct effect between comfort at a communication hotspot and perceived barriers to healthcare is described at the top of the figure.

SE = .15, *p* = .30, CI [−.14, .44]; *bschool* = −.09, *SE* = .15, *p* = .52, CI [−.39, .20]; *brestaurant* = .14, *SE* = .13, *p* = .28, CI [−.11, .39]), and health network diversity (*bchurch* = .04, *SE* = .05, *p* = .48, CI [−.07, .14]; *bschool* = .02, *SE* = .05, *p* = .71, CI [−.08, .12]; *brestaurant* = .07, *SE* = .05, *p* = .13, CI [−.02, .16]). Likewise, there was no direct effect of hotspot category on perceived barriers to healthcare (*bchurch* = −.06, *SE* = .43, *p* = .88, CI [−.91, .78]; *bschool* = −.48, *SE* = .43, *p* = .27, CI [−1.33, .37]; *brestaurant* = .51, *SE* = .37, *p* = .17, CI [−.22, 1.24]). The model was able to explain 6.7% of the variance in perceived barriers to healthcare ($F(13,453) = 2.48$, $p = .003$).

Discussion

Although there is a growing realization that communication infrastructure can affect human action and shape health outcomes (Kim & Ball-Rokeach, 2006; Wilkin, 2013), much less is known about the specific information-sharing mechanisms that underlie this process. Without understanding how communication infrastructure may facilitate or frustrate the sharing of health information, it is unclear whether and how communication infrastructure can be leveraged to reduce health disparities, especially to benefit those who are most in need, such as minority populations. Similarly, prior studies that outlined social capital as a positive predictor of health behavior (Shiell, Hawe, & Kavanagh, in press) have often overlooked a more basic question – how can we encourage greater community social capital? While we know much about health communication activities such as information-sharing and social support in the abstract, communication between people occurs in particular physical spaces in a community. Thus, by integrating CIT with the social capital approach to health, the current study attempted to benefit both frameworks. First, the social capital approach to health can offer much-needed nuance and clarity to the information-sharing mechanisms at the heart of CIT. Second, through an investigation of communication hotspots as key locations for social capital building, researchers can advance a more complete understanding that focuses both on the health outcomes of social capital, as well as the communication antecedents that support and maintain social capital.

The departure point for the current study was that by better understanding neighborhood communication infrastructure we might be able to better support community health. Indeed, over 70% of our sample indicated that they have at least one public place where they regularly interact with other members of their community. Importantly, having such places positively reflected on people's health-related social capital in terms of discussion frequency as well as network size and its diversity. While not all social capital indicators reduced perceived barriers to healthcare, network diversity emerged as a significant negative predictor. Simply put, respondents from social networks that were associated with greater diversity tended to report fewer barriers to healthcare, whereas those from more homogenous networks were more likely to a identify a greater number of barriers.

In contrast to the positive influence of network diversity, the analysis suggested that frequency of health-related discussion was actually linked with an increase in perceived barriers to healthcare. Though it is difficult to provide a definitive interpretation for this finding without having access to the content of health-related conversations, this result may indicate that network diversity and discussion frequency can play two distinct roles when it comes to people's health. Namely, while discussion frequency might amplify homophily and access to similar views, irrespective of their accuracy, network diversity opens people up to a variety of sources, increasing

the likelihood that they will be exposed to more individuals with diverse views. As summarized by Centola (2011), "homophily – similarly to social contacts – can increase dyadic-level influence, but it can also force less healthy individuals to interact primarily with one another, thereby excluding them from interactions with healthier, more influential, early adopters" (2011. p. 1269).

In addition to raising awareness of the existence of communication hotspots, the current findings also suggest that the level of comfort people feel within the hotspot provides another key factor in social capital building. In fact, when substituting the mere existence of a communication hotspot with the relative level of comfort as a predictor of health-related social capital, the total explained variance of the mediation model almost tripled, from 5.4% to 14.9%. Although comfort as a health concept is frequently addressed in the patient-doctor communication literature (e.g., Gilbert, Ussher, & Perz, 2011), it is rarely identified as a focal predictor of social capital (but see Keuroghlian, Ard, & Makadon, 2017). Building on the CIT literature (Ball-Rokeach et al., 2001), the results of the current study illustrated that a respondent's level of comfort within the communication hotspot can positively predict the frequency of health-related discussions, as well as the size and diversity of the health-related network. In turn, network diversity was able to decrease perceived barriers to healthcare. This finding highlights the fact that a successful communication hotspot not only provides an infrastructure to gather and chat, give and receive knowledge and support, but also makes people comfortable engaging in such activities.

A closer look at the control variables also tells an interesting story. Of the variables analyzed (including age, years living in the community, having son/daughter, employment status, marital status and health literacy), only health literacy was a significant predictor of reduced barriers to healthcare. To this end, the mediating role of communication hotspots appears to be quite robust, showing a direct reduction of perceived barriers to healthcare, irrespective of central predictors such as age, employment, or family status.

Several study limitations should be noted. First, the social networks in the study were formed around one ego node – the survey respondent – who provided information about other individuals (alters) she is connected with and the social ties among them (Valente, 2010). Thus, there are traditional biases associated with self-report that may affect our data. Additionally, while the current study focuses on general health, the ego-network name generator focused on "women's health." As women's health topics have the potential to be stigmatized (e.g., Nadeem et al., 2007; Norris et al., 2011), we consider this wording to be a conservative measure of health-related social ties.

Third, to some extent this was an exploratory study; therefore, careful consideration should be given to measurements. For instance, it can be argued that the phrasing of the item measuring the availability of communication hotspots was biased toward an assumption that everyone has a hotspot. Simply put, by asking people "what is one place in your community where people get together and chat?" some respondents may have felt that it was expected to identify such a place. Thus, attempts should be made to validate this measure in future studies and to assess alternative ways of gauging the availability of communication hotspots. Relatedly, we recognize the potential limitations of a single-item measurement of health literacy (Chew, Bradley, & Boyko, 2004), which was utilized to shorten the overall length of the survey. Although the results pertaining to health literacy fit well with previous findings, future studies should consider more extensive operationalizations of this construct.

Fourth, given the cross-sectional nature of the data, the findings of the study should not be interpreted causally and alternative models should be considered. For example, it is conceivable that those who have more diverse social networks would also be more likely to have communication hotspots and feel comfortable talking about their health with others. Similarly, perceived barriers to healthcare may dictate individuals' health-related conversations, resulting in smaller and less diverse networks when people perceive healthcare to be inaccessible. These concerns point to longitudinal studies as a much-needed next step to support and contextualize some of the exploratory and correlational findings obtained in the present inquiry.

Further, although the underlying assumption of the communication hotspots approach is that infrastructure and geography can facilitate or limit people's access to healthcare, the analytical approach in the current paper does not include such multilevel considerations. Undoubtedly, the current project would have substantially benefited from a place-based analysis that is sensitive to respondents' geographical locations (e.g., the zip code analysis in Southwell et al., 2010). With that in mind, however, multilevel analyses require a sufficient number of sample individuals to be nested within a particular area to allow a statistically meaningful inference. In our case, only 18 zip codes had a sufficient number of respondents (ranging from 10 to 82 across 18 different zip codes), whereas the majority of respondents (64%) were nested within zip codes with less than 10 sample individuals. In future studies, it would be critical to consider a sampling strategy that could guarantee a suitable distribution of zip codes or other meso- or macro-level geographical categories.

Finally, this study was conducted in a specific location and cultural context. Latinas in Southern California face significant health disparities, with substantial barriers to effective healthcare such as limited English proficiency (Genoff et al., 2016; Kim et al., 2011). Thus, our research provides specific insights into how hotspots affect this particular low-literacy, low-income minority population, which may or may not be applicable to other communities. However, in light of the promising results described here, the effects of communication hotspots in other communities in the U.S. and worldwide deserve further study.

Despite these limitations, the current study contributes to understanding the antecedents of health-related social capital and the role-played by communication infrastructure in shaping Hispanic/Latino health. On a practical level, knowledge of specific community communication hotspots would enable more effective interventions that target individuals with flyers or information boards about health. Another opportunity might be to encourage clinicians to frequent these locations as members of their community to interact

with others. This could help prevent or correct misinformation about health and healthcare. Finally, place-based interventions provide a unique opportunity to reach underserved populations that suffer from lower levels of health literacy and language barriers. Notably, technology-focused interventions that are often designed to target underserved populations (e.g., Aguilera & Muñoz, 2011; Grimes & Grinter, 2007; Mackert, Kahlor, Tyler, & Gustafson, 2009) are unlikely to be an effective fit for eliminating health disparities, as low health literacy is often matched with a growing technological divide (Swindle, Ward, Whiteside-Mansell, Bokony, & Pettit, 2014).

In conclusion, this work provides an initial exploration of the concept of communication hotspots, illustrating a variety of ways through which public spaces can facilitate social capital construction and contribute to neighborhood health. Although this endeavor should be seen only as an initial exploration, it offers a framework and a toolkit for scholars and practitioners to think about the interplay between physical spaces and health.

Notes

1. Although Hispanic and Latino represent two different terms, we refer to our population of interest as "Hispanic/Latino" for two reasons. First, the inclusion criteria in this study focused both on individuals who identify themselves as Hispanics (people of Spanish-speaking origin) and those who identify as Latinos (people of Latin American origin). Second, federal agencies such as the Center for Disease Control and Prevention (CDC) tend to combine these two racial/ethnic categories when describing health-related statistics and trends. Thus, most of our knowledge regarding health disparities among Latino individuals also includes Hispanics, and vice versa.
2. Smaller categories included libraries, gyms, markets, grocery stores, and bus stops.
3. Adapted from Chew et al. (2004), respondents' health literacy was assessed with a single item, "how confident are you filling out medical forms by yourself?", on a 5-point scale, ranging from 1 "not at all" to 5 "highly confident" (M = 3.53, SD = 1.01).

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