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"Sense of community belonging" in health surveys: What social capital is it measuring?

Richard M. Carpiano [a,*], Perry W. Hystad [b]

[a] Department of Sociology, University of British Columbia, 6303 NW Marine Drive, Vancouver, BC, Canada V6T1Z1
[b] School of Population and Public Health, University of British Columbia, Canada

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ABSTRACT

Canadian national health surveys regularly ask respondents to rate their sense of belonging to their local community. Health studies commonly use this question as a social capital indicator, but what social capital domains community belonging is measuring remains unclear. Analyzing Canadian General Social Survey data, we evaluate the validity of this measure with respect to network-based social capital and health. Results indicate that sense of community belonging is associated positively with several network-based social capital measures. Neighborhood network-based social capital most substantially reduced associations between sense of community belonging and health measures, but results differed by urban and rural settings. These findings indicate the need for public health surveys to include specific measures of respondents' networks.

1. Introduction

The health implications of community social connections, although having long been a research focus (Leighton, 1959), has witnessed renewed interest over the past two decades. This resurgence can be credited in significant part to the concept of "social capital" as a popular focus within public and population health (Moore et al., 2005, 2006).

Social capital, the resources embedded within social networks, considers the actual or potential material, informational, and affective resources that individuals have access to via social networks and that may be used as a means to pursue individual or collective action (Bourdieu, 1986; Coleman, 1988; Portes, 1998). As noted by Moore et al. (2006), health research on social capital has not typically focused on these network-based elements, and has instead often relied upon attitudinal measures of perceived interpersonal trust and reciprocity to serve as proxy indicators of real-life social relationships and social capital. Nevertheless, an increasing number of health researchers have utilized this network approach, focusing on (a) *general social capital*, that is, social capital that either exists within individuals' social networks in general (e.g. Moore et al., 2009a,b) or that emanates via their membership in groups and organizations (e.g., Rose, 2000; Veenstra, 2005; Harpham, 2008)—and (b) *geographically bounded social capital* that exists within particular locations (e.g., neighborhoods or larger local geographic areas) (e.g. Bhattacharya, 2005; Boneham and Sixsmith, 2006; Carpiano, 2007, 2008; Friedman et al., 2007). Network-based approaches to social capital, which have a long theoretical and empirical tradition in the social sciences, are crucial in studying social determinants of health. From a "fundamental causes" theoretical perspective, which focuses on access to resources as a key mechanism for maintaining health, a network-based approach to social capital enables a more precise examination of people's differential access to resources that may promote or harm health, thereby, helping us to better understand how social structures and policies shape health inequalities (see Carpiano et al., 2008).

Coinciding with this renewed interest in community social ties, public health surveys in Canada have, since at least 2000 (Shields, 2008), included a single question that asks a respondent to describe the level of her/his "sense of belonging to her/his local community." To date, a number of published studies using these nationally based survey data have reported that this single item is positively and significantly associated with a variety of health outcomes, including better general health (Ross, 2002; Wister and Wanless, 2007; Shields, 2008) and mental health (Shields, 2008; Romans et al., 2010), as well as increased odds of undertaking a change in a variety of health behaviors (Hystad and Carpiano, 2010). From the perspective of theory, these studies are motivated by prior health research on social relationships and social capital and their findings are consistent with other research that utilizes more specific measures of actual social network ties (House et al., 1988). Some authors have even explicitly stated that they are using this sense of community belonging item as either a measure of social capital (Wister and Wanless, 2007;

* Corresponding author. Tel.: +1 604 822 3845; fax: +1 604 822 6161.
E-mail address: carpiano@interchange.ubc.ca (R.M. Carpiano).

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Laporte et al., 2008) or community connectedness (Romans et al., 2010). But even though this single item has been used as a proxy for social capital and produces findings consistent with prior empirical studies, is sense of community belonging—as a concept and a measure—really the same thing as social capital? We are unaware of any prior work that has sought to evaluate this question.

From the standpoint of theory, sense of community belonging has some conceptual overlap with research on psychological sense of community—most notably McMillan and Chavis' (1986) well-cited conceptual framework (although a number of other theories and multi-item measurement tools exist) (Long and Perkins, 2003; Obst et al., 2002; Puddifoot, 1995; Townley and Kloos, 2009; Tartaglia, 2006; Peterson et al., 2008; Coffman and BeLue, 2009). Central to McMillan and Chavis' (1986, p. 9) framework are four key components of sense of community: *membership* ("feeling of belonging or of sharing a sense of personal relatedness"), *influence* ("a sense of… making a difference to a group and of the group mattering to its members"), *integration and fulfillment of needs* ("the feeling that members' needs will be met by the resources received through their membership in the group"), and *shared emotional connections* ("the commitment and belief that members have shared and will share history, common places, time together, and similar experiences") (see also Garcia et al., 1999). Based on this framework, two arguments can be made. First, one's sense of community belonging may most closely reflect the membership domain. Indeed, items similar in wording to the commonly used sense of community belonging item discussed so far in this paper have been included in scales of sense of community (see the review by Lochner et al., 1999). Second, there is potential conceptual overlap between sense of community and social capital given that the latter either encompasses each of these four framework components or, in terms of structural factors that shape personal thoughts and behaviors, helps one in the pursuit to acquire these elements. In fact, an extensively cited review of potential social capital measures published during a period when the current public health interest in social capital was nascent includes discussion of how psychological sense of community may conceptually be tapping some aspects of social capital (Lochner et al., 1999).

Given this conceptual overlap between sense of community belonging and network-based social capital, it remains unclear, from a measurement perspective, what this single, commonly used sense of local community belonging item could be capturing with respect to one's actual social capital. Is reporting a greater sense of community belonging indicative of having greater social capital and, if so, what type of social capital is being measured? With respect to prior health studies, is this sense of community belonging item capturing the health-promoting resources of an individual's general network social capital or geographically bounded social capital located in either one's own city/town or neighborhood? In terms of construct validity, it is important to delineate these issues in order to improve inferences from empirical findings using this item.

In an effort to better understand prior research and to inform future studies, we examine the relations among personal sense of local community belonging, specific network-based social capital measures, and health. Using a Canadian national survey with a thematic focus on social relationships, we empirically evaluate:

(a) If this commonly used sense of community belonging measure is a valid substitute for actual network-based social capital measures and, if so,
(b) what is the "community" for which one's belonging is associated with health?

To examine these issues, we utilize a variety of measures of actual social ties and test how the association between one's sense of community belonging and health status varies with respect to general (non-geographically bounded) social capital (i.e., position-based social capital and group membership) as well as geographically specific social capital (i.e., located within one's city/local community and neighborhood). To be sure, the aim of this study is not to dismiss or critique any prior work using the sense of community belonging measure, but to simply contribute insights regarding measurement issues that may add to the interpretation of prior findings as well as guide future research that may utilize this measure in analyses.

2. Methods

2.1. Data and sample

We analyze data from Cycle 22 (2008) of the Canadian General Social Survey (GSS). This dataset is ideal for this current study given that the 2008 GSS focused thematically on social networks. The 2008 GSS is a national cross-sectional survey that was conducted by Statistics Canada from February to November, 2008 using computer-assisted telephone interviewing (Statistics Canada, 2010). The target population of the GSS included all persons 15 years of age and older in all 10 provinces of Canada, excluding full-time residents of institutions. Conducted since 1985, the primary aims of the GSS are to gather data on social trends in order to monitor changes in the living conditions and well-being of Canadians over time and provide timely information to inform social policy issues. Specific details of the sampling design have been discussed extensively elsewhere (see Statistics Canada, 2010).

We limited our analysis to 19,739 adult respondents aged 18 or older and who had complete information on all variables necessary for our analysis, yielding an analytic sample of 18,052 respondents who had complete (non-missing) data for all variables in our analyses. Consistent with Statistics Canada's (2010) recommendations, we use population-based sampling weights in all our analyses to account for non-response and sampling design.

2.2. Measures

Table 1 reports the coding and descriptive statistics for all variables used in this study.

2.2.1. Sense of community belonging

Sense of community belonging is based on a single, commonly used item that asked respondents "How would you describe your sense of belonging to your local community?" The four-point response scale for this item ranged from "very strong" to "very weak." For the purposes of comparing estimates in this study to prior published findings, our analyses model sense of community belonging as three categorical dummy variables with "very weak" as the referent category.

2.2.2. Health outcome variables

In our analyses of how sense of community belonging relates to health, we utilize two self-reported health outcome variables: self-reported health and self-reported mental health (hereafter referred to as "general health" and "mental health," respectively). Each of these variables is based on a single item that asked respondents to, respectively, rate ("in general") their health and mental health using a five-point scale ranging from "excellent" to "poor." Both variables were recoded into separate dichotomous measures where excellent/very good = 1 and good/fair/poor = 0. These cut-offs were chosen in order to compare findings from this study with those of prior studies of community belonging and health (Shields, 2008; Ross, 2002).

Table 1
Descriptive statistics for dependent and key independent variables ($N=18,052$).

	N	Weighted %
Sense of community belonging		
Very weak	1327	7.75
Somewhat weak	3099	18.07
Somewhat strong	9265	52.25
Very strong	4361	21.93
Health outcome variables		
Very good/excellent general health	9115	52.38
Very good/excellent mental health	10,932	62.23
General network social capital		
Network diversity, mean (SD); weighted mean (SE)	10.11 (4.51)	10.09 (0.38)
Any group participation	11,880	65.76
Geographic-based social capital		
Close relatives in city/local community		
None	5398	28.77
1–5	9423	52.91
6–10	2231	12.87
Over 10	1000	5.46
Close friends in city/local community		
None	2988	16.93
1–5	10,988	60.58
6–10	2963	16.62
Over 10	1113	5.88
People in neighborhood R knows		
None	845	4.85
A few	8501	49.05
Many	2592	14.62
Most	6114	31.47
People in neighborhood R knows well enough to ask for a favor		
None	2274	12.89
1–5	9734	55.68
6–10	3300	18.22
Over 10	2744	13.22

Note: SD=standard deviation; SE=standard error.

2.2.3. Social capital measures

Our social capital measures fall into two categories: *general social capital* (i.e., social capital that is not necessarily restricted to social ties who live in a specific locality), which is captured via a position-based measure of social capital as well as a measure of group membership, and *geographic-based social capital*, which measures network-based social capital located within the same city/local community of the respondent, as well as the respondent's neighborhood.

2.2.3.1. General network social capital measures. Position-based social capital: We assessed an individual's *network diversity*, that is, the heterogeneity of accessibility that one has to different social positions, using the position generator, a commonly used and validated instrument in sociological research on social networks and social capital (Erickson, 2004) that has more recently seen use in health research on social capital (Moore et al., 2009a). The position generator asked respondents to identify if they know someone "by name and by sight and well enough to talk to" in each of 18 different occupational positions representing a variety of sectors and levels of occupational prestige (e.g., farmer, social worker, police officer or firefighter, manager in sales, marketing or advertising, computer programmer, engineer, delivery or courier driver, nurse, and accountants or auditors). Diversity was assessed by the sum total of occupational positions for which a respondent reported knowing someone and, thus, could range from 0 to 18. The position generator is a useful instrument for measuring an individual's general network-based social capital because it samples positions in a hierarchical (in this case, occupational) structure, rather than sampling interpersonal ties (Lin et al., 2001). Furthermore, the version of the position generator used in the GSS does not delineate between family/friends and acquaintances (i.e., respectively, "strong" versus "weak" ties; see Granovetter, 1973), thus allowing for the assessment of a range of different ties that one may have.

Membership/participation in groups: We computed a single dichotomous measure of group membership (any group membership=1; no group membership=0) using a series of questions that asked respondents if, in the past 12 months, they were a member of or participant in each of the following associations, groups, or clubs: union/professional association; political party/group; sports/recreational organization; cultural, educational or hobby organization; a religious-affiliated group; school group, neighborhood, civic, or community association; service club or fraternal organization; any other group (for which the respondent was asked to list the total number of other groups). The prevalence of participation in each group ranged from approximately 3% (any other group) to approximately 31% (union/professional association). Sensitivity analyses (not presented here) were performed to evaluate this measure. First, results using this dichotomous measure and a continuous measure of the total number of groups one reported being a member produced similar results in the final analytic models. Second, bivariate correlations between sense of community belonging and each type of group membership were consistently <0.10, indicating that, in using this dichotomous variable of any group membership, any observed association with sense of community belonging is less likely to be attributable to one specific type of group membership. Third, due to the potential of membership/participation in a "school group, neighborhood, civic, or community association" to reflect neighborhood (i.e., geographically specific versus more geographically-diffuse) ties, we also computed our dichotomous group membership variable with this item excluded. The correlation between both of these variables was 0.95, indicating that they are essentially the same measure.

2.2.3.2. Geographic-based social capital measures. City/local community social capital: For city/local community social ties, we focus specifically on the total number of close family and friends whom the respondent feels "at ease with, can talk to about what is on your mind, or call on for help" and created two measures: (a) *close relatives in the respondent's city/local community* and (b) *close friends in the respondent's city/local community*. Both measures were modeled as three dummy variables (1–5, 6–10, and over 10, with None as the referent) in order to be consistent with the neighborhood social ties measures described below.

Neighborhood social ties: We assessed the number and intensity of a respondent's neighborhood social relations using two items. The first item asked respondents "Would you say that you know most, many, a few or none of the people in your neighborhood?" Based on this four-point response scale, we modeled this item as four dummy variables with "none" as the referent category. The second item asked "About how many people in your neighborhood do you know well enough to ask for a favor?" Examples provided of favours were "picking up the mail, watering plants, shoveling, lending tools or garden equipment, carrying things, feeding pets when neighbors go on holiday, and shopping." Given the original four-point response scale (None, 1–5, 6–10, and over 10), we modeled this item as three dummy variables with "none" as the referent.

2.2.4. Control variables

Our analysis controls for an extensive range of sociodemographic and health-related variables. Table 2 displays the descriptive statistics and coding for each of these variables. Sociodemographic variables include sex, visible minority status, Aboriginal identity, immigrant to Canada, marital status, education, household income, length of

residency in city/local community, and whether or not one resides in an urban location. Household income is adjusted for the number of people in the household using a formula previously utilized by Ross (2002), which produced five categories coded from "lowest" (the referent category) to "highest." In addition to these categories, we also include a sixth category for respondents who had missing data on household income. Sensitivity analyses (not presented here) revealed that this household member-adjusted income measure was a stronger predictor of health outcomes than the unadjusted income measure. For urban location, we used the urban/rural indicator in the GSS public use file, which originally coded each respondent's residential location as: (1) "large urban centers" (Census Metropolitan Area [CMA]/Census Agglomeration [CA] Area), (2) rural and small town (non-CMA/CA), and (3) Prince Edward Island (PEI). We recoded this item as 0=rural location (including categories 2 and 3) and 1=urban location. Sensitivity analyses produced similar results when PEI was either included or excluded from the rural category.

In addition to sociodemographics, we also control for several health-related variables (some considered in prior research) that may confound the relationship between community belonging and health: any activity limitation, high stress, and health now compared to 5 years ago. *Any activity restriction* is a binary variable coded 1 if "the respondent is limited in the amount or kind of activity he/she can do at home, at work, at school or in other activities because of a physical condition or mental condition or health problem." *High stress* is a binary variable based on a single item asking respondents to report on the amount of stress in their lives. It is coded 1 if the respondent reported that most days are "quite a bit stressful" or "extremely stressful" and coded 0 if the respondent reported that most days are "not at all stressful" or "not very stressful." *Health now compared to five years* ago is based on a single self-rated item with a three-point response scale from which three dummy variables were created: "Worse than before" (referent), "Same as before", and "Better than before."

Table 2
Descriptive statistics for sociodemographic and health-related control variables (N=18,052).

	N	Weighted %
Sociodemographic covariates		
Male sex	7774	49.10
Age		
18–29	2350	20.90
30–44	4734	27.79
45–64	7146	35.69
65 or older	3822	15.62
Education		
Less than secondary graduation	3063	14.81
Secondary graduation	2570	14.12
Some post-secondary education	2558	15.75
Diploma/certificate from community college or trade/technical school	5180	28.19
Bachelor's or graduate degree	4681	27.13
Household Income		
Lowest	373	1.26
Lower-middle	754	3.01
Medium	2531	11.89
Upper-middle	5021	26.60
Highest	6328	40.14
Missing income data	3045	17.09
Visible minority status	1445	12.10
Aboriginal status	659	3.37
Immigrant	2970	20.03
Marital status		
Married/common-law	10,722	66.42
Divorced/separated/widowed	3755	11.68
Single	3575	21.90
Length of residence in city/local community		
Less than 1 year	599	3.58
1–5 years	2303	13.73
5 years to less than 10 years	2097	12.42
10 years and over	13,053	70.27
Urban (versus rural) location of residence	13,598	80.98
Health-related covariates		
Any activity restriction	7091	34.81
High (versus low) stress	4184	24.45
Health now compared to 5 years ago		
Worse than before	5430	28.87
Same as before	8381	47.18
Better than before	4241	23.95

2.3. Analyses

Our analyses proceed in three steps. First, we investigate the convergent and divergent validity of the sense of community belonging measure with all social capital variables as well as the sociodemographic and health-related confounding variables. We use ordinal logistic regression to estimate a series of models testing the relationship between sense of community belonging (the dependent variable) and each type of general and geographic-based social capital variable described in the previous section, while controlling for sociodemographic and health-related confounding variables.

Second, we investigate the network-based social capital features that potentially underlie the relationship between sense of community belonging and health. We use binary logistic regression for modeling both separate health outcomes (self-reported health and mental health). After presenting baseline results for the association between sense of community belonging (the independent variable) with each of the health outcome dependent variables, we estimate a series of models that, similar to step one above, introduce each type of general and geographic-based social capital variable as separate covariates. Diagnostic analyses (not shown) indicated that there were no substantial correlations between any of the variables that could present potential multicollinearity in our analytic models.

Third, we examine how the relationships evaluated in steps one and two of our analysis may be contingent upon residential location—after all, community and its meaning, as well as the health-related role of specific social ties may differ between urban and rural contexts. To accomplish this, we estimate the above-mentioned models stratified by urban and rural location.

Our analyses were conducted using the survey ("svy") function in Stata 11 (StataCorp LP, College Station, Texas, USA). Given the complex sampling design of the GSS, we utilize analytic survey weights for all point estimates and compute standard errors using the 500 corresponding mean bootstrap weight variables provided in the GSS dataset (based on instructions in Statistics Canada, 2010). We report all p values ≤ 0.05 as statistically significant.

3. Results

3.1. Associations between sense of community belonging and specific social capital measures

Table 3 presents the odds ratios (ORs) and 95% confidence intervals (CIs) for a series of ordinal regression models that assess the associations between sense of community belonging and each type of social capital, while controlling for sociodemographic and health-related covariates. The results indicate that, in general, social capital in a variety of forms is positively and significantly associated with increased sense of community belonging. Social network diversity and having 1–5 close relatives (versus none) in the city/local community are the only two social capital variables that did not have statistically significant estimates when

Table 3
Adjusted odds ratios (95% confidence intervals) for sense of community belonging by social capital, sociodemographic and health-related control variables (N=18,052).

	1	2	3	4	5
General network social capital					
Social network diversity	**1.06** (1.05–1.07)				1.01 (1.00–1.02)
Any group participation		**1.39** (1.28–1.51)			**1.12** (1.03–1.22)
Geographic-based social capital					
Close relatives in city/local community					
None			1.00		1.00
1–5			**1.09** (1.01–1.19)		1.04 (0.96–1.13)
6–10			**1.31** (1.17–1.48)		**1.17** (1.04–1.33)
Over 10			**1.53** (1.29–1.82)		**1.24** (1.05–1.47)
Close friends in city/local community					
None			1.00		1.00
1–5			**1.55** (1.41–1.71)		**1.26** (1.14–1.40)
6–10			**2.10** (1.85–2.38)		**1.44** (1.26–1.64)
Over 10			**3.33** (2.75–4.04)		**1.99** (1.62–2.44)
People in neighborhood *R* knows					
None				1.00	1.00
A few				**1.34** (1.07–1.69)	**1.34** (1.07–1.69)
Many				**3.33** (2.60–4.26)	**3.28** (2.56–4.19)
Most				**3.85** (3.01–4.92)	**3.78** (2.95–4.83)
People in neighborhood R knows well enough to ask for a favor					
None				1.00	1.00
1–5				**2.56** (2.22–2.95)	**2.45** (2.13–2.83)
6–10				**4.62** (3.90–5.47)	**4.20** (3.55–4.98)
Over 10				**7.78** (6.51–9.29)	**6.73** (5.62–8.07)
Sociodemographic covariates					
Male sex	**0.89** (0.83–0.96)	**0.88** (0.82–0.95)	**0.88** (0.82–0.95)	**0.84** (0.78–0.91)	**0.84** (0.78–0.91)
Age					
18–29	1.00	1.00	1.00	1.00	1.00
30–44	**1.55** (1.36–1.77)	**1.52** (1.34–1.73)	**1.61** (1.41–1.83)	**1.41** (1.24–1.60)	**1.48** (1.30–1.68)
45–64	**1.79** (1.58–2.04)	**1.71** (1.51–1.94)	**1.87** (1.64–2.12)	**1.53** (1.35–1.74)	**1.63** (1.43–1.86)
65 or older	**3.04** (2.60–3.56)	**2.61** (2.24–3.04)	**2.72** (2.33–3.17)	**2.27** (1.95–2.65)	**2.41** (2.06–2.83)
Education					
Less than secondary graduation	1.00	1.00	1.00	1.00	1.00
Secondary graduation	1.02 (0.89–1.17)	1.08 (0.94–1.23)	1.08 (0.94–1.23)	1.03 (0.90–1.18)	0.99 (0.86–1.14)
Some post-secondary education	0.89 (0.77–1.03)	0.96 (0.83–1.11)	1.01 (0.88–1.15)	0.94 (0.81–1.08)	0.89 (0.76–1.03)
Diploma/certificate from community college or trade/technical school	**0.85** (0.75–0.96)	0.90 (0.80–1.02)	0.99 (0.88–1.11)	0.91 (0.80–1.03)	**0.87** (0.76–0.99)
Bachelor's or graduate degree	0.89 (0.78–1.02)	0.92 (0.81–1.06)	1.02 (0.90–1.16)	0.91 (0.80–1.05)	**0.86** (0.74–0.99)
Household Income					
Lowest	1.00	1.00	1.00	1.00	1.00
Lower-middle	1.05 (0.73–1.49)	1.10 (0.77–1.57)	1.04 (0.73–1.47)	1.08 (0.75–1.55)	1.05 (0.73–1.51)
Medium	0.92 (0.69–1.22)	0.95 (0.72–1.27)	0.93 (0.70–1.25)	0.97 (0.72–1.31)	0.94 (0.69–1.26)
Upper-middle	0.81 (0.61–1.09)	0.86 (0.64–1.15)	0.86 (0.64–1.15)	0.92 (0.68–1.25)	0.88 (0.65–1.19)
Highest	0.85 (0.64–1.13)	0.90 (0.68–1.20)	0.89 (0.67–1.19)	0.93 (0.69–1.25)	0.86 (0.63–1.15)
Missing income data	0.90 (0.66–1.21)	0.95 (0.70–1.28)	0.91 (0.68–1.24)	0.97 (0.71–1.32)	0.92 (0.67–1.26)
Visible minority status	1.00 (0.86–1.16)	0.97 (0.84–1.13)	0.96 (0.83–1.12)	**1.20** (1.02–1.41)	**1.21** (1.03–1.43)
Aboriginal status	**0.79** (0.63–0.98)	0.82 (0.66–1.01)	**0.78** (0.63–0.96)	**0.77** (0.63–0.96)	**0.75** (0.61–0.92)
Immigrant	1.03 (0.92–1.15)	0.99 (0.89–1.11)	0.98 (0.88–1.10)	1.04 (0.93–1.16)	1.06 (0.95–1.19)
Marital status					
Married/common-law	1.00	1.00	1.00	1.00	1.00
Divorced/separated/widowed	**0.75** (0.68–0.83)	**0.73** (0.66–0.81)	**0.75** (0.68–0.83)	**0.90** (0.80–1.00)	0.91 (0.81–1.01)
Single	**0.72** (0.65–0.80)	**0.70** (0.63–0.78)	**0.70** (0.63–0.78)	**0.78** (0.70–0.87)	**0.77** (0.69–0.86)
Length of residence in city/local community					
Less than 1 year	1.00	1.00	1.00	1.00	1.00
1–5 years	1.19 (0.95–1.49)	1.21 (0.97–1.51)	1.14 (0.91–1.44)	0.86 (0.69–1.09)	0.85 (0.67–1.08)
5 years to < 10 years	**1.59** (1.28–1.99)	**1.62** (1.30–2.01)	**1.48** (1.18–1.84)	0.98 (0.78–1.23)	0.94 (0.75–1.18)
10 years and over	**2.16** (1.75–2.66)	**2.25** (1.82–2.77)	**1.84** (1.48–2.28)	1.12 (0.90–1.39)	1.02 (0.81–1.27)
Urban (versus rural) location of residence	**0.63** (0.58–0.68)	**0.59** (0.55–0.64)	**0.57** (0.53–0.62)	0.94 (0.87–1.03)	0.93 (0.85–1.01)
Health-related covariates					
Any activity restriction	**0.88** (0.81–0.95)	**0.88** (0.82–0.96)	**0.92** (0.85–0.99)	**0.91** (0.84–0.98)	**0.91** (0.84–0.98)
High (versus low) stress	**0.79** (0.72–0.86)	**0.80** (0.74–0.87)	**0.81** (0.75–0.89)	**0.83** (0.76–0.91)	**0.83** (0.76–0.91)
Health now compared to 5 years ago					
Worse than before	1.00	1.00	1.00	1.00	1.00
Same as before	**1.26** (1.15–1.37)	**1.24** (1.14–1.36)	**1.22** (1.12–1.34)	**1.19** (1.09–1.30)	**1.18** (1.08–1.29)
Better than before	**1.19** (1.08–1.32)	**1.21** (1.09–1.34)	**1.20** (1.09–1.33)	**1.19** (1.07–1.32)	**1.17** (1.05–1.29)

Note: All bolded estimates indicate $p \leq 0.05$.

examined alone and in the final model. While substantially large estimates are observed for having close friends in the city/local community, neighborhood-based social capital has the strongest association with sense of community belonging. For sociodemographic and health-related covariates, the full model (model 5) indicates increased odds of higher community belonging are observed among women, older (versus the youngest) individuals, lower (versus higher) education level, visible ethnic minorities, persons of non-Aboriginal heritage, and married/common-law individuals, as well as persons who report no activity limitations,

lower stress, and having a health status that is the same as or better than what it was 5 years prior. The pattern of results shown here was robust to an alternative model specification (not shown) that instead used ordinary least squares regression.

3.2. Sense of community belonging and self-rated general health

Table 4 presents ORs and 95% CIs of successive multivariate models that regress very good/excellent general health on sense of community belonging and social network variables. All models adjust for the abovementioned sociodemographic and health-related control variables. Model 1 presents a baseline model to allow us to compare with the successive models (as well as prior studies)—that is, the baseline model estimates the association between general health (dependent variable) and sense of community belonging (independent variable) while adjusting for sociodemographic and health-related control variables. The estimates for sense of community belonging indicate that, relative to very weak community belonging, somewhat strong and very strong community belonging were associated with 23% and 55% higher odds of very good/excellent health, respectively. These estimates are remarkably similar to prior studies using nationally based population health datasets (Shields, 2008; Ross, 2002).

Models 2–6 introduce successively the social capital variables. Model 2 introduces social network diversity, indicating that even though each one unit increase in diversity is associated with approximately 3% higher odds of very good/excellent health, the estimates for sense of community belonging remain relatively unchanged from Model 1, although the estimate for somewhat strong sense of community belonging loses statistical significance. In Model 3, when group membership is introduced, the estimate for sense of community belonging again shows little change compared to Model 1 even though any group membership is significantly associated with higher odds of better health. In Model 4, variables for close relatives and friends who live in the respondent's city/local community are entered. Nearly all these variables have positive estimates, but only one of these (having 6–10 close friends in the local area versus none) is statistically significant. Once again, little change is observed for the size of the estimates for sense of community belonging.

Model 5 focuses on neighborhood-based social capital, indicating that, of the two types of neighborhood ties that are modeled, it is the more intense ties—the number of people in one's neighborhood whom the respondent knows well enough to ask for a favor—that are strongly associated with better health. Compared to knowing no one in the neighborhood well enough to ask for a favor, each successive categorical increase in knowing such persons is associated with increasingly higher odds of better health. Examined together, these estimates indicate a somewhat diminishing rate of return to these types of neighborhood ties—as the increased odds of better health from knowing between 1 and 5, 6 and 10, or more than 10 (relative to none) is relatively small (i.e., an approximate 9.4% difference in the odds of better health between knowing 1–5 and knowing more than 10 of these types of people). Thus, even knowing just 1–5 such individuals is associated with approximately 28% higher odds of better health. In terms of sense of community belonging, the estimates for the two highest categories are substantially reduced in magnitude from the baseline model, such that only very strong sense of community belonging (which is reduced from its baseline magnitude by 15%) remains associated significantly with health.

When all the social capital variables are simultaneously entered into the same model (Model 6), the results for each social capital variable show very little change from the initial estimates obtained in the previous four models where they were entered

Table 4
Adjusted odds ratios (95% confidence intervals) for very good/excellent general health by sense of community belonging, social network and group membership factors (N=18,052).

	1	2	3	4	5	6
Sense of community belonging						
Very weak	1.00	1.00	1.00	1.00	1.00	1.00
Somewhat weak	0.97 (0.81–1.18)	0.95 (0.79–1.15)	0.96 (0.80–1.16)	0.97 (0.80–1.17)	0.92 (0.76–1.11)	0.91 (0.75–1.10)
Somewhat strong	**1.23** (1.03–1.47)	1.19 (0.99–1.42)	**1.21** (1.01–1.44)	**1.21** (1.01–1.45)	1.09 (0.91–1.31)	1.07 (0.89–1.28)
Very strong	**1.55** (1.28–1.88)	**1.47** (1.21–1.79)	**1.50** (1.23–1.82)	**1.50** (1.23–1.82)	**1.31** (1.07–1.60)	**1.26** (1.03–1.55)
General network social capital						
Social network diversity		**1.03** (1.02–1.04)				**1.02** (1.01–1.03)
Any group participation			**1.28** (1.17–1.41)			**1.21** (1.10–1.33)
Geographic-based social capital						
Close relatives in city/local community						
None				1.00		1.00
1–5				1.01 (0.92–1.12)		1.01 (0.91–1.11)
6–10				0.99 (0.85–1.14)		0.97 (0.84–1.12)
Over 10				1.22 (1.00–1.48)		1.18 (0.97–1.44)
Close friends in city/local community						
None				1.00		1.00
1–5				1.04 (0.93–1.17)		0.99 (0.88–1.11)
6–10				**1.17** (1.00–1.36)		1.06 (0.91–1.24)
Over 10				1.19 (0.97–1.47)		1.06 (0.86–1.32)
People in neighborhood R knows						
None					1.00	1.00
A few					0.94 (0.73–1.21)	0.94 (0.73–1.22)
Many					1.09 (0.83–1.43)	1.08 (0.82–1.42)
Most					1.05 (0.80–1.38)	1.04 (0.79–1.37)
People in neighborhood R knows well enough to ask for a favor						
None					1.00	1.00
1–5					**1.28** (1.09–1.49)	**1.24** (1.06–1.45)
6–10					**1.36** (1.13–1.64)	**1.29** (1.06–1.55)
Over 10					**1.40** (1.16–1.70)	**1.29** (1.06–1.56)

Note: All models adjust for the sociodemographic and health-related control variables detailed in Table 2. All bolded estimates indicate $p \leq 0.05$.

individually. The ORs for sense of community belonging in this model show little change relative to those in Model 5 when only neighborhood social capital was modeled.

3.3. Sense of community belonging and self-rated mental health

Table 5 presents the ORs and 95% CIs for self-rated mental health in the same fashion as the previously detailed results for general health displayed in Table 4.

Model 1 indicates an even stronger association for sense of community belonging and mental health than what was observed in Model 1 for general health. Somewhat strong and very strong sense of community belonging are, respectively, associated with 44% and 94% higher odds of reporting very good/excellent mental health. These estimates also closely resemble previously reported results using other datasets (Shields, 2008). The respective inclusion of social network diversity (Model 2), group membership (Model 3), and close relatives and friends living in the city/local community (Model 4), despite each showing significant associations with better mental health, individually produce little change in the estimates for sense of community belonging. In Model 5, however, the inclusion of neighborhood ties shows greater (yet still modest) change in the estimates for sense of community belonging as well as a different pattern of associations for neighborhood relationships. Compared to the baseline model, the ORs for somewhat strong and very strong sense of community belonging are reduced by approximately 6% and 11%, respectively. Opposite to what was observed for self-rated general health, simply knowing neighbors (and not necessarily knowing people well enough to ask for favors) is associated with higher odds of better mental health. When all the social capital variables are simultaneously entered in Model 6, similar to general health, the estimates for sense of community belonging and mental health do not change substantially from what was observed in Model 5.

3.4. Analyses stratified by urban and rural location

How do the previously detailed results depend upon area of residence? Tables 6–8 examine relationships between community belonging, network-based social capital, and both health outcomes stratified by urban and rural location.

3.4.1. Associations between sense of community belonging and specific social capital measures by location

Table 6 presents adjusted ORs and 95% CIs for predictors of sense of community belonging stratified by location of residence. The estimates for the urban and rural residents are generally similar in direction, though differences in the strength of magnitude exist. In terms of substantive differences between these two subsamples, greater sense of community belonging is, among urban respondents, significantly associated with group participation and knowing people in one's neighborhood; however, these associations do not exist for rural respondents, for whom greater sense of community belonging is, unlike their urban counterparts, significantly associated with having six or more (versus no) close relatives in the city/local community.

3.4.2. Sense of community belonging and self-rated general health by location

Table 7 presents ORs and 95% CIs of multivariate models that regress very good/excellent general health on sense of community belonging and social network variables and are stratified according to location. All models adjust for the sociodemographic and health-related covariates. For the urban and rural samples, two models are presented: Model 1 presents baseline results for sense

Table 5
Adjusted odds ratios (95% confidence intervals) for very good/excellent mental health by sense of community belonging, social network and group membership factors ($N=18{,}052$).

	1	2	3	4	5	6
Sense of community belonging						
Very weak	1.00	1.00	1.00	1.00	1.00	1.00
Somewhat weak	1.03 (0.86–1.25)	1.01 (0.83–1.22)	1.03 (0.85–1.24)	1.02 (0.84–1.23)	1.00 (0.83–1.21)	0.99 (0.82–1.20)
Somewhat strong	**1.44** (1.23–1.72)	**1.41** (1.19–1.67)	**1.44** (1.22–1.70)	**1.40** (1.18–1.66)	**1.35** (1.13–1.61)	**1.32** (1.10–1.57)
Very strong	**1.94** (1.62–2.33)	**1.87** (1.55–2.24)	**1.92** (1.60–2.30)	**1.84** (1.53–2.21)	**1.72** (1.41–2.09)	**1.65** (1.36–2.01)
General network social capital						
Social network diversity		**1.02** (1.01–1.03)				**1.01** (1.00–1.02)
Any group participation			**1.10** (1.01–1.21)			1.04 (0.95–1.14)
Geographic-based social capital						
Close relatives in city/local community						
None				1.00		1.00
1–5				1.08 (0.98–1.19)		1.08 (0.97–1.19)
6–10				**1.17** (1.01–1.34)		**1.16** (1.00–1.33)
Over 10				**1.32** (1.09–1.61)		**1.29** (1.06–1.57)
Close friends in city/local community						
None				1.00		1.00
1–5				1.08 (0.97–1.21)		1.05 (0.94–1.17)
6–10				**1.31** (1.13–1.52)		**1.25** (1.08–1.45)
Over 10				**1.25** (1.02–1.53)		1.16 (0.95–1.45)
People in neighborhood R knows						
None					1.00	1.00
A few					**1.29** (1.03–1.62)	**1.30** (1.03–1.63)
Many					**1.40** (1.08–1.82)	**1.39** (1.07–1.80)
Most					**1.52** (1.19–1.93)	**1.51** (1.18–1.93)
People in neighborhood R knows well enough to ask for a favor						
None					1.00	1.00
1–5					0.93 (0.80–1.07)	0.90 (0.78–1.04)
6–10					0.95 (0.80–1.13)	0.89 (0.75–1.06)
Over 10					1.08 (0.89–1.30)	0.98 (0.81–1.18)

Note: All models adjust for the sociodemographic and health-related control variables detailed in Table 2. All bolded estimates indicate $p \leq 0.05$.

Table 6
Adjusted odds ratios (95% confidence intervals) for sense of community belonging by social capital, sociodemographic and health-related control variables among urban and rural samples.

	Urban (n=13,598)	Rural (n=4,454)
General network social capital		
Social network diversity	1.01 (1.00, 1.02)	1.01 (0.99, 1.03)
Any group participation	**1.11** (1.01, 1.22)	1.17 (0.98, 1.40)
Geographic-based social capital		
Close relatives in city/local community		
None	1.00	1.00
1–5	1.03 (0.94, 1.14)	1.10 (0.93, 1.30)
6–10	1.10 (0.96, 1.26)	**1.57** (1.21, 2.02)
Over 10	1.12 (0.92, 1.37)	**1.77** (1.31, 2.40)
Close friends in city/local community		
None	1.00	1.00
1–5	**1.20** (1.07, 1.35)	**1.53** (1.24, 1.89)
6–10	**1.32** (1.14, 1.53)	**2.00** (1.53, 2.62)
Over 10	**1.85** (1.48, 2.32)	**2.60** (1.78, 3.80)
People in neighborhood R knows		
None	1.00	1.00
A few	**1.40** (1.10, 1.78)	0.69 (0.30, 1.62)
Many	**3.40** (2.61, 4.42)	1.73 (0.73, 4.13)
Most	**3.99** (3.06, 5.21)	1.91 (0.80, 4.53)
People in neighborhood R knows well enough to ask for a favor		
None	1.00	1.00
1–5	**2.50** (2.13, 2.93)	**2.32** (1.55, 3.45)
6–10	**4.34** (3.59, 5.24)	**3.75** (2.47, 5.69)
Over 10	**6.79** (5.45, 8.45)	**6.26** (4.06, 9.64)
Sociodemographic covariates		
Male sex	**0.84** (0.77, 0.92)	**0.86** (0.75, 0.99)
Age		
18–29	1.00	1.00
30–44	**1.46** (1.26, 1.68)	**1.56** (1.17, 2.07)
45–64	**1.58** (1.36, 1.83)	**1.86** (1.38, 2.51)
65 or older	**2.40** (2.00, 2.89)	**2.48** (1.77, 3.46)
Education		
Less than secondary graduation	1.00	1.00
Secondary graduation	1.01 (0.86, 1.20)	0.90 (0.70, 1.16)
Some post-secondary education	0.88 (0.74, 1.05)	0.86 (0.65, 1.13)
Diploma/certificate from community college or trade/technical school	**0.83** (0.71, 0.97)	1.00 (0.80, 1.25)
Bachelor's or graduate degree	**0.82** (0.70, 0.98)	1.05 (0.80, 1.38)
Household income		
Lowest	1.00	1.00
Lower-middle	0.96 (0.63, 1.46)	1.45 (0.73, 2.86)
Medium	0.91 (0.64, 1.28)	1.09 (0.60, 1.99)
Upper-middle	0.84 (0.60, 1.19)	1.04 (0.58, 1.86)
Highest	0.81 (0.58, 1.13)	1.10 (0.61, 2.00)
Missing income data	0.90 (0.63, 1.29)	1.00 (0.55, 1.82)
Visible minority status	**1.23** (1.04, 1.46)	1.30 (0.62, 2.71)
Aboriginal status	0.78 (0.60, 1.02)	**0.67** (0.48, 0.94)
Immigrant	1.03 (0.91, 1.17)	**1.36** (1.06, 1.74)
Marital status		
Married/common-law	1.00	1.00
Divorced/separated/widowed	**0.85** (0.75, 0.97)	1.12 (0.91, 1.36)
Single	**0.76** (0.67, 0.85)	0.85 (0.66, 1.09)
Length of residence in city/local community		
Less than 1 year	1.00	1.00
1–5 years	0.81 (0.62, 1.06)	1.00 (0.64, 1.55)
5 years to <10 years	0.93 (0.72, 1.20)	0.95 (0.59, 1.54)
10 years and over	1.01 (0.79, 1.31)	1.03 (0.66, 1.58)
Health-related covariates		
Any activity restriction	**0.90** (0.82, 0.99)	0.93 (0.79, 1.10)
High (versus low) stress	**0.83** (0.75, 0.92)	**0.82** (0.68, 0.99)
Health now compared to 5 years ago		
Worse than before	1.00	1.00
Same as before	**1.18** (1.07, 1.31)	1.15 (0.94, 1.40)
Better than before	**1.17** (1.04, 1.32)	1.13 (0.92, 1.39)

Note: All bolded estimates indicate $p \leq 0.05$.

of community belonging (similar to Model 1 in Table 4) and Model 2 includes sense of community belonging and all social capital variables (similar to Model 6 in Table 4).

Results from the baseline models indicate that sense of community belonging is only associated with general health for urban residents. This initial relationship observed in Model 1 for urban respondents reporting either somewhat or very strong sense of community belonging is attenuated in Model 2, such that only very strong sense of community belonging remains statistically significant. Similar to the non-stratified results presented in Table 4 (Model 6), network diversity, group participation, and knowing people in the neighborhood well enough to ask for a favor are the social capital variables that are significantly associated with better general health. Nevertheless, results (not shown) from models that added incrementally each group of social capital variables (similar to models 2–5 in Table 4) indicate that the largest attenuation of the sense of community belonging–general health relationship occurred when the neighborhood-based social capital variables were introduced into the model.

For rural residents, only one social capital variable is associated with general health in the final model. Knowing 6–10 (versus no) people in the neighborhood well enough to ask for a favor is associated with 84% higher odds of reporting very good/excellent health. Unlike the results for the full and urban samples, the ORs for network diversity and group participation were not statistically significant in the final model. Both variables, however, had initially positive and statistically significant associations with general health when, similar to Table 4 Models 2 and 3, each was the only social capital variable included in the model. In these initial models (not shown), the ORs for network diversity and group membership were 1.03 and 1.24, respectively (both $p \leq 0.05$). Further diagnostic analyses (not shown) revealed that each category of knowing people in the neighborhood well enough to ask for a favor was initially significantly associated with general health, but, all but one of these associations (i.e., for knowing 6–10 people well enough to ask a favor) became statistically non-significant once the variables for knowing people in the neighborhood were entered into the model.

3.4.3. Sense of community belonging and self-rated mental health by location

Table 8 presents adjusted ORs and 95% CIs of stratified models for self-rated mental health in the same manner as the stratified results reported in Table 7 for general health. The pattern of results for the urban respondents is similar to those reported in Table 5 for the full sample.

For the rural respondents, Model 1 indicates that only very strong (versus very weak) sense of community belonging is significantly associated with mental health, but this relationship becomes non-significant in Model 2 once all the social capital variables are entered. In this final model, the only social capital variable significantly associated with mental health is having 1–5 (versus no) close relatives in one's city/local community. Results from models (not shown) where each category of social capital variables was entered separately (similar to Table 5, Models 2–5) indicate that no other social capital variable had an initial, statistically significant estimate.

4. Discussion

The current study was designed to better understand "sense of community belonging," a commonly used measure in health surveys that has been frequently used as an indicator of one's social capital. Specifically, we examined what aspects of social capital this single measure may be capturing and, to what degree its observed associations with health may be attributable to respondents' actual network-based social capital. Using recent,

Table 7
Adjusted odds ratios (95% confidence intervals) for very good/excellent general health by sense of community belonging, social network and group membership factors among urban and rural respondents.

	Urban (n=13,598)		Rural (n=4454)	
	1	2	1	2
Sense of community belonging				
Very weak	1.00	1.00	1.00	1.00
Somewhat weak	0.98 (0.80, 1.20)	0.92 (0.75, 1.13)	0.90 (0.55, 1.46)	0.79 (0.48, 1.29)
Somewhat strong	**1.29** (1.06, 1.57)	1.14 (0.93, 1.39)	0.90 (0.59, 1.37)	0.71 (0.46, 1.10)
Very strong	**1.60** (1.29, 1.99)	**1.34** (1.06, 1.69)	1.18 (0.77, 1.82)	0.87 (0.55, 1.36)
General network social capital				
Social network diversity		**1.02** (1.00, 1.03)		1.02 (0.99, 1.04)
Any group participation		**1.22** (1.09, 1.36)		1.17 (0.97, 1.41)
Geographic-based social capital				
Close relatives in city/local community				
None		1.00		1.00
1–5		1.02 (0.91, 1.14)		0.96 (0.79, 1.18)
6–10		0.99 (0.84, 1.17)		0.90 (0.68, 1.19)
Over 10		1.20 (0.96, 1.51)		1.05 (0.71, 1.55)
Close friends in city/local community				
None		1.00		1.00
1–5		1.04 (0.91, 1.20)		0.85 (0.68, 1.07)
6–10		1.12 (0.93, 1.34)		0.93 (0.70, 1.23)
Over 10		1.13 (0.88, 1.46)		0.91 (0.63, 1.30)
People in neighborhood R knows				
None		1.00		1.00
A few		0.94 (0.71, 1.23)		1.14 (0.52, 2.51)
Many		1.04 (0.77, 1.42)		1.50 (0.65, 3.49)
Most		1.00 (0.74, 1.34)		1.45 (0.63, 3.33)
People in neighborhood R knows well enough to ask for a favor				
None		1.00		1.00
1–5		**1.22** (1.02, 1.44)		1.36 (0.92, 2.01)
6–10		1.18 (0.95, 1.46)		**1.84** (1.18, 2.87)
Over 10		**1.32** (1.05, 1.66)		1.38 (0.89, 2.16)

Note: All models adjust for the sociodemographic and health-related control variables detailed in Table 2. All bolded estimates indicate $p \leq 0.05$.

high quality national data collected by the Canadian federal government, we empirically tested the validity of this measure with respect to two health measures by utilizing a wide range of measures of actual social connections. Additionally, we conducted stratified analyses by location to determine how these findings may differ by urban and rural residential context.

Improving understanding of the conceptual and empirical qualities of this sense of community belonging measure is important for informing not only past health studies that have used it—whether as an indicator of social capital or other constructs—but also future studies that might use this measure in lieu of other, more precise measures of social networks. Although our findings indicate that many different types of social capital ranging from general network ties to more geographically bounded networks are positively associated with better health, collectively, our results indicate that sense of community belonging is most closely capturing aspects of one's neighborhood social capital. The initial associations between sense of community belonging and health—similar in magnitude to those reported in prior studies (Shields, 2008; Ross, 2002)—were most substantially reduced after controlling for the number of people one knows in their neighborhood and the number of people one knows in their neighborhood well enough to ask for a favor. For sense of community belonging and self-rated general health, this relationship appears to most closely reflect knowing people well enough to ask them for favors. For sense of community belonging and self-rated mental health, the initial relationship appears to be capturing simply the number of people that one knows in her/his neighborhood. When these analyses were stratified by urban and rural location, the findings for urban respondents were generally consistent with the findings based on the full sample. Results for the rural respondents, however, indicated that sense of community belonging had weaker or non-significant relationships with general health and mental health, respectively. These findings corroborate prior analyses by Hystad and Carpiano (2010), which found that, among several types of rural Canadian health regions, sense of community belonging was not significantly associated with undertaking a health behavior change (e.g., quitting smoking, diet change). Furthermore, the present study's stratified analyses revealed that, even though many social capital variables were observed to be significantly associated with sense of community belonging in both urban- and rural-specific models, few social capital variables were significantly associated with either health outcome in the rural sample.

Why are different types of neighborhood social relations differentially associated with these health outcomes? We conjecture that having geographically proximal ties (i.e., neighbors, business owners, and local service providers) that one can ask for material, informational, emotional, and other types of support is important for dealing with life strains/stressors, local issues, and maintaining health in general and is thus a key way in which community social life may matter for overall health. For mental health, however, social capital explained less of its relationship with community belonging overall, but it may be that simply knowing other people in the neighborhood is important for one's mental health due to providing a sense of familiarity, safety, and overall person–environment congruence. Also, in this situation, sense of community belonging may be capturing neighborhood attachment (Carpiano, 2006), the degree to which one is integrated into one or more neighborhood networks from which they can potentially obtain resources. Prior research indicates that one's level of neighborhood attachment is an important effect

Table 8
Adjusted odds ratios (95% confidence intervals) for very good/excellent mental health by sense of community belonging, social network and group membership factors among urban and rural respondents.

	Urban ($n=13,598$)		Rural ($n=4454$)	
	1	2	1	2
Sense of community belonging				
Very weak	1.00	1.00	1.00	1.00
Somewhat weak	1.05 (0.86, 1.28)	1.00 (0.81, 1.23)	0.94 (0.61, 1.43)	0.93 (0.61, 1.44)
Somewhat strong	**1.46** (1.23, 1.78)	**1.35** (1.11, 1.63)	1.32 (0.90, 1.94)	1.19 (0.80, 1.79)
Very strong	**1.96** (1.60, 2.40)	**1.69** (1.36, 2.10)	**1.81** (1.22, 2.69)	1.50 (0.98, 2.30)
General network social capital				
Social network diversity		**1.01** (1.00, 1.03)		1.01 (0.99, 1.03)
Any group participation		1.04 (0.93, 1.15)		1.03 (0.86, 1.24)
Geographic-based social capital				
Close relatives in city/local community				
None		1.00		1.00
1–5		1.04 (0.93, 1.16)		**1.22** (1.01, 1.48)
6–10		1.14 (0.97, 1.34)		1.21 (0.91, 1.59)
Over 10		**1.35** (1.06, 1.70)		1.11 (0.76, 1.62)
Close friends in city/local community				
None		1.00		1.00
1–5		1.10 (0.97, 1.26)		0.89 (0.73, 1.09)
6–10		**1.31** (1.11, 1.56)		1.09 (0.82, 1.44)
Over 10		1.23 (0.97, 1.56)		1.01 (0.69, 1.47)
People in neighborhood R knows				
None		1.00		1.00
A few		**1.34** (1.05, 1.71)		0.86 (0.42, 1.77)
Many		**1.37** (1.03, 1.82)		1.16 (0.55, 2.46)
Most		**1.57** (1.20, 2.04)		1.04 (0.50, 2.17)
People in neighborhood R knows well enough to ask for a favor				
None		1.00		1.00
1–5		0.89 (0.75, 1.04)		0.99 (0.68, 1.43)
6–10		0.86 (0.70, 1.04)		1.10 (0.74, 1.63)
Over 10		0.94 (0.76, 1.17)		1.18 (0.78, 1.77)

Note: All models adjust for the sociodemographic and health-related control variables detailed in Table 2. All bolded estimates indicate $p \leq 0.05$.

modifier of the relationship between neighborhood social capital and various personal health-related outcomes (e.g., see Carpiano, 2007, 2008). Furthermore, just knowing people in the neighborhood may be more indicative of an individual's perception or belief that emotional support is available, which has been found in prior studies to be a stronger influence on mental health than the actual receipt of social support (Thoits, 1995).

Why are some social capital indicators associated with health for urban residents, but not for rural residents? Consistent with prior research, the study data suggest that there may be not only positive aspects of social capital, but negative aspects, as well. For example, sense of community belonging was found to be significantly higher among rural versus urban respondents—approximately 31% versus 20%, respectively, reported having very strong community belonging. Also, rural respondents reported having significantly higher numbers of close relatives and friends in their local community as well as knowing a significantly higher number of people in their neighborhood (in general and well enough to ask for a favor). Taken together, these findings suggest that rural respondents may possess networks that have greater geographic concentration of ties and also potentially greater multiplexity (networks comprised of the same persons connected together via multiple different roles, such as residents of a town who are simultaneously neighbors, relatives/friends, and even co-workers). While both network features may appear, at face value, to be positive—after all, one may argue that having more friends living nearby is nearly always "better" from the standpoint of having greater access to different resources—there can be downsides to these features, as well. For example, these features may give rise to strong community normative influences on one's behaviors, potential role strains (e.g., personal stress experienced due to demands for assistance from multiple individuals), and hindrances to accessing new information from members outside of one's regular network (e.g., job leads or health-related information)—each of which has the potential to negatively impact an individual's health (see Portes, 1998; Carpiano, 2007, 2008; Moore et al., 2009b). While these downsides can, of course, manifest in both urban and rural networks, it may be the case that fewer significant health effects were found among rural (versus urban) residents for numerous social capital measures because, in addition to capturing the health-promoting aspects of social capital, these network-based social capital measures also potentially capture health-damaging downsides of social capital (i.e., downsides that emerge from potentially greater network concentration and multiplexity)—in essence, "nullifying" the effect of the social capital indicator. Although consistent with prior research, more detailed data (not available in the dataset used here) is required in order to fully evaluate the tenability of this explanation.

Overall, our results suggest that the relationship between sense of community belonging and health may be explained partially by one's social capital. In analyses of the full sample as well as the urban subsample, sense of community belonging remained one of the largest associations with general health and the largest association with mental health even after controlling for all social capital, sociodemographic, and health-related variables. Thus, it is important to consider that sense of community belonging and its health benefits may also be driven by other factors such as features of the physical and built environment (e.g., living in a personally desirable location), local services and amenities, and other social and cultural factors not included in these analyses. In sum, sense of community belonging may be capturing an extremely diverse set of features, including multiple domains of psychological sense of community (McMillan and Chavis, 1986). Nevertheless, it is also important to recognize that, *among rural residents*, even though sense of community belonging was significantly higher relative to urban respondents

(a finding consistent with those reported by Shields, 2008) and was significantly associated with many social capital variables, it was not associated with general health and had only one category (very strong belonging) initially associated with mental health (an association that was reduced to non-significance once social capital measures were entered in the final model). Thus, this commonly used measure may have less utility for health research focused on rural communities.

Our study has a number of strengths—namely, a large national sample (that permitted stratified analyses by urban and rural areas), high data quality, and the ability to control for numerous potential confounding factors (including predisposing health factors that may prevent individuals from engaging with others and lead to poor health). Our findings, however, must be considered with respect to various limitations. First, with respect to our social capital measures, although we were able to use an extensive range of measures of actual general and geographically bounded social network ties (a rarity in national datasets), we were unable to fully account for all types of social network ties and the specific types of resources they provide. For example, we could not fully take into account acquaintances and other types of "weak ties" (Granovetter, 1973) that may serve as important links to health-related and other resources. Second, in terms of our outcome variables, we only examine two self-rated health measures. Although these are commonly used measures, it would have been preferable to have more specific measures of physical and mental health status (e.g., depression and anxiety scales). That said, these two self-rated health measures have been utilized in prior studies that examined sense of community belonging. Consequently, our use of these health measures provided an opportunity to compare our results with prior research that used population health datasets, but did not have the extensive social network measures that were included in the 2008 GSS. Third, even though we found that neighborhood measures were most strongly associated with this sense of community belonging item, question wording and ordering in the GSS may also contribute to how respondents conceptualize "local community." Although "local community" is a term used throughout the GSS for various questions (e.g., used in the term "city/local community" as a geographic reference), the actual sense of community belonging question appeared after a series of neighborhood-specific questions. Hence, we cannot fully eliminate the possibility that these prior neighborhood questions may have contributed to priming the respondent to think about her/his neighborhood when asked about sense of belonging to the local community. Nevertheless, our findings show that this sense of community belonging measure was significantly correlated with a variety of network measures assessed at different geographic scales, hence, we are confident that this question ordering does not significantly bias our findings. Finally, our study is based on data collected in Canada. Sense of community belonging may have different interpretations in other locations—an empirical question that needs to be evaluated by studies using international data.

In conclusion, we make the following recommendations for future health research that may use this sense of community belonging measure. First, sense of community belonging does seem to capture actual social capital—albeit very crudely and predominantly in terms of social capital located in one's neighborhood. Thus, future studies using this measure as an indicator of social capital or other construct need to consider the health mechanisms for which they are using sense of community belonging to test. Of course, theory should be a guiding cornerstone of any research (Carpiano and Daley 2006a, 2006b), but, in the case of using a single measure of sense of community belonging, it is important to specify properly what are the pathways through which sense of community belonging may be operating to affect health and well-being. For example, though not examined in this study, it may be possible that sense of community belonging and specific types of social capital may mediate each other in their respective pathways to health. Second, in studying social capital, it is always preferable to use specific measures of actual social capital. For example, one's general network may matter or provide more for one's health than one's neighborhood-based network for which we found the single item of sense of community belonging to be most strongly correlated. Nevertheless, if specific measures of social capital are not available in the dataset, it is important for researchers to recognize that this sense of community belonging measure is not an ideal proxy for one's general network social capital—and, given that its relationship with health is not fully explained by actual social capital for which one possesses access, there is other "noise" or measurement error built into this item (e.g., other social and/or psychological factors) that may confound its observed associations with health outcomes. Related to this point, our findings for rural areas indicate that sense of community belonging may be a far less useful measure for studying health issues within some geographic contexts versus others. Finally, furthering understanding of the health implications of social capital requires the increased availability and use of measures of the actual social networks that people have for accessing material, informational, emotional, and other resources. By allowing a greater depth of analysis regarding how different social structural conditions promote or harm health, the inclusion of even a small number of network-based social capital measures in public health surveys can better inform knowledge about—as well as action towards addressing—health disparities.

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