Is Social Capital Mediating the Relationship Between Ethnicity and Health in Canada?

by

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Author's Declaration

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any final revision, as accepted by my examiners.

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Abstract

Ethnic minorities in Canada experience poorer health compared to their Canadian counterparts, on several important health outcomes. This study examines whether social capital – measured by social networks, civic engagement and trust – may offer an explanation for the continued persistence of these health inequities. Bivariate and logistic regression analysis was performed using the *2008 General Social Survey* to investigate whether ethnicity and/or social capital are associated with self-reported health and if social capital is mediating the relationship between ethnicity and health. The study found that ethnicity was significantly associated with self-reported health with respondents identifying as South Asian, Aboriginal or Chinese, being significantly more likely to report poorer health compared to other Canadians. Furthermore, measures of civic engagement and generalized trust were positively and significantly associated with health. Although this study was unable to conclude that social capital is mediating the relationship between ethnicity and health, it explored the operationalization of social capital measures that could have policy or program evaluation implications. Further research is needed to confirm the findings of this study.

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Chapter 1: Introduction and Overview

1.1 Statement of the Problem

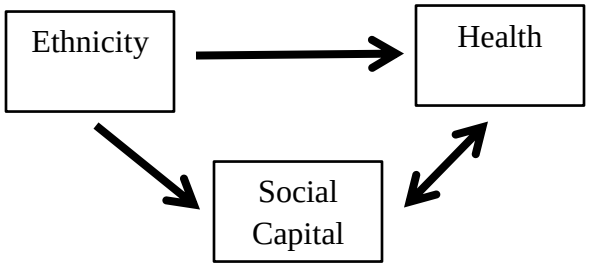
Health inequalities persist across minority ethnic groups as evidenced by several studies in the United States and Canada (Anand et al., 2000; McGee et al., 1999; Nazroo, 2003; Wu and Schimmele, 2005). For example, a study using the 2001 Canadian Community Health Survey found that visible minorities (defined as persons who are not Aboriginal but who are non-Caucasian in race) have high average health status, compared to non-visible minorities and Aboriginal people, where health was measured by self-reported health, functional limitations and disabilities (Kobayashi et al., 2008). As the Canadian population is becoming increasingly diverse and multicultural, addressing these health inequalities has become increasingly important as a public health issue (Buchman et al., 2009; Prus and Lin, 2005).

Despite the body of literature supporting the relationship between ethnicity and health differences, the mechanisms underlying this relationship are less clear. At least part of the health difference may be attributable to genetics. For example, studies of BRCA1 and BRCA2 mutations, which predispose individuals to breast and ovarian cancer, have shown that the mutant genes vary by ethnicity (Neuhausen, 1999). Furthermore, sickle-cell anemia, which occurs due to a gene mutation, has a much higher prevalence among individuals whose ancestors originated in western Africa (Ridley, 1999). There are several other cases in which ethnic differences in health can be explained by genetic and biological factors.

Although genetic mechanisms for the relationship between ethnicity and health have not been heavily explored in Canada, approaching the issue of ethnic health differences from a biological lens might not be particularly meaningful for public health initiatives as genes are

non-modifiable. A sociological lens, on the other hand, would allow for the relationship between ethnicity and health to be further elucidated and potentially lead to appreciable change. In particular, a study by Wu and colleagues (2003) speculated that psychosocial forces such as social capital, broadly conceived as social relationships and the various resources that flow along them, may mediate the relationship between ethnicity and health (Noh et al., 1999; Prus and Lin, 2005). This relationship between ethnicity and health, with social capital as a mediator, is the central focus of this research project (Figure 1).

Figure 1: Proposed relationship between ethnicity and health, mediated by social capital



1.2 Study Rationale and Contributions

As far as this author knows, no Canadian study to date has investigated the potential mediating effects of social capital between ethnicity and health outcomes. This research will fill some of the existing gaps in the literature.

As an analytical concept, social capital has been gaining momentum in public health and social sciences literature for the past few decades (Islam et al., 2006). It has still not been heavily explored in Canada, however, partly due to its relatively recent emergence in the literature (Franke, 2005; Bryant and Norris, 2002). As such, this research will also allow for the explication of a social capital framework and in the process reveal social capital measurement indicators. This has practical implications, for example, for the design, implementation and

evaluation of public health interventions (Franke, 2005). For example, if social capital proves useful, a community program targeted at new immigrants might benefit from collecting data on the number of new friends a program participant makes as a result of the program as this could significantly increase their social support and resources. The growing interest in measurement indicators in the population health field has coincided with an increased interest in the use and viability of social indicators (van Kemenade, 2003).

This study will also be one of a very few that compare health outcomes across a large number of ethnic groups in a single study (Gee et al., 2006). Studying differences between ethnic groups may help with understanding disease etiology, addressing system inequalities, assessing needs and, most importantly, making better health plans and directing resources allocations (Bhopal, 2007).

Finally, this research may lend further credence to "social prescribing." Social prescribing is a way by which physicians and other health care providers connect patients with social resources and support in the community to improve patient health (Brandling and House, 2009). For example, a physician may refer a recently widowed patient to a local bereavement group; other examples include connecting patients with volunteer opportunities, further education, social clubs, sports clubs, social services, and other community supports (South et al., 2008; Brandling and House, 2009). There are clear benefits for some referrals, as with a recently widowed patient being referred to a bereavement support group; similarly, a physician may suggest that a patient join a sports club for exercise. However, an important benefit of social prescribing that is often overlooked is that it may improve an individuals' social network which the literature suggests can lead to improved health outcomes (Putnam, 2000).

1.3 Objectives and Research Questions

The overall objective of this study is to investigate the relationship between social capital, ethnicity and self-rated health among Canadians. More specifically, this study aims to answer the following questions:

1. Is there an association between ethnicity and self-rated health? Do different ethnic groups have different probabilities of having good or better self-rated health?
2. Is there an association between social capital, measured by social networks, civic engagement, and trust, and the probability of having good self-rated health?
3. Are some of the ethnic differences in self-rated health accounted for by differences in social capital? Does social capital mediate the relationship between ethnicity and self-rated health?

1.4 Study Components

Quantitative methods will be used to answer the research questions outlined above. Data from the 2008 General Social Survey will be analyzed to assess the relationship between social capital, ethnicity and health outcomes. Binary logistic regression was used to identify significant relationships and to control for potential confounders.

1.5 Organization

The thesis is organized as follows. Chapter 2 reviews relevant literature for ethnicity, social capital and health. Chapter 3 describes the research methodologies to be used in this research, followed by the results in chapter 4. Chapter 5 discusses the research findings before the concluding chapter which includes future directions for research.

Chapter 2: Literature Review

2.1 Introduction

This section begins with a discussion of the measurement of ethnicity, particularly in the Canadian context. Then the complex concept of social capital is introduced, as well as its measurement, and the reasons for expecting that it may play a mediating role in the relationship between ethnicity and health. Finally, we discuss additional variables that are expected to be important when considering the statistical models used to test that relationship.

2.2 Ethnicity

2.2.1 Measuring ethnicity

Ethnicity is a contested concept, and there is no single way to define ethnicity in public health– prior studies have used a wide range of measures to determine ethnicity in surveys and other data collection (Senior and Bhopal, 1994; Bhopal, 2007). Measures of ethnicity that have been used to date include: skin color or observation; birthplace; birthplace of ancestors; geographical origin; language; names; ancestry; religion; or, some combination of these factors (Senior and Bhopal, 1994; Bhopal, 2007). These measures have largely been deemed unsatisfactory. Using birthplace, birthplace of ancestors or geographical origin is problematic because of intergenerational migration between countries (Lamb, n.d.). Using language spoken at home as a proxy measure for ethnicity can be useful for some ethnic groups however it decreases in relevance as successive generations of children do not always speak the same language as their parents or ancestors (Lamb, n.d.). A similar argument might be made for the salience of religion.

Public health literature will sometimes use “ethnicity” interchangeably with “race”. However these concepts, though overlapping, are operationally divergent (Bhopal, 2007;

Betancourt and Lopez, 1993; Helms and Talleyrand, 1997). “Race” typically distinguishes individuals on the basis of morphological features (e.g. skin color). Ethnicity differentiates individuals on the basis of both physical and cultural characteristics (Senior and Bhopal, 1994; Bhopal, 2007). There are also differences in how ethnicity and race are practically assessed in public health research. Race is determined by historically defined groupings based on the assessors’ observations and recently, with input from individuals belonging to those defined groupings (Bhopal, 2007). Ethnicity, on the other hand, is assessed pragmatically “based upon a combination of external assessors’ ideas and consultation with the populations to be defined” (Bhopal, 2007). Ethnicity “is a multifaceted quality that refers to the group to which people belong, and/or are perceived to belong, as a result of certain shared characteristics, including geographical and ancestral origins, but with particular emphasis on cultural traditions and languages” (Bhopal, 2007).

For our purposes, it is anticipated that the use of ethnicity, rather than race, will provide a more accurate picture of ethnic health disparities in Canada and therefore lay the groundwork for effective public health strategies.

The emerging convention in public health is that ethnicity is fundamentally a matter of self-perception (Bhopal, 2007). As such, there is growing consensus amongst health researchers that self-classification is the most appropriate method for collecting data on ethnicity (Senior and Bhopal, 1994; Bhopal, 2007).

Because ethnicity is imprecise and fluid as a concept, self-definition can make the task of establishing meaningful categories for determining ethnic identity in surveys and census questionnaires near-impossible (Burton et al., 2010; Bhopal, 2007). For example, open-ended survey questions may lead to responses that are too specific to meaningfully interpret or use to

inform public health policies and services. In a study by Pringle and Rothera, participants were asked an open-ended ethnicity question and a pre-existing census ethnicity question; of the valid responses, only 28 per cent were the same or almost the same (1996). The detail with which a respondent specifies their ethnic origin may also differ. For example, of two respondents of the same ethnic ancestry, one may give a very general response such as "African" whereas the other may be more specific and report "Ghanaian" or "Eritrean," resulting in the two respondents being counted as having different ethnic origins (Statistics Canada, 2007). One way to mitigate some of this is to collapse specific ethnic categories into broader ones; for example "Ghanaian" and "Eritrean" may be collapsed into the broader category of "African origins" (Statistics Canada, 2007). Although these broader categories are conventionally the most functional way of categorizing ethnicity, the trade-off is that these broader categories can guise important distinctions in language, diet and other factors that may influence health (Bhopal, 2007).

Canada's ethnocultural portrait is incredibly diverse. There were 263 distinct ethnic origins reported in response to the write-in "ethnic ancestry" question on the 2011 National Household Survey. The smallest ethnic group, respondents identifying Gambian as their ethnic origin, had a population of only 595 (Statistics Canada, 2013). The ten largest self-reported ethnic groups in Canada are European origins, Other North American origins, Canadian, Asian origins, British Isles origins, East and Southeast Asian origins, Southern European origins, English, South Asian origins and Chinese (Table 1). These most common responses vary considerably by province and territory (Statistics Canada, 2013).

Table 1: Ten most common "Ethnic Ancestry" Responses, 2011 National Household Survey

	Number	Percentage
European origins	7,229,120	37.98%
Other North American origins	6,030,470	31.68%
Canadian	5,834,535	30.65%
Asian origins	4,022,085	21.13%
British Isles origins	2,521,360	13.25%
East and Southeast Asian origins	2,169,270	11.40%
Southern European origins	1,357,735	7.13%
English	1,312,570	6.90%
South Asian origins	1,306,380	6.86%
Chinese	1,210,945	6.36%

Note: This table presents the ten most popular "single ethnic origin responses" only. Totals do not sum to 100%. Source: 2011 National Household Survey (Statistics Canada, 2013)

The use of ethnicity as study variable is further complicated when one considers those individuals of mixed ancestry. Some mixed ancestry individuals may identify more strongly with one ethnicity over another based upon their own social or political experiences (Mays et al., 2003). Measurement of ethnicity can also be affected by a respondent's awareness of family background or length of time since immigration. When asked about ethnic origin, respondents may also interpret ethnicity as referring to citizenship, nationality, language or cultural identity (Statistics Canada, 2007).

Ethnicity is sometimes considered to be a controversial variable in epidemiology and public health because of its inherent ability to differentiate individuals (Bhopal, 2003). To remove discussions of ethnicity from health initiatives, however, would reduce the power of predictive models in public health or introduce uncontrolled confounding into these models (Mays et al., 2003). Furthermore, Swift (2002) compiled a number of studies on disease patterns

and found that even after controlling for income, education, occupation and other demographic variables, there was strong evidence that there is an independent effect of ethnicity on health.

It is important to consider the role of ethnicity in health outcomes but is essential to do so in a respectful and transparent manner. Studies investigating ethnicity should be up front about their motivations for researching ethnicity, their definitions of ethnicity and how ethnicity is being measured. These principles will be used to guide this research.

2.2.2 Ethnic differences in Health

Notwithstanding the difficulties defining and measuring ethnicity, there is convincing evidence of ethnic health differences in Canada. A study of persons of South Asian, European and Chinese origin, showed that South Asians and Europeans were at highest risk for death from ischemic heart disease compared to Canadians of Chinese origin (Sheth et al., 1999). Kobayashi and colleagues also found that persons of Chinese origin had higher self-reported health compared to persons of Canadian, French and English origin (2008). Using the National Population Health Survey, Wu and Schimmele (2005) found that Aboriginal, Arabic and West Asian Canadians had significantly worse functional health than the sample average. Another study found that Aboriginal persons on average reported poorer health than persons of Chinese, Canadian, French, English, South Asian or West Asian/Arab ethnic origin (Kobayashi et al., 2008). Young and colleagues found the prevalence of self-reported major chronic diseases to be significantly higher for Aboriginal persons compared to the general population (1999) and a study by Trovato showed that Aboriginal populations have higher rates of mortality and lower life expectancy compared other ethnic populations (2001). Wu and colleagues also found that East and Southeast Asian, Chinese, and South Asian populations experience the lowest rates of depression in Canada (2003). And it was this study that first stipulated that psychosocial forces

such as social capital may be mediating the relationship between ethnicity and health – potentially, by providing support and access to healthcare resources and services.

2.3 Social Capital

Social capital has been growing in importance and relevance to health research since its emergence in the literature. Several studies have demonstrated the relationship between social capital and specific health outcomes. However, few have explored the role of social capital in ethnic health differences.

2.3.1 Defining Social Capital

There is disagreement as to the intellectual origins of social capital however there are key persons who were responsible for giving visibility to the concept (Islam et al., 2006; Portes, 1998). Pierre Bourdieu defined social capital as "the aggregate of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized relationships of mutual acquaintance or recognition" (1985). Bourdieu's theory focused on the deliberate construction of sociability to capitalize on the benefits accruing to individuals due to their participation in groups (Portes, 1998). Bourdieu's interest in social capital was in relation to cultural capital (how refined or genteel an individual was) and its role in the creation of economic capital (Portes, 1998). Bourdieu defined cultural capital as familiarity with the dominant culture in a society, especially the ability to use "educated" language - in other words, sophistication or genteelness (Sullivan, 2001). In general, higher social classes possessed higher cultural capital (Sullivan, 2001). Bourdieu further argued that judgements of taste were related to social position; those with higher cultural capital were more likely to determine what constitutes taste within society whereas those with lower social capital accepted this taste. Taste refers to an individual's personal and cultural patterns of choice and preferences in things such as styles,

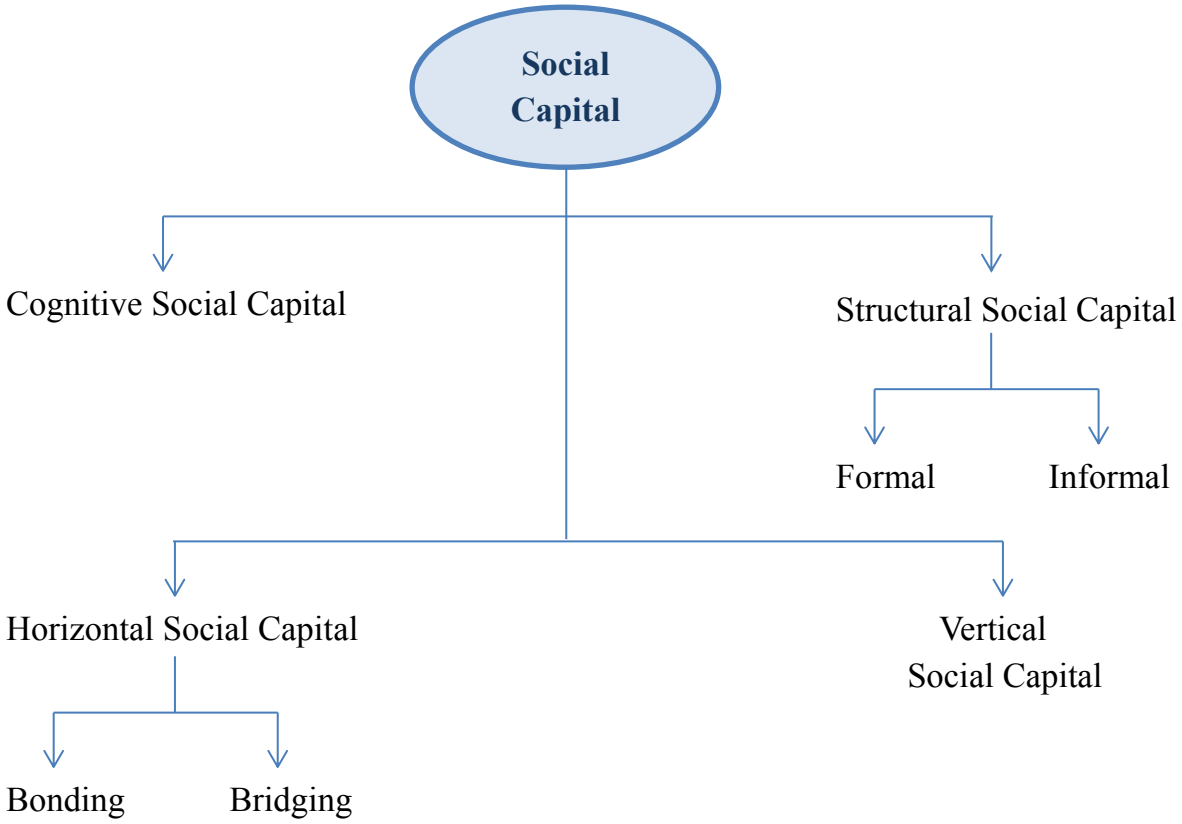
manners, consumer goods and art; in other words, taste is the judgement of what is beautiful, good and proper. In summary, Bourdieu asserted that those in higher social classes determined societal tastes and had greater cultural capital which increased their economic capital by facilitating direct access to economic resources (Bourdieu, 1984; Portes, 1998).

Unfortunately, as Bourdieu's work was originally written and published in French, it went relatively unnoticed by the English-speaking world for some time (Portes, 1998). In particular, Bourdieu's work failed to appear in James S. Coleman's influential analysis of social capital, despite similarities between the approaches of thee two authors. Coleman's somewhat vague definition of social capital was that it was "some aspect of social structures [that] facilitate certain action of actors – whether persons or corporate actors – within the structure" (Coleman, 1988). As with Bourdieu, Coleman was motivated by an interest in economics when conceptualizing social capital; Coleman used social capital as a way of giving a more collective social face to rational choice theory – a meta-predictive model of how things work (Gauntlett, 2011). Coleman argued that social capital was a resource that could be available to an individual but not owned. For example, a parent living on a street where they had neighbours they could rely upon for baby-sitting would have more social capital than those who lived on a street where there was less trust or bonding between neighbours (Gauntlett, 2011). Coleman was particularly interested by the fact that social capital led to the creation of human capital; for example, social capital, e.g. relationships within members of a family, could lead to improved self-confidence or self-identity – aspects of human capital (Gauntlett, 2011).

Although Bourdieu and Coleman are well known for their early contributions, Robert Putnam is currently the most prominent theorist of social capital. Putnam's definition of social capital is widely accepted and states that social capital "refers to features of social organization

such as trust, norms and networks that can improve the efficiency of society by facilitating coordinated actions" (Putnam et al., 1993). However when social capital has been conceptualized through a health lens, its definition has been slightly adapted to be the features of social organization such as trust, social networks and civic engagement that facilitate cooperation for mutual benefit (Kawachi et al., 1997; OECD, 2001). These are commonly seen as characteristics of societies or communities that affect the health of their members.

Figure 2: Dichotomies of social capital (Adapted from Uphoff and Wijayaratna, 2000; Harpham, 2008).



To further explore social capital, several dichotomies have been suggested (Figure 2). First, social capital can be either "structural" or "cognitive" (Uphoff and Wijayaratna, 2000). Structural social capital is the roles, rules, procedures, precedents and social networks that facilitate mutually beneficial collective action (2000); it refers to what people *do* (Harpham,

2008). Cognitive social capital is the norms, values, attitudes and beliefs that are conducive for mutually beneficial collective action (Uphoff and Wijayaratna, 2000); it refers to what people *feel* (Harpham, 2008). Therefore structural social capital is seen as external and objective, whereas, cognitive social capital is internal and subjective (Uphoff and Wijayaratna, 2000).

Structural social capital can be further divided into "formal" or "informal" networks (Harpham, 2008). Formal networks are groups related to politics, education, employment including trade union, faith or religion, sports, hobbies, well-being and finance or other clubs (Harpham, 2008). Informal networks include ties to family in the household, family outside the household, friends, neighbours and co-workers (Harpham, 2008).

Social capital can also be delineated into horizontal or vertical social capital. Horizontal social capital is the ties between individuals or groups of similar or equal status; vertical social capital is the relations between individuals of different power or resource bases (Islam et al., 2006). Horizontal social capital can also be dichotomized into bonding or bridging social capital. Bonding social capital refers to the ties between family members, neighbors and close friends (Cullen and Whiteford, 2001). Bridging social capital refers to the weak ties that link individuals from different ethnic and occupational backgrounds (2001). A summary of the dichotomies of social capital is presented in Table 2 including examples of measures for the different types of social capital.

Table 2: Summary of social capital dichotomies with example measures

Type of Social Capital	Definition	Examples of Social Capital Measures
Structural	Roles, rules, procedures, precedents and social networks that facilitate mutually beneficial collective action	Social contact with relatives, friends, and new people, frequency of contact with friends, volunteerism, frequency of civic engagement, etc.
Formal network	Groups related to politics, education, employment, etc.	Volunteerism, frequency of civic engagement, etc.
Informal network	Social ties to family, friends, neighbours, etc.	Social contact with relatives, friends, and new people, frequency of contact with friends, etc.
Cognitive	Norms, values, attitudes and beliefs that are conducive for mutually beneficial collective action	Trust, etc.
Horizontal	Relations between individuals/groups of similar or equal status	Position generator (highest and lowest accessed prestige), etc.
Bonding	Ties between family members, neighbours and close friends	Social contact with relatives, friends, and new people, frequency of contact with friends, etc.
Bridging	Weak ties that link individuals from different ethnic and occupational backgrounds	Social contact with new people, etc.
Vertical	Relations between individuals of different power or resource bases	Position generator (highest and lowest accessed prestige), etc.

2.3.2 The Relationship between Social Capital and Health

The relationship between social capital and health was perhaps first described in the seminal work by Emile Durkheim who identified a relationship between an individual's degree of social integration in a society and their risk for suicide (Durkheim, 1970). Since then,

empirical evidence from more than 140 independent studies has shown that social relationships significantly predict mortality (Holt-Lunstad et al., 2010). Similarly, social isolation and perceived loneliness have been correlated with high rates of all-cause mortality (McClintock et al., 2005). Lower levels of social trust are related to higher incidence of coronary heart disease, malignant neoplasms and infant mortality (Kawachi et al., 1997). Loss of social capital has even been shown to alter the methylation of specific oncogenes and their promoters to increase the probability of cancer development (McClintock et al., 2005). The exact mechanisms behind how social capital can contribute to the development of disease are unknown, although several have been suggested (Kawachi et al., 1999; Zhao et al., 2010).

The first mechanism that could explain the role of social capital in population health can be deemed "social pressure" or "influence"; social relationships are important for encouraging or indirectly modeling healthy behaviors (Kawachi et al., 1999; Putnam, 2000; Berkman and Glass, 2000; Holt-Lunstad et al., 2010). For example, an Australian study found that women with higher degrees of social participation, and therefore more social capital, were more likely to engage in any leisure-time physical activity (Ball et al., 2010). It was postulated that these women were more likely to have companions with whom to exercise, increased social support for an active lifestyle and greater exposure to health promotion and modeling of healthier behaviors (Ball et al., 2010). Social capital may also act to constrain negative health behaviors. For example, social capital's influence on teenage sexual risk has been hypothesized to be a function of the role-model behavior of adults within the adolescents' social network (Crosby et al., 2003).

The second proposed mechanism by which social capital may influence health is via knowledge transmission and exchange (Kawachi et al., 1999; Berkman and Glass, 2000; Rocco,

2012). Individuals with extensive social networks are more likely to access information about diseases, treatment options, and the best health care services and providers (Kawachi et al., 1999; Berkman and Glass, 2000; d'Hombres et al., 2010; Rocco, 2012).

Third, evidence has shown that social capital, in the form of community support networks and informal social support services, is an important determinant of longevity and quality of life (Berkman and Glass, 2000; Putnam, 2000; Lochner et al., 2003). Informal social support services like babysitting, running errands or cooking meals for neighbors, friends and family members can all have positive health outcomes (Rocco, 2012). Social capital can also be a source of emotional support which may even serve as a psychological triggering mechanism which can stimulate an individual's immune system to help fight disease and stress (Berkman and Glass, 2000; Putnam, 2000).

The final hypothesized mechanism suggests that large socially cohesive groups can better lobby public authorities to obtain health infrastructure and other health-promoting goods and services like recreational spaces, green space areas and commercial stores (Rocco, 2012; Lochner et al., 2003). Increased availability of these amenities can facilitate a person's ability to engage in healthy behaviors like buying fresh foods (Lochner et al., 2003)

2.2.3 Rationale for Social Capital as a Mediating Factor

How then, might social capital mediate the relationship between ethnicity and health? There is very little literature on this question. Theorists have proposed that social capital may be an attribute that persists across generations and geography and that as a result, some ethnocultural groups have more or less "civic qualities" (Johnston and Soroka, 2001). Alternatively, others have suggested that disparities in social capital across ethnic groups may be attributable to the differential importance certain cultures place on community and/or family

orientations compared to others (Prus and Lin, 2005). For example, in a qualitative study that interviewed 25 African-Caribbean residents of a south England town, informants cited close family ties as a key tenet of African-Caribbean identity and commented on their ability to rely on family members for all forms of social support (Campbell, 2002). In the same study, interviewees perceived their own families to be stronger and with higher levels of loyalty and support than that of their white English counterparts (2002). Conversely, these same informants "spoke of a culture of solidarity that existed amongst Asian people [and how] they believed that African-Caribbean people lacked the cohesive and group-minded nature of their Asian counterparts on a number of levels" (2002). A similar study also postulated that the composition of social networks, in terms of number and characteristics of contacts, could differ by ethnicity and that there may be ethnic differences in the way in which individuals interact and relate with those members of their social network (Lewis and Noguchi, 2009). Noh and Avison (1996) conducted a longitudinal study of Korean immigrants to Canada and found that ethnic social support can be a psychological resource that can dampen the effects of stressors. At this point, it is unknown whether quantitative differences in social capital exist across ethnic groups.

2.2.4 Measuring Social Capital

Social capital has been measured in several studies however its relatively recent emergence coupled with the absence of a standardized operational definition has resulted in an expansive list of social capital measures.

Overall civic participation and civic engagement has often been used to measure social capital (Chavez et al., 2004; Hyyppä and Maki, 2001; Lindstrom, 2004; Smith and Polanyi, 2003; Veenstra, 2000; Ziersch et al., 2005). Specifically, involvement with voluntary associations (Hyyppä and Maki, 2003; Veenstra, 2005), religious involvement (Helliwell and

Putnam, 2004; Hyyppä and Maki, 2003), and involvement in hobby club activity (Carlson, 2004; Hyyppä and Maki, 2003; Sundquist et al., 2004) have been used as proxy measures of social capital. Trust and reciprocity are also major measurement indicators of social capital (Carlson, 2004; Chavez et al., 2004; Hyyppä and Maki, 2001; Hyyppä and Maki, 2003; Lindstrom, 2004; Pollack and Knesebeck, 2004; Rose, 2000; Smith and Polanyi, 2003; Veenstra, 2000; Ziersch et al., 2005). Social networks or ties (Helliwell and Putnam, 2004; Hyyppä and Maki, 2001; Hyyppä and Maki, 2003; Rose, 2000; Sundquist et al., 2004; Ziersch et al., 2005) and social support (Chavez et al., 2004; Hyyppä and Maki, 2001; Liukkonen et al., 2004; Rose, 2000) has been used. Several studies have also combined one or more measures into a single comprehensive social capital index (Sundquist et al., 2004; Veenstra, 2000; Veenstra, 2002; Veenstra et al., 2005; NQF Composite Framework and Measures, 2009).

However, as health researchers have largely adopted the definition of social capital as features of social organization such as trust, social networks and civic engagement that facilitate cooperation for mutual benefit, appropriate proxies for social capital should measure some aspect of these features (Kawachi et al., 1997; OECD, 2001).

2.2.4.1 Measuring Social Capital through Trust

Trust has been used as a proxy measure for social capital in several studies, though it has been measured in different ways and with varying results.

Carlson (2004) measured social capital by asking respondents in 18 European countries whether or not they could trust other people or not; Carlson found that trust in people reduced the odds of poor self-rated health. Trust was measured by a question that asked respondents whether "most people can be trusted" or if you "can't be too careful" (Carlson, 2004). A study using data from cross-sectional household surveys identified six common social capital components, of

which feelings of trust and reciprocity was the only component that significantly related to self-reported health and significantly contributed to explaining the health variance (Chavez et al., 2004). Pollack and Kneseback (2004) measured trust by asking respondents to rate their level of agreement on a five-point Likert scale (strongly agree to strongly disagree) to the statement "I can trust most people in my neighbourhood." In both US and German samples, lack of trust was a strong predictor of poor self-rated health. Similarly, Lindstrom (2004) measured generalised trust by asking respondents if "Generally, You can trust other people." Responses were dichotomised into low trust ("Do not agree at all" and "Do not agree") and high trust ("Agree" and "Completely agree"). Respondents with low trust had significantly higher odds ratios of poor self-reported health than respondents with high trust. In a study by Smith and Polanyi (2003), the measure of trust was also dichotomised by asking respondents to choose which of the following statements best described their feelings: "generally most people can be trusted" or "you can't be too careful in dealing with people."

The aforementioned studies all used single measures of trust in their analysis. However, Hyppa and Maki (2001) assessed mistrust by asking respondents: (1) "Generally speaking, would you say most people can be trusted?" and (2) Do you think most people would try to take advantage of you if they got a chance?" Although mistrust was not significantly related to self-reported health, it approached significance for women. Finally, Veenstra (2000) created a social capital index that in part measured trust (in government, neighbours, people from respondents' communities, people from respondents' part of Saskatchewan, and people in general) and found that social capital was significantly related to self-rated health among the elderly, but not in the general population. The majority of studies that have measured trust as a proxy for social capital

have used a single question for assessment and typically dichotomised the responses into low or high trust.

2.2.4.2 Measuring Social Capital through Social Networks

Social networks are amenable to being quantified in different ways. Some have used simple, one-dimensional questions. Bolin and colleagues (2003) measured whether the respondent had a close friend outside the home or not and found that social capital had a positive effect on self-assessed health, for example.

Another measure of social networks is their size; social network size refers to the number of individuals with whom a person maintains different types of relationships (Franke, 2005). In a study that looked at Finnish versus Swedish speakers, social networks were measured by asking respondents about their number of friends, local friends and "auxiliary friends" (friends who are always available if the respondent needs help) (Hyppa and Maki, 2001). This study found that the number of auxiliary friends was significantly, positively, and independently related to self-rated health (Hyppa and Maki, 2001).

Social networks can also be measured in terms of relational properties such as frequency, intensity and proximity. Relational frequency is a measure of the number and duration of contacts amongst members of a social network (how many times two individuals or two groups have contact and for how long). For example, Sundquist and colleagues (2004) measured whether respondents socialized with neighbours at least once every three months. Relational intensity is a measure of the strength of intrapersonal or intra-organizational ties; narratively, the relational intensity between best friends should be stronger than that between two casual acquaintances. A study measuring the strength of family, neighbourhood, religious and community ties found that each of the types of ties was associated with life satisfaction,

happiness and self-assessed health (Helliwell and Putnam, 2004). Finally, relational or spatial proximity measures face-to-face contact between members of a social network (Franke, 2005).

Social network density refers to the interconnectedness amongst members of network; it is a measure of the characteristics of the members of a social network rather than the network itself (Franke, 2005). Network density is a measure of the heterogeneity or homogeneity of the members within a social network. For example, Moore (1990) gauged social capital by measuring the relative composition (proportion of kin, number of kin types and number of non-kin types) of a respondents' social network.

An alternative method for assessing social capital via social ties is using a "position generator". The position generator was first used in 1975 and stipulates that individual social capital can be measured by quantifying ones' social network based on the occupations of the members within that social network (Lin and Dumin, 1986; Lin et al., 2001; Van der Gaag et al., 2004). Typically, respondents are presented with a predetermined list of occupations (positions) and asked to indicate whether or not they know someone in each occupation on the list (Lin et al., 2001; Van der Gaag et al., 2004). A positive response is assigned a value based on the occupation (which varies by the scale used) and a negative response is given a value of zero. The position generator is a useful tool for measuring social capital because the logic and theoretical rigor of the instrument allows for it to be applied to a diversity of populations and allows for comparison between different populations (Van der Gaag et al., 2004). However one limitation of the position generator is that is ignores occupations that are not traditionally associated with prestige, such as homemakers and students, resulting in underestimations of social capital (Van der Gaag et al., 2004).

There are several social capital indicators that can be derived from the position generator instrument. Highest accessed prestige, range in accessed prestige and number of different positions accessed have remained largely standardised and are the most often used measures (Van der Gaag et al., 2004). Other indicators include lowest accessed prestige, average accessed prestige, and total accessed prestige.

Highest accessed prestige refers to specific social resource quality (Lin, 2001; Van der Gaag et al., 2004). Lin (2001) supposed that higher prestige positions resulted in more social capital for an individual because they are more likely to provide access to resources (Van der Gaag et al., 2004). Lowest accessed prestige is a very similar construct and supposes that knowing someone in a low prestige position or occupation does not result in much social capital for an individual (refuted (Van der Gaag et al., 2004). Average accessed prestige is calculated by finding the mean prestige value of all the positions a respondent says they know (Campbell et al., 1986). Total accessed prestige is measure of social capital volume and is calculated by summing the prestige values for all the positions a respondent says they know (Hsung and Hwang, 1992; Lin, 1999; Van der Gaag et al., 2004).

As previously mentioned, the values assigned to a position are dependent on the scale used. Furthermore, different scales are comprised of different sets of occupations. Table 3 provides a summary of for measures that have been used in combination with the position generator instrument (Bakker et al., 1997; Goyder and Frank, 2007; Lin and Dumin, 1986; Lin et al., 2001; Van der Gaag et al., 2004).

Van der Gaag and colleagues' (2004) study using the position generator coded occupations using the 1992 standard classification for occupations of the Dutch Central Bureau of Statistics and linked them to Sixma and Ultee's 1992 occupational prestige measures (Bakker

et al., 1997). Goyder and Frank (2007) developed their scale of occupational prestige based on the Human Resources Development Canada's National Occupational Classification (NOC) scheme. There are 26 NOC major groups and respondents of the *Occupational Prestige in Canada: 2005* survey were asked to rank the types of occupation according to their social standing; responses to this prompt were quantified into a prestige score (Goyder and Frank, 2007). Similar ranking methodologies were used to develop Duncan's Socioeconomic Index (Duncan, 1961) and the measure using in Lin and Colleagues (2001) study of occupational presige.

Goyder and Frank's scale was developed to measure occupational prestige in Canada. The scale also uses the NOC major groups for coding that allows for greater flexibility when assigning prestige scores to occupations in Canadian surveys like the General Social Survey. Goyder and Frank's measures of occupational prestige is also the most recently developed, relevant and appropriate of the aforementioned scales as shown in Table 3 (2007).

Table 3: Occupational Status Classification Schemes and Prestige Scores.

Reference	*Scale*	*Occupation or Group*	*Prestige Score*
Bakker et al., 1997; Van der Gaag et al., 2004	Sixma and Ultee's 1992 occupational prestige measures	Police officer	54
		Cook	39
		Unskilled labourer	15
		Manager	67
		Information technologist	68
		Engineer	76
		Farmer	36
		Nurse	44
		Cleaner	20
		Book-keeper/accountant	52
		Musician/artist/writer	45
		Lorry driver	26
		Teacher	62
Duncan, 1961; Lin and Dumin, 1986	Duncan's Socioeconomic Index	Waiter/Bartender	17
		Laborer	7.9
		Manager	75.1
		Office Machine Operator	45
		Skilled worker	44
		Guard/watchman	18.02
		Engineer	86.9
		Janitor/porter	12.7
		Teacher	44.2
		Machinist	21
		Lawyer	92.3
		Department Head	70.6
		Small business owner	62.0
		Union official	59.8
		Insurance Agent	66.0
		Secretary	61.9
		Salesman	49.4
		Office Clerk	44.0
		Foreman	49.7
		Mechanic/Repairman	27.0
Lin et al., 2001	Prestige Score	Police	40
		Housemaid, cleaning worker	22
		Office workman/guard	26
		Owner of small factory/firm	48
		Nurse	54
		Truck driver	31
		Electrician	36
		Physician	78
		Lawyer	73
		Owner of large factory/firm	70
		Assemblymen/women	69
		High school teacher	60
		Division head	55
		Reporter	55

Table 3: Continued.

Goyder and Frank, 2007	Occupational Prestige in Canada: 2005	Senior Management Occupations	77.1
		Middle and Other Management Occupations	65.7
		Professional Occupations in Business and Finance	71.7
		Skilled Administration and Business Occupations	66.8
		Clerical Occupations	56.7
		Professional Occupations in Natural and Applied Sciences	76.6
		Technical Occupations Related to Natural and Applied Sciences	74.8
		Professional Occupations in Health	80.9
		Technical and Skilled Occupations in Health	78.0
		Assisting Occupations in Support of Health Services	71.8
		Professional Occupations in Social Science, Education, Government Services and Religion	77.5
		Paraprofessional Occupations in Law, Social Services, Education and Religion	69.8
		Professional Occupations in Art and Culture	69.2
		Technical and Skilled Occupations in Art, Culture, Recreation and Sport	66.6
		Skilled Sales and Service Occupations	62.0
		Intermediate Sales and Service Occupations	57.8
		Elemental Sales and Service Occupations	52.3
		Trades and Skilled Transport and Equipment Operators	64.9
		Intermediate Occupations in Transport, Equipment, Operators, Installation and Maintenance	62.4
		Trades Helpers, Construction Labourers and Related Occupations	58.2
		Skilled Occupations in Primary Industry	66.7
		Intermediate Occupations in Primary Industry	54.8
		Labourers in Primary Industry	52.8
		Processing, Manufacturing and Utilities Supervisors and Skilled Operators	64.0
		Processing and Manufacturing Machine Operators and Assemblers	57.2
		Labourers in Processing, Manufacturing and Utilities	54.1

2.2.4.3 Measuring Social Capital through Civic Engagement or Participation

Civic engagement or civic participation has typically been measured via membership in organisations or activities, though the types of organisations or activities vary.

In a study of 18 European countries, civic participation was measured by asking respondents whether they were active in any voluntary organisations (Carlson, 2004). This study found that for men, organizational activity reduced the odds of less than good health (Carlson, 2004).

In a study comparing Finnish and Swedish speakers, civic engagement was assessed by asking respondents about "their participation in cultural clubs (signing in a choir, acting in a theatre group, dancing in a dancing club, playing a music band, participating in a writers' club, in a film or video club, or others), attendance at various cultural, religious, political sports, recreational, work-related and community events, attendance at summer music festivals and art exhibitions and memberships in a variety of voluntary associations (sports, political, social, fraternal, local, religious, education-related, recreational, work-related and community organizations)" (Hyppa and Maki, 2001). However, in this study, civic engagement did not predict self-rated health (Hyppa and Maki, 2001).

Lindstrom (2004) took a similar approach and asked participants "whether in the previous 12 months they had been involved in any of the following activities: study circle/course at workplace, other study circle/course, union meeting, meeting of other organisations, theatre/cinema, arts exhibition, church, sports event, letter to the editor of a newspaper/journal, demonstration, night club/entertainment, large gathering of relatives, private party." These 13 items formed a civic participation index on which respondents were dichotomised into low participation (engaged in three or less activities) or high participation (engaged in four or more

activities) (Lindstrom, 2004). This study found that participants with low social participation had higher odds ratios for lower self-reported health compared to participants with high social participation (Lindstrom, 2004).

Pollack and Knesebeck (2004) assessed civic participation by whether individuals attended a church, charity group, sports club, self-help group, or other local activity at least once a month. In the US sample, lack of civic participation was significantly associated with self-rated health only when controlling for age and gender but this association disappeared after controlling for socioeconomic status and other covariates (Pollack and Knesebeck, 2004). However, in the German sample, civic participation was positively and significantly associated with self-rated health even after controlling for all of the covariates.

In a study by Veenstra and colleagues (2005), a social capital index was created to focus on the breadth and depth of involvement of a respondent in voluntary associations. The minimum score on this index was zero (no groups were mentioned) and the maximum was six. Study results showed that greater participation in voluntary associations was positively associated with measures of health after controlling for age, gender and neighborhood of residence (though not significant).

Frequency of participation in civic activities has also been used as a proxy measure for social capital. In one survey, respondents were asked to rate their membership in nine different organisations as “active,” “non-active,” or “non-member” (Smith and Polanyi, 2003). Respondents were then grouped into one of three categories: (1) active member of two or more organisations, (2) active member of one organisation, or (3) not an active member of any organisations (Smith and Polanyi, 2003). Furthermore, one of the indices the Saguaro Seminar’s *Social Capital Community Benchmark Survey* uses to measure social capital is associational

involvement; this index measures the frequency of participation in formal groups (The Saguaro Seminar, 2013). Frequency and intensity of civic participation has also been used to measure social capital in several other surveys in the United Kingdom (Harper, 2002). Civic participation, and in particular, frequency of civic participation, has been shown to be a good measure of social capital.

2.3 Confounding variables

Previous studies of social capital and health suggest that several sociodemographic variables may confound a relationship between social capital and health. These include gender, age, immigration status, household income, education, length of residence in local community urban versus rural geography, activity limitation, and marital status.

2.3.1 Gender

Gender may be a potential confounding variable when investigating the role of social capital in ethnic differences in health as the effects of social capital, access to social capital, and composition of social networks vary by gender.

Studies have found that the effect of social participation on health was greater for women compared to men (Cheng et al., 2000; Lee et al., 2008). In addition, access to social capital also appears to vary by gender. Women, for example, may be at risk for social isolation due to childrearing and family responsibilities (Cheng et al., 2000). However, another study found that a significantly larger proportion of women had bonding and bridging social compared to men ($p \leq 0.05$) (Anucha et al., 2006).

There also appears to be structural and organizational differences in the social networks of males compared to females (Moore, 1990; Szell and Thurner, 2013). For example, one study

found an organizational difference in the composition of social networks by gender; women tend to show homophily, the tendency to associate with others who possess similar attributes, whereas males tend to show heterophily (Szell and Thurner, 2013). Similarly, studies found that women had social networks with greater links to kin and fewer links to non-kin when compared to those of males (Fischer and Oliker, 1983; Wellman, 1985; Marsden, 1987). Unsurprisingly, females also tend to reciprocate friendships more and invest more effort into these relationships than males (Szell and Thurner, 2013). Males tend to have better connected communication partners than females meaning that the communication partners of males had more communication partners than the communication partners of females (Szell and Thurner, 2013). Accordingly, males also had social networks with greater ties to coworkers (Fischer and Oliker, 1983; Wellman, 1985; Marsden, 1987).

There are conflicting views in the literature regarding the size of men's and women's social networks. A study by Szell and Thurner (2013) found that on average, the females in their study had social networks that were 15% larger than those of their male counterparts. Other studies have found no difference in the size of social networks by gender (Fischer, 1982; Marsden, 1987).

Although social capital appears to differ by gender, self-rated health is similar for Canadian men and women; in 2011 60% of men and women rated their health as excellent or very good and 12% of women rated their health as being fair or poor compared to 11% of men (Statistics Canada, 2012).

2.3.2 Age

Age may also be a potential confounding variable in attempts to measure the influence of social capital, access to social capital and overall health. The effect of social capital on an

individual's health varies by age. One study found that the influence of social participation on self-rated good health increased with age; this influence was particularly evident for adults aged 65 or over (Lee et al., 2008).Van Willigen (2000) found that the effect of volunteering on self-rated health was more than 2.5 times greater for elderly volunteers compared to younger volunteers. Ziersch and colleagues also found that age was negatively associated with physical health (2005).

Access to social capital may also decrease with age. In general, the number of opportunities to participate in social activities is lower for older adults compared to younger adults (Lee et al., 2008). Similarly, social participation decreases significantly with age (Derosiers et al., 2004).

Finally, self-rated health varies by age; self-rated excellent of very good health decreases with age whereas self-rated fair or poor health increases with age, as shown in Table 4 (Statistics Canada, 2012). Similarly, immigrants in older age groups are more likely to rate their health status as being fair or poor (Zhao et al., 2010).

Table 4: Self-rated health by age group in Canada in 2011.

Age	**Self-rated health**	
(years)	Excellent, very good or good	Fair or poor
12 to 19	68%	6%
20 to 34	69%	6%
35 to 44	65%	8%
45 to 64	56%	14%
65+	43%	23%

Source: Canadian Community Health Survey, 2011 (Statistics Canada, 2012)

2.3.3 Immigration Status

Controlling for immigrant status or the number of years spent in Canada is important when examining ethnic differences in health. In Canada, there is evidence for the "healthy immigrant effect" whereby recent immigrants are generally healthier than the Canadian born population (Dunn and Dyck, 2000; Pérez, 2002; Beiser, 2005; De Maio and Kemp, 2010; Zhao et al., 2010) which is partly attributable to a self-selection process and Canadian immigration policies (Laroche, 2000; Oxman-Martinez et al., 2000; Hyman, 2004; De Maio and Kemp, 2010). One study found that recent immigrants are less likely than the Canadian-born population to have chronic diseases or disabilities (Dunn and Dyck, 2000). However, as time progresses, the health of immigrants converges with that of the general Canadian population as measured by the prevalence of chronic conditions, life expectancy, health expectancy, and disability and dependency (Chen et al., 1996; Pérez, 2002). Immigration to Canada is also associated with unhealthy weight gain (McDonald and Kennedy, 2005) and increased rates of depression (Ali et al., 2004). Similar trends have been documented in Australia (Donovan et al., 1992) and the United States (Stephen et al., 1994).

Social capital is also a major determinant of immigrant health, especially in the initial years after landing (van Kemenade et al., 2006; Zhao, 2007; Zhao et al., 2010). Recent immigrants who reported having monthly social interactions with family and friends are less likely to transition to poor health compared to those who reported having less than monthly social interactions based on data from the Longitudinal Survey of Immigrants to Canada (LSIC) (Newbold, 2009). Another study using the LSIC had similar results; immigrants who had frequent interactions with friends had a decreased risk of a decline in health status (Zhao, 2007). A study by van Kemenade and colleagues (2006) using the General Social Survey found a

positive association between immigrants' self-reported health and the size of networks of strong ties and with the number of ties with organization. The same study found that immigrant women were more likely to report being in good health if they had at least one reciprocal support relationship (van Kemenade et al., 2006). Finally, van Kemenade and colleagues (2006) found that immigrant men, who volunteered in the year before the survey, were more likely to report good health when compared to their non-volunteering counterparts. Therefore, it is important to control for immigration and the length of residence in Canada, in studies of the effects of social capital and health.

2.3.4 Household Income

Several studies have demonstrated the inverse graded relationship between income and health; furthermore, as one's income increases, in general, there is an associated change in health for the better (Kitagawa and Hauser, 1973; Blaxter, 1987; Haan, 1987; Marmot et al., 1987; Goldblatt, 1990; Pappas et al., 1993; Mackenbach, 1993; Lahelma et al., 1994). For example, Ziersch and colleagues found that income is positively associated with physical health (2005).

The relationship between income and social capital is less clear. It is hypothesized that the that the growing income gap between the rich and the poor has led to lower levels of social capital, and in particular, social cohesion and trust (Wilkinson, 1994; Kaplan et al., 1996; Kennedy et al., 1996; Kawachi et al., 1997). Conversely, a study in rural Tanzania found that social capital significantly increased household income (Narayan and Pritchett, 1997). Intuitively, lower income may also limit access to social capital by preventing opportunities to engage in formal social networks such as sports or hobby clubs that have associated fees. Therefore, household income should be controlled for during analysis of social capital and ethnic differences in health.

2.3.5 Education

There is a well-established positive association between education and health (Ross and Wu, 1995; Ziersch et al., 2005). A study by Ross and Wu (1995) offers three theoretical explanations for the association. First, individuals with higher levels of education are more likely to be employed and therefore have higher incomes than individuals with lower levels of education (Ross and Wu, 1995). Another explanation may be that individuals who are well-educated may have a higher sense of mastery (Pearlin et al., 1981; Mirowsky and Ross, 1989; Ross and Wu, 1995) as well as greater social support, both of which can decrease mortality (Eckenrode, 1983; House et al., 1988; Ross and Mirowsky, 1989). Finally, individuals with higher levels of education may lead healthier lifestyles as they are more likely to exercise and choose nutritious and healthy foods.

Education is an important predictor of social capital. Higher levels of education have been positively associated with political and social engagement (Helliwell and Putnam, 2007). Education may also lead to larger social networks or the enrichment of existing ones (Desjardins and Schuller, 2007).

2.3.6 Length of residence in local community

Although length of residence has not been directly linked to health outcomes, a person living in a community for only a short period of time will have less social capital as they may not be aware of opportunities for civic participation or have trust in or know anyone in the community (Grootaert et al., 1999). Hyman and Wright (1971) and Haezewindt (2003) independently found that length of residence in a community motivated or permitted greater civic participation. Length of residence in a community has also been shown to have mixed impacts on neighbourhood social ties and trust (Hampton and Wellman, 2003). Another study

found that the proportion of people who were satisfied with their relatives network and friendship network increased with length of residence in a community (Haezewindt, 2003).

2.3.7 Urban versus rural location

It is important to control for urban versus rural geography because of its confounding effect on health, social capital and the relationship between health and social capital.

It is well established in Canadian literature that there is a health disparity between urban and rural residents; rural residents have a lower health status (DSP, 2004; Herbert, 2007; Kondro, 2006; PHAC, 2003; PHAC, 2006). Rural Canadians engage in less healthy behaviours and dietary practices, and are less physically active on average (Herbert, 2007; Kondro, 2006). Rural residents also have shorter life expectancies compared to their urban counterparts (Kondro, 2006; PHAC, 2006).

Urban versus rural residence can also impact social capital. One study found that people living in rural areas had significantly higher levels of social capital than urban dwellers and argued that people living in communities with smaller populations "cannot help but meet most or all of those around them, whether these people are similar to them or not, while people in more urban areas [do not]" (Erickson, 2004). Higher levels of networks and civic participation were found in rural versus urban areas (Ziersch et al., 2009). In particular, one study found that rural people were more likely to have done some volunteer work (Statistics Canada, 2005). Rural residents reported having a greater sense of community belonging which may foster greater social ties and trust (PHAC, 2006; Statistics Canada, 2005).

Finally, social capital and its relationship to health can vary by urban versus rural area (Ziersch et al., 2009; Nummela et al., 2007). For example, one study found that although social

capital was associated with good mental health for urban and rural participants, social capital was only associated with good physical health in urban participants (Ziersch et al., 2009).

2.3.8 Activity limitation

Activity limitation as a function of health status can affect some aspects of social capital. Studies have shown that civic or social participation may be restricted by activity limitations (Adamson et al., 2003; Lee et al., 2008). One study also found that chronic diseases of ageing were associated with reduced social participation (Adamson et al., 2003). Activity limitation with regard to mobility may also limit opportunities for civic engagement or social contact with friends or relatives. Therefore activity of functional limitation is an important covariate to include for analysis of the relationship between social capital and ethnic differences in health.

2.3.9 Marital Status

Marital status is a widely used covariate in studies of social capital and health because of its potentially confounding effects (Carlson, 2004; Hyppa and Maki, 2001; Smith and Polanyi, 2003; Veenstra, 2000).

Married people have lower rates of mortality and morbidity than unmarried people; of the unmarried, divorced people have the highest rates (Koskenvuo et al., 1986; Kotler and Wingard, 1989; Morgan, 1980; Trovato and Lauris, 1989; Wyke and Ford, 1992). There are several explanations for the relationship between marital status and health. The first is that marital status is dependent on health because disabled or less healthy people are not as likely to get married as healthy people, or if they do marry, more likely to get divorced (Wyke and Ford, 1992). Alternatively, health may depend on marital status; married people have greater resources (two incomes versus one), may be less vulnerable to the effects of stress, engage in healthier

behaviours, and have access to greater social support (Trovato and Lauris, 1989; Wyke and Ford, 1992).

Marital status can affect and individuals' social capital. Compared to married or cohabitating couples, trust was significantly lower for divorced and unmarried people (Lindstrom, 2009). Social network size can also differ significantly by marital status (Hill and Dunbar, 2002). For example, one study found that a divorced persons' social network was around 60% of the size it was when that person was married (Rands, 1988). Social participation also declines following separation or divorce (Albrecht, 1980; Milardo, 1987; White, 1979). Finally, Hetherington and colleagues (1977) also found that divorced women had fewer friends and less civic participation than their married counterparts.

Because of its potentially confounding effects, marital status will be an important variable to control for in analyses.

In summary, gender, age, immigration status, household income, education, length of residence in local community, urban versus rural geography, activity limitation and marital status will all be controlled for to mitigate the confounding effects of these variables.

Chapter 3: Methods

Statisticsal analyses of the *2008 General Social Survey* (GSS), accessed on-site at the South-Western Ontario Research Data Centre[1], was used to investigate the three research questions stated in Chapter 1:

1. Is there an association between ethnicity and self-rated health? Do different ethnic groups have different probabilities of having good or better self-rated health?
2. Is there an association between social capital, measured by social networks, civic engagement and trust, and the probability of having good self-rated health?
3. Are some of the ethnic differences in self-rated health accounted for by differences in social capital? Does social capital mediate the relationship between ethnicity and self-rated health?

The following chapter describes the content and design of that survey, the general analysis plan, and the specific procedures used.

3.1 2008 General Social Survey

Statistics Canada's *2008 General Social Survey* (*GSS*) is Cycle 22 of the General Social Survey program and was chosen because of its focus on social capital. The *GSS* collects information from persons 15 years of age and older in Canada to inform social policy issues. The *GSS* is comprised of eight sections including: social networks, civic participation, and well-being. Survey estimates were weighted at the person level to ensure that the *GSS* sample was representative of the target population, including those without telephones (Statistics Canada, 2010).

[1] The data for these analyses were provided by Statistics Canada. Statistics Canada takes no responsibility for the analyses or the conclusions drawn.

3.1.1 Sample

The target population for the *GSS* was all persons aged 15 years and older in Canada excluding residents of the territories, those living on First Nations reserves, or full-time residents of institutions (Statistics Canada, 2010). The total sample size of the *GSS* was 20,401. The target population was geographically divided into strata and sampling was done based on minimum sample sizes required to ensure low sampling variability and precision for certain estimates (Statistics Canada, 2010). Furthermore, bootstrap weights were used to calculate more precise estimates of the sampling variability to assess the quality of the survey estimates (Statistics Canada, 2014). Bootstrapping exploits the idea that *the population is to the sample as the sample is to the bootstrap samples* (Fox, 2015). In other words, bootstrapping treats the sample as the population and repeatedly samples from it. In particular, the balanced repeated replication (BRR) method with a Fay adjustment was chosen to calculate the mean bootstrap variance estimates in this study (Statistics Canada, 2014). The standard BRR method of estimating variances divides the sample in each stratum into half-samples; the weights of one half-sample are increased by 100% while the weights of the other half-sample are decreased to zero (Judkins, 1990). This method can be problematic however as replicate estimates may be undefined due to division by zero (Judkins, 1990). The BRR method using Fay adjustment increases the weights of one half-sample by a Fay adjustment factor and decreases the weights of the other half-sample by that same factor to avoid division by zero and calculate appropriate mean bootstrap variance estimates (Judkins, 1990). Bootstrapping was used in this study because the sample was complex with stratification and clustering, resulting in design effects. Bootstrapping does not require distributional assumptions (such as normally distributed errors) and can be applied to statistics with sampling distributions that are hard to derive (Fox, 2015).

3.1.2 Data Collection

Data were collected in five waves from February to November 2008 using computer assisted telephone interviewing. One survey respondent was selected per household and households were selected via a randomly generated list of phone numbers. Respondents were interviewed in their language of choice and proxy interviews were not permitted.

3.1.3 Measurements

The 2008 GSS collected data for a wide variety of variables. The variables of interest include self-reported health, ethnicity and several social capital variables. In addition, the 2008 GSS collected data for several control variables that are important for our present research questions. A full list of variables can be found in Table 7.

3.1.3.1 Dependent Variable

The dependent variable was self-reported general health. We use this as a measure of overall health, rather than focussing on specific health outcomes. Numerous longitudinal studies have shown a strong relationship between self-rated health and mortality (Idler and Benyamini, 1997), indicating that it has sufficient validity for our purposes. The question asked on the 2008 GSS was "In general, would you say your health is:" and possible responses were "excellent," "very good," "good," "fair," and "poor." Respondents could also answer "don't know" or with a refusal however these respondents were excluded from statistical analyses. Also, for the purposes of analyses, self-reported general health was coded as dichotomous (excellent/very good/good versus fair/poor).

3.1.3.2 Key Independent Variable: Ethnicity

Ethnicity was captured by the 2008 GSS by asking respondents "The following question is about your ethnic ancestry, heritage or background. What were the ethnic or cultural origins of your ancestors?" Interviewers were instructed not to probe or provide examples. If a respondent listed more than one ethnic or cultural background (to a maximum of six), each response was recorded uniquely. For example, if a respondents' ancestors were Ukrainian and Chinese, the ethnic origins of that respondent were recorded as "Ukrainian" and "Chinese" (two responses) not "Ukrainian and Chinese" (one response).

For statistical analyses, seven possible response categories were used: Canadian only, British Isles origin (English, Scottish, Irish, or Other combinations of the 3), French only, Aboriginal only, Other European (German, Italian, Ukrainian, Dutch, Polish, Portuguese, Jewish, Other combinations of the 7), Chinese only and South Asian only; all other responses were excluded from analyses. With the exception of Aboriginal only, the ethnicities chosen for inclusion in this study were the six most common single response ethnic groups identified on the survey; these ethnicities were also consistent with the most common single ethnic origin responses identified in the 2011 National Household Survey (as shown in Table 1). The Aboriginal only ethnic group was included in the study because of the large body of evidence indicating that Aboriginal Canadians suffer from poorer health outcomes as compared to the rest of the population (Young et al., 1999; Trovato, 2001; Wu and Schimmele, 2005; Kobayashi et al., 2008). Finally, the "Canadian only" was chosen as the reference category because it was the highest frequency category and allowed for the best conceptualization of whether differences in social capital could explain ethnic health differences in Canada.

Contextually, it is important to note that the measurement of ethnicity and its categories has changed over time in reflection of Canada's changing immigration patterns and the increasing diversity (Statistics Canada, 2008). For example, prior to 1981, "Black" was not listed as an ethnic origin, it was added in 1986, and then replaced by more specific ethnic origins like "Haitian" and "Jamaican" in 1996 (Statistics Canada, 2002). The question itself has also undergone several changes including to its wording and accompanying instructions (Statistics Canada, 2008).

3.1.3.2 Key Independent Variable: Social Capital

In total, seven measures of social capital were used for analyses. We selected measures that capture several of the social capital constructs discussed in Chapter 3.

Social contact with relatives was measured by asking "How many relatives do you have who you feel close to, (that is, who you feel at ease with, can talk about what is on your mind, or call on for help)?" Respondents could answer with any number from 0 to 200, "Don't know" or refuse to answer. This social capital variable was recoded as a categorical variable with three possible responses: 0-9, 10-19, and 20-200.

Similarly, social contact with friends was measured by asking "How many close friends do you have, (that is, people who are not your relatives, but who you feel at ease with, can talk to about what is on your mind, or call on for help)?" Respondents could answer with any number from 0 to 200, "Don't know" or refuse to answer. Again, the social capital variable was recoded three possible responses: 0-9, 10-19, and 20-200.

To measure frequency of social contact with friends, respondents were asked, "Thinking of all your friends: in the past month, how often did you see any of your friends?" The response

categories were: "Every day," "A few times a week," "Once a week," "2 or 3 times a month," "Once a month," or "Not in the past month."

Social contact with new people was measured by the question: "In the past month, how many new people did you meet outside of work or school, that is people who you hadn't met before and who you intend to stay in contact with?" The available response categories were: "None," "1 or 2," "3 to 5," "6 to 10," "11 to 20," or "More than 20;" this was recoded so that the last three categories were collapsed into "6 or more."

Volunteerism was captured in the GSS by two questions. The first asked, "In the past 12 months, did you do unpaid volunteer work for any organization?" Respondents could answer "Yes" or "No." For those respondents who answered "Yes" a follow-up question was asked regarding the frequency of volunteerism: "On average, about how many hours per month did you volunteer?" Possible responses were: "Over 15 hours per month," "5 to 15 hours per month," "1 to 4 hours per month," and "Less than 1 hour per month." For analyses, a fifth response category of "Does not volunteer" was added to the frequency of volunteerism question to capture respondents who answered "No" in the first question.

The GSS measured civic engagement by asking respondents a series of questions regarding their involvement in specific types of group activities and meetings. For example, respondents were asked "In the past 12 months, were you a member or participant in a union or professional association?" They were also asked about their involvement with: a political party or group, a sport or recreational organization, a cultural, educational or hobby organization, a religious-affiliated group, a school group, neighbourhood, civic or community association, a service club or fraternal organization, or any other type of organization not mentioned. Respondents who answered "Yes" to any of the previous questions were asked "Altogether,

about how often did you participate in group activities and meetings?" Possible responses were: "At least once a week," "A few times a month," "Once a month," "Once or twice a year," and "Not in the past year." An additional response category, "Does not participate in group activities" was added to capture respondents who were not asked the follow-up question as they answered "No" to all of the specific civic engagement questions.

We used a "position generator" technique, similar to those developed by Goyder and Frank, discussed in Chapter 3, to measure connectedness to positions with different levels of social status (2007). The position generator measures were based on a module in the GSS that began with the interviewer stating: "I will now ask you whether you know people in certain kinds of work. You do not have to know these people really well, but you should know them by name and by sight and well enough to talk to." The occupations inquired about in the GSS position generator are: "social workers", "police officers or fire-fighters", "food or beverage servers", "labourers in landscaping or grounds maintenance", "managers in sales, marketing or advertising", "computer programmers", "instructors or leaders in recreation and sport", "security guards", "engineers", "farmers", "nurses", "janitors or caretakers", "accountants or auditors", "graphic designers or illustrators", "delivery or courier drivers", "early childhood educators or assistants", "sewing machine operators", or "carpenters." Each occupation was assigned an occupational prestige value based on the Canadian National Occupational Classification (NOC) groups (Table 5) (Statistics Canada, 2001). The assigned prestige values came from Goyder and Frank (2007); this scale was chosen because it uses the NOC major groups for coding which allowed for greater flexibility when assigning prestige scores and because of its recency and relevancy (2007).

For each of the eighteen occupations respondents were asked, “Do you know any women [occupation]?” and “Do you know any men [occupation]?” Respondents could answer “Yes,” or “No.” If a respondent answered “Yes” to knowing someone in an occupation (regardless of gender), their response was assigned a value of “1.” If a respondent answered “No” to both questions asked about an occupation, their response was assigned a value of “0.” This was done for each occupation; that assigned value was then multiplied by its associated prestige value (as in Table 5) to create 18 new occupational prestige variables. For example, if a respondent answered “Yes” to knowing a female engineer, a male engineer, or both, the occupational prestige variable for “Engineer” would have a value of 76.6; if the respondent knew neither a female engineer nor a male engineer, the occupational prestige variable for “Engineer” would have a value of 0. These occupational prestige variables were used to calculate several position generator measures: highest value position accessed, lowest value position accessed, number of different positions accessed, and average accessed prestige. Consider a respondent who answers “Yes” to knowing an engineer (76.6), security guard (57.8), farmer (65.7), and carpenter (64.9). Table 6 summarizes each of the position generator measures and how each measure is calculated.

Table 5: Occupation prestige value based on Canadian National Occupational Classification

GSS Occupation	Corresponding NOC group	Occupational Prestige Value
Social workers	Professional Occupations in Social Science, Education, Government Services and Religion	77.5
Police officers or fire-fighters	Professional Occupations in Social Science, Education, Government Services and Religion	77.5
Food or beverage servers	Elemental Sales and Service Occupations	52.3
Labourers in landscaping or grounds maintenance	Labourers in Primary Industry	52.8
Managers in sales, marketing or advertising	Middle and Other Management Occupations	65.7
Computer programmers	Professional Occupations in Natural and Applied Sciences	76.6
Instructors or leaders in recreation and sport	Technical and Skilled Occupations in Art, Culture, Recreation and Sport	66.6
Security guards	Intermediate Sales and Service Occupations	57.8
Engineers	Professional Occupations in Natural and Applied Sciences	76.6
Farmers	Middle and Other Management Occupations	65.7
Nurses	Professional Occupations in Health	80.9
Janitors or caretakers	Elemental Sales and Service Occupations	52.3
Accountants or auditors	Professional Occupations in Business and Finance	71.7
Graphic designers or illustrators	Technical and Skilled Occupations in Art, Culture, Recreation and Sport	66.6
Delivery or courier drivers	Intermediate Occupations in Transport, Equipment, Operators, Installation and Maintenance	62.4
Early childhood educators or assistants	Paraprofessional Occupations in Law, Social Services, Education and Religion	69.8
Sewing machine operators	Processing and Manufacturing Machine Operators and Assemblers	57.2
Carpenters	Trades and Skilled Transport and Equipment Operators	64.9

Table 6: Summary of position generator measures and how each measure is calculated

Position Generator Measure	How measure is calculated	Sample calculations for respondent (knowing an engineer, security guard, farmer and carpenter)
1. Highest value position accessed	Maximum occupational prestige value of the occupations for which a respondent knows someone	Of the occupations the respondent knows, the maximum occupational prestige value is 76.6. Therefore, the highest accessed prestige is 76.6.
2. Lowest value position accessed	Minimum occupational prestige value of the occupations for which a respondent knows someone	Of the occupations the respondent knows, the maximum occupational prestige value is 57.8. Therefore, the lowest accessed prestige is 57.8.
3. Number of different positions accessed	Count of the positions to which respondents said they knew someone	The respondent knows people from 4 different occupations. Therefore, the number of different positions accessed is 4.
4. Average accessed prestige	Sum of the accessed prestige divided by the number of different positions accessed	Average accessed prestige = (76.6+57.8+65.7+64.9)/4 = 66.25

3.1.3.3 Control Variables

As presented in the previous chapter, a review of the existing literature was conducted to identify potential confounders of self-rated health or social capital. The variables controlled for in analyses were: age, gender, education, marital status, household income, length of residence in local community, urban versus rural, immigration status/age of respondent when immigrated, and activity limitations. Reference categories were chosen based on ease of interpretation; the lowest value category was used for reference e.g. for social contact with relatives, “0-9” was chosen as the reference category and indicated by an asterisk in Table 7.

Table 7: Response and Predictor Variables

Variable	Response Categories
Self-rated Health	• Fair/poor* • Excellent/very good/good
Ethnicity	• Canadian only* • British Isles origin (English, Scottish, Irish, Other combinations of the 3) • French only • Aboriginal only • Other European (German, Italian, Ukrainian, Dutch, Polish, Portuguese, Jewish, Other combinations of the 7) • Chinese only • South Asian only
Social Capital Measures	
1. Social Contact with Relatives	• 0-9* • 10-19 • 20-200
2. Social Contact with Friends	• 0-9* • 10-19 • 20-200
3. Frequency of Contact with Friends	• Less than once a month* • 2 or 3 times a month • Once a week • A few times a week • Every day
4. Social Contact with New People	• None* • 1 or 2 • 3 to 5 • More than 6
5. Volunteerism	• Does not volunteer* • Less than 1 hour per month • 1 to 4 hours per month • 5 to 15 hours per month • Over 15 hours per month
6. Frequency of Civic Engagement	• Does not participate in group activities* • Not in the past year • Once or twice a year • Once a month • A few times a month • At least once a week

Table 7: Continued.

Variable	Response Categories
7. Position Generator – Number of Positions Accessed	• 0* • 1 to 3 • 4 to 7 • 8 to 10 • 11 to 14 • 15 to 18
8. Position Generator – Highest Value Position Accessed	• 0* • Less than 65 • 65 to less than 70 • 71.7 • 76.6 • 77.5 • 80.9
9. Position Generator – Lowest Value Position Accessed	• 0 • 52.3
10. Position Generator – Average Accessed Prestige	• Less than 6 • 6 to less than 10 • 10 to less than 15 • 15 to less than 20 • 20 to less than 25 • 25 to less than 30 • 30 to less than 40 • 40 to less than 70
Control Variables	
Age	• 15-34* • 35-44 • 45-54 • 55-64 • 65 years and over
Gender	• Male* • Female
Education	• Some secondary/elementary/no schooling* • High school diploma • Some university/community college • Diploma/certificate from community college or trade/technical • Doctorate/masters/bachelor's degree
Marital Status	• Single* • Separated or Divorced • Widowed

Table 7: Continued.

Variable	Response Categories
	• Married or living common-law
Household Income	• Less than $10,000* • $10,000 to $19,999 • $20,000 to $29,999 • $30,000 to $39,999 • $50,000 to $59,999 • $60,000 to $79,999 • $80,000 to $99,999 • $100,000 or more
Length of residence in local Community	• Less than 5 years* • 5 years to less than 10 years • 10 years and over
Urban versus Rural	• Large Urban Centre (CMA/CA)* • Rural or Small Town (non-CMA/CA) and PEI
Immigration Status/ Age of respondent when immigrated	• Canadian citizen by birth* • 0 to 14 • 15 to 29 • 30 to 49 • 50-94
Activity Limitations	• Yes • No*

3.1.4 Statistical Analysis

Whether social capital is mediating the association between ethnicity and health amongst Canadians was assessed using the 2008 GSS. Binary logistic regression analysis was performed using Statistical Analysis System (SAS), Version 9.3. Descriptive sample characteristics were obtained using frequency procedures. Chi-square tests were also performed to assess bivariate associations. Six key models were created and are summarized in Table 8. Model 1 was created as a base model and includes ethnicity and all of the control variables. Model 2 was created to measure the effect of social networks on ethnic differences in health and added the social contact with relatives, social contact with friends, frequency of contact with friends, and social contact

with new people variables to the base model. Model 3 measured the effect of civic engagement by adding volunteerism and frequency of civic engagement to the base model. Model 4 measured trust by adding it to the base model. Finally, Models 5 and 6 were created by adding the position generator variables, number of positions accessed and highest value position accessed, to the base model respectively.

Binary logistic regression was used to investigate the relationship between ethnicity, social capital and health. It is important to note that if social capital was mediating the relationship between ethnicity and health, the effect of ethnicity on health would lessen in the model containing social capital i.e. the effect of ethnicity on health would be higher in the null model and lower in the model containing social capital (Mackinnon et al., 2000). Therefore, to test for mediation, z-scores were calculated for the coefficients of each ethnicity in the null model and for each coefficient of ethnicity in Models 2-6. For example, a z-score was calculated for the coefficient of French ethnicity in the null model and for the coefficient of French ethnicity in Model 2; the z-scores were then compared for significant difference. This was done for every ethnicity and for Models 3, 4, 5, and 6, respectively. A statistically significant difference in the effect of ethnicity on health after the addition of social capital variables to the model would suggest mediation.

Table 8: Summary of Models for Regression Analysis

Model	Variable Type	Variables Included
1	Base model	• Ethnicity • All control variables
2	Social networks	• Ethnicity • All Control variables • Social contact with relatives • Social contact with friends • Frequency of contact with friends • Social contact with new people
3	Civic engagement	• Ethnicity • All control variables • Volunteerism • Frequency of civic engagement
4	Trust	• Ethnicity • All control variables • Trust
5	Position Generator – Number	• Ethnicity • All control variables • Number of positions accessed
6	Position Generator – Highest value	• Ethnicity • All control variables • Highest value position accessed

Model fit characteristics -2logL, AIC and the C-statistic are reported. The -2logL values were used to conduct likelihood ratio tests to compare nested models and determine which model was a better fit (Kleinbaum and Klein, 2010). The likelihood ratio test was performed by subtracting the -2logL value of a model from the –2logL of the null model (Model 1). The difference in -2logL values is assumed to have a chi-square distribution and can determine the significance of the improvement in model fit as a result of the added social capital variable(s) (Kleinbaum and Klein, 2010). AIC, or the Akaike Information Criterion, is a widely used model selection tool that allows for comparison between two non-nested models (Cavanaugh, 2012). Of two models, the optimal fitted model will have a lower AIC value (Cavanaugh, 2012). Finally, the C-statistic was used to test whether a model's probability of predicting an outcome is better

than chance (Hosmer and Lemeshow, 2000). The C-statistic can range in value from 0.5 (model is no better than chance at predicting the outcome) to 1 (the model is better than chance at predicting the outcome) (Hosmer and Lemeshow, 2000). Models with C-statistics of 0.8 or greater are considered to strongly predict outcomes better than chance (Hosmer and Lemeshow, 2000).

Chapter 4: Results

This chapter begins by presenting the sample characteristics and a brief discussion of missing cases. Included in the sample characteristics are the bivariate associations for ethnicity and self-reported health, the distribution characteristics of the position generator measures, the means for the position generator measures by ethnicity and the correlations between the position generator measures. Next, the binary logistic regression models are presented to investigate the relationship between ethnicity, social capital and health.

4.1 Sample Characteristics

The 2008 GSS surveyed a total of 20, 401 respondents. Only respondents who were of Canadian, British Isles, French, Aboriginal, European, Chinese or South Asian ethnic ancestry were included in analyses resulting in the exclusion of 7, 518 respondents. Respondents who answered "Don't know" or refused to answer even one of the relevant survey questions were excluded; the percentage of missing cases by ethnicity for these respondents is presented in Table 9. Due to insufficient cell sample size and Statistics Canada's disclosure guidelines, several values could not be presented; in addition, several variables were not included in Table 9 as there were no missing cases. It is important to note that respondents of Chinese or South Asian ethnic origin, respectively, are overrepresented in the percentage of missing cases for the three social capital variables for which data could be presented.

After deleting missing cases, the data from 9, 908 respondents were analyzed. Table 10 presents the sample characteristics and the bivariate association with self-reported health; Table 11 shows the bivariate association with ethnicity[2].

[2] Note: The sample size for the variables (except trust) in Table 10 and 11 is 9, 858 resulting from Statistic Canada's residual disclosure rules (previously released tables prevented new output from being released). However, the sample size for the rest of the study including the binary logistic regression was 9, 908.

Table 9: Distribution of missing cases

	Ethnicity							
	Canadian %	British Isles origin %	French %	Aboriginal %	Other European %	Chinese %	South Asian %	Sample %
Covariates								
Education	--	--	--	--	--	--	--	0.91
Length of residence in local community	--	--	--	--	--	--	--	1.47
Activity Limitations	--	--	--	--	--	--	--	0.63
Immigration Status	--	--	--	--	--	--	--	1.86
Social Capital Measures								
Social Contact with Relatives	1.00	1.32	1.02	2.23	1.37	5.26	4.80	1.71
Social Contact with Friends	--	--	--	--	--	--	--	1.15
Frequency of Contact with Friends	4.06	2.59	2.20	1.96	3.05	8.24	4.48	3.16
Social Contact with New People	--	--	--	--	--	--	--	0.86
Volunteerism	--	--	--	--	--	--	--	0.57
Frequency of Civic Engagement	--	--	--	--	--	--	--	0.19
Trusts People	1.37	1.95	1.28	1.40	1.94	4.40	3.20	3.26

Note: The percentage of missing cases by ethnicity could not be presented for several variables above (indicated by "--") due to insufficient cell size; however, the percentage of missing cases for the entire sample is presented. There were no missing cases for the following variables: general health, household income, gender, age, marital status, urban/rural status, number of positions accessed, and highest position accessed.

Table 10: Characteristics of Sample and Bivariate Associations with Self-Reported Health

	N	%	Self-Reported Health		P-value
			% Good	% Poor	
Self-rated Health					
Excellent/very good/good	8456	85.78	…	…	…
Fair/poor	1402	14.22	…	…	
Ethnicity					**<0.001**
Canadian	1199	12.16	87.08	12.92	
British Isles origin	3917	39.73	87.03	12.97	
French	1607	16.30	86.97	13.03	
Aboriginal	285	2.89	73.72	26.28	
Other European	1964	19.92	84.79	15.21	
Chinese	469	4.76	81.34	18.66	
South Asian	417	4.23	83.72	16.28	
Gender					0.266
Male	5108	51.82	86.16	13.84	
Female	4750	48.18	85.38	14.62	
Age					**<0.001**
15-34	2820	26.61	90.57	9.43	
35-44	1903	19.31	89.95	10.05	
45-54	2119	21.50	85.34	14.66	
55-64	1564	15.87	82.00	18.00	
65 years and over	1451	14.72	75.74	24.26	
Marital Status					**<0.001**
Single	1985	20.13	86.95	13.05	
Separated or Divorced	637	6.46	78.38	21.62	
Widowed	374	3.79	74.35	25.65	
Married or living common-law	6863	69.62	86.75	13.25	
Education					**<0.001**
Some secondary/elementary/no schooling	1505	15.26	75.33	24.67	
High school diploma	1288	13.07	85.19	14.81	
Some university/community college	1381	14.01	84.66	15.34	
Diploma/certificate from community college or trade/technical	2864	29.06	86.10	13.90	
Doctorate/masters/bachelor's degree	2820	28.60	91.85	8.15	

			Self-Reported Health		
	N	%	% Good	% Poor	P-value
Household Income					**<0.001**
Less than $10,000	148	1.50	63.80	36.20	
$10,000 to $19,999	497	5.04	65.23	34.77	
$20,000 to $29,999	685	6.95	74.52	25.48	
$30,000 to $39,999	855	8.68	79.53	20.47	
$40,000 to $49,999	847	8.59	82.08	17.92	
$50,000 to $59,999	1068	10.83	86.51	13.49	
$60,000 to $79,999	1565	15.88	89.12	10.88	
$80,000 to $99,999	1260	12.78	90.55	9.45	
$100,000 or more	2933	29.75	91.80	8.20	
Length of residence in local community					**<0.001**
Less than 5 years	1645	16.68	89.77	10.23	
5 years to less than 10 years	1203	12.20	89.24	10.76	
10 years and over	7010	71.11	84.26	15.74	
Urban/Rural					**0.027**
Large Urban Centre (CMA/CA)	7919	80.33	86.17	13.83	
Rural or Small Town (non-CMA/CA) and PEI	1939	19.67	84.21	15.79	
Immigrant Status/Age of respondent when immigrated					**<0.001**
Canadian citizen by birth	8125	82.42	86.53	13.47	
0 to 14	159	1.61	95.04	4.96	
15 to 29	244	2.47	89.64	10.36	
30 to 49	324	3.29	79.85	20.15	
50-94	1006	10.21	79.27	20.73	
Activity Limitations					
Yes	3315	33.62	67.98	32.02	**<0.001**
No	6543	66.38	94.80	5.20	
Social Capital Measures					
Social Contact with Relatives					**<0.001**
0-9	7354	74.60	84.89	15.11	
10-19	1798	18.24	89.57	10.43	
20-200	706	7.16	85.45	14.55	

			Self-Reported Health		
	N	%	% Good	% Poor	P-value
Social Contact with Friends					**0.032**
0-9	7944	80.59	85.47	14.53	
10-19	1437	14.58	87.95	12.05	
20-200	477	4.84	84.41	15.59	
Frequency of Contact with Friends					**<0.001**
Less than once a month	1536	15.58	81.65	18.35	
2 or 3 times a month	1783	18.08	85.92	14.08	
Once a week	1942	19.70	86.01	13.99	
A few times a week	2888	29.29	87.29	12.71	
Every day	1709	17.34	86.55	13.45	
Social Contact with New People					**0.003**
None	6216	63.05	84.80	15.20	
1 or 2	1879	19.06	87.17	12.83	
3 to 5	1077	10.92	87.38	12.62	
More than 6	687	6.97	88.39	11.61	
Volunteerism					**<0.001**
Does not volunteer	5736	58.18	83.99	16.01	
Less than 1 hour per month	445	4.52	87.94	12.06	
1 to 4 hours per month	1393	14.13	89.28	10.72	
5 to 15 hours per month	1463	14.84	90.58	9.42	
Over 15 hours per month	822	8.33	82.65	17.35	
Frequency of Civic Engagement					**<0.001**
Does not participate in group activities	2957	29.99	80.59	19.41	
Not in the past year	649	6.59	86.40	13.60	
Once or twice a year	1417	14.37	88.08	11.92	
Once a month	1430	14.51	87.13	12.87	
A few times a month	1215	12.33	89.07	10.93	
At least once a week	2190	22.22	88.43	11.57	
Trusts People					**<0.001**
No	4906	49.51	82.40	17.60	
Yes	5002	50.49	88.95	11.05	

			Self-Reported Health		
	N	%	% Good	% Poor	P-value
Position Generator – Number of Positions Accessed					**<0.001**
0	941	9.55	76.61	23.39	
1 to 3	3314	33.62	84.31	15.69	
4 to 7	3758	38.12	88.47	11.53	
8 to 10	1230	12.47	88.22	11.78	
11 to 18	616	6.25	86.45	13.55	
Position Generator – Highest Value Position Accessed					**<0.001**
0	941	9.55	76.61	23.39	
Less than 65	363	3.68	81.52	18.48	
65 to less than 70	1057	10.73	86.67	13.33	
71.7	731	7.42	84.87	15.13	
76.6	1472	14.93	88.13	11.87	
77.5	1946	19.74	88.51	11.49	
80.9	3347	33.95	86.12	13.88	

Note: N was rounded to the nearest whole number. Significance was assessed using chi-square test of independence of the independent variables and self-reported health. Significant p-values ($p<0.05$) are bolded.

Table 11: Bivariate Associations with Ethnicity

	Ethnicity							
	Canadian %	British Isles origin %	French %	Aboriginal %	Other European %	Chinese %	South Asian %	P-value
Gender								**0.042**
Male	11.44	39.18	16.80	2.93	19.95	5.12	4.59	
Female	12.93	40.33	15.77	2.86	19.89	4.38	3.84	
Age								**<0.001**
15-34	13.21	34.26	14.00	4.06	21.54	6.05	6.88	
35-44	12.25	37.46	14.63	3.47	19.47	6.32	6.40	
45-54	12.71	40.03	17.80	2.71	19.94	4.50	2.31	
55-64	10.52	45.55	18.87	2.15	17.88	3.03	2.01	
65 years and over	10.97	46.67	17.98	0.96	19.54	2.46	1.43	
Marital Status								**<0.001**
Single	12.85	33.97	15.05	3.96	20.76	7.47	5.93	
Separated or Divorced	12.24	40.83	18.04	4.28	20.97	1.79	1.86	
Widowed	10.59	50.76	16.12	1.36	17.37	2.19	1.61	
Married or living common-law	12.04	40.70	16.51	2.54	19.72	4.40	4.10	
Education								**<0.001**
Some secondary/elementary/no schooling	20.11	32.31	18.44	5.12	18.29	2.02	3.72	
High school diploma	13.91	42.25	15.38	3.08	18.52	3.57	3.29	
Some university/community college	10.63	43.22	12.63	2.91	22.14	4.13	4.34	
Diploma/certificate from community college or trade/technical	11.88	42.26	16.13	3.48	20.36	3.17	2.73	
Doctorate/masters/bachelor’s degree	8.15	38.28	17.55	1.02	19.90	8.70	6.40	

	Ethnicity							
	Canadian %	British Isles origin %	French %	Aboriginal %	Other European %	Chinese %	South Asian %	P-value
Household Income								**<0.001**
Less than $10,000	11.77	32.53	11.69	7.36	16.41	7.74	12.49	
$10,000 to $19,999	17.84	31.93	16.34	8.08	16.38	4.71	4.73	
$20,000 to $29,999	13.94	38.77	18.24	5.29	16.90	3.14	3.72	
$30,000 to $39,999	13.59	35.34	18.52	5.12	18.22	5.88	3.34	
$40,000 to $49,999	17.15	36.16	18.30	1.95	18.93	3.70	3.81	
$50,000 to $59,999	13.70	39.16	16.38	3.18	16.93	6.32	4.32	
$60,000 to $79,999	12.87	40.30	16.33	1.88	20.12	4.40	4.11	
$80,000 to $99,999	10.58	40.61	16.27	2.95	20.34	4.55	4.70	
$100,000 or more	8.68	43.49	14.81	1.27	22.99	4.70	4.06	
Length of residence in local community								**<0.001**
Less than 5 years	12.10	39.04	14.71	3.85	18.14	4.86	7.30	
5 years to less than 10 years	10.88	36.74	17.34	2.14	18.33	6.89	7.69	
10 years and over	12.39	40.41	16.49	2.80	20.62	4.37	2.92	
Activity Limitations								**<0.001**
Yes	10.88	42.46	16.93	3.61	20.04	2.46	3.61	
No	12.81	38.35	15.98	2.53	19.86	5.93	4.54	
Social Capital Measures								
Social Contact with Relatives								**<0.001**
0-9	12.83	38.61	16.87	2.77	18.96	5.68	4.28	
10-19	10.73	44.55	15.62	2.88	20.61	2.19	3.41	
20-200	8.79	39.22	12.10	4.16	28.15	1.80	5.79	

	Ethnicity							
	Canadian %	British Isles origin %	French %	Aboriginal %	Other European %	Chinese %	South Asian %	P-value
Social Contact with Friends								**<0.001**
0-9	12.60	38.44	17.21	2.88	19.50	5.08	4.29	
10-19	10.68	44.97	14.04	2.61	20.80	3.20	3.71	
20-200	9.30	45.49	7.91	3.98	24.38	4.10	4.85	
Frequency of Contact with Friends								**<0.001**
Less than once a month	11.84	33.35	16.35	3.54	21.03	7.79	6.09	
2 or 3 times a month	12.65	37.96	17.55	2.48	20.91	4.49	3.95	
Once a week	11.96	39.86	15.03	2.46	20.98	5.72	3.98	
A few times a week	12.26	42.45	17.27	2.73	18.23	3.54	3.52	
Every day	12.00	42.57	14.75	3.50	19.55	3.30	4.33	
Social Contact with New People								**<0.001**
None	13.41	38.40	18.37	2.64	18.84	4.86	3.48	
1 or 2	11.11	41.28	14.00	2.65	22.82	4.00	4.13	
3 to 5	8.92	40.71	12.17	4.44	22.48	5.22	6.07	
More than 6	8.77	46.04	10.35	3.46	17.81	5.20	8.37	
Volunteerism								**<0.001**
Does not volunteer	14.54	34.09	18.62	3.16	19.58	5.56	4.44	
Less than 1 hour per month	11.31	36.25	17.67	2.55	20.34	7.11	4.78	
1 to 4 hours per month	8.40	48.95	12.93	2.34	20.81	3.70	2.87	
5 to 15 hours per month	8.00	49.58	12.19	2.58	20.39	3.39	3.86	
Over 15 hours per month	9.74	47.89	12.34	2.73	19.73	2.16	5.40	

	Ethnicity							
	Canadian %	British Isles origin %	French %	Aboriginal %	Other European %	Chinese %	South Asian %	P-value
Frequency of Civic Engagement								**<0.001**
Does not participate in group activities	15.33	33.12	17.64	3.39	18.25	6.94	5.34	
Not in the past year	16.53	34.97	21.40	3.74	18.75	2.42	2.18	
Once or twice a year	12.02	38.95	19.30	2.78	19.10	4.39	3.47	
Once a month	10.33	43.47	14.90	2.30	21.45	2.72	4.84	
A few times a month	8.75	43.28	14.14	2.97	21.98	3.85	5.03	
At least once a week	9.76	46.18	13.15	2.40	20.92	4.59	2.99	
Trusts People								**<0.001**
No	15.05	34.11	19.49	3.88	18.52	4.05	4.90	
Yes	9.21	45.00	13.08	1.94	21.67	5.26	3.84	
Position Generator – Highest Value Position Accessed								**<0.001**
0	19.45	30.93	18.22	2.39	15.82	6.94	6.25	
Less than 65	12.95	35.67	18.92	4.05	17.41	5.25	5.76	
65 to less than 70	14.58	37.12	14.30	2.73	23.80	3.65	3.82	
71.7	11.35	41.86	14.45	2.30	19.51	4.86	5.67	
76.6	8.41	35.71	14.53	1.23	21.17	11.27	7.69	
77.5	10.24	47.04	15.01	3.37	19.90	2.45	1.98	
80.9	12.20	40.53	18.04	3.55	19.67	2.91	3.10	

Note: N was rounded to the nearest whole number. The bivariate associations for number of positions accessed, immigration status and, urban versus rural were not presented due to insufficient cell sample size. Significant p-values ($p<0.05$) are bolded.

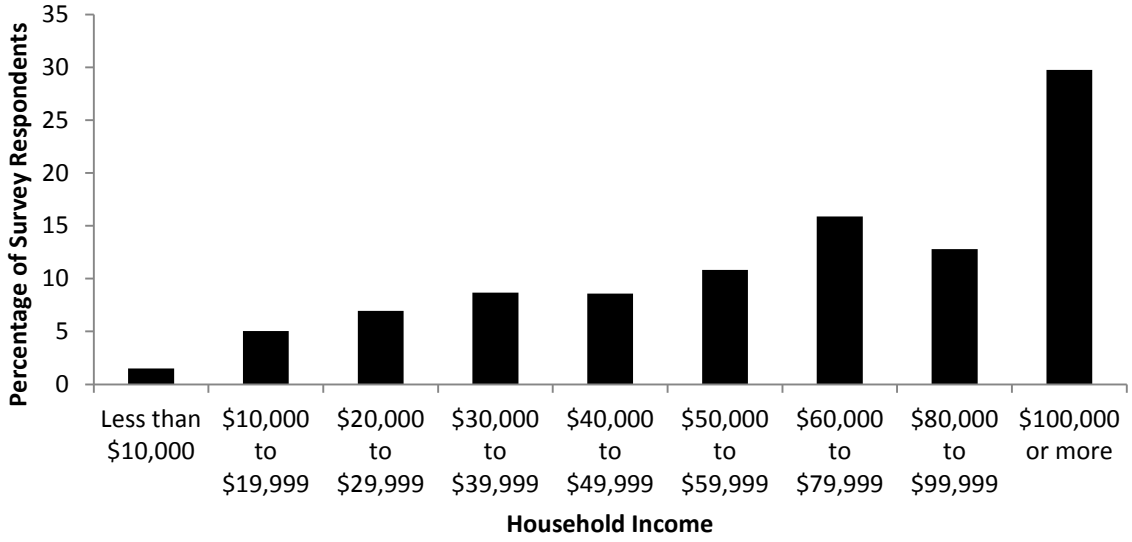
4.1.1 Descriptives

We first examine the proportion of the sample reporting "good" or "poor" self-rated health, the main dependent variable. Overall, respondents were more likely to report having good or better self-rated health; 86% of respondents reported good health compared to the 14% that reported poor health (Table 10). However 67% of the sample reported having a condition or health problem that limited the amount or kind of activity they could do.

As shown in Table 10, ethnic distribution of the sample was such that 40% of survey respondents reported of British Isles origin. The next largest ethnic groups that composed the sample were Europeans, not British Isles origin or French (20%), and French (16%). Comparatively, only a small proportion of the sample identified as Chinese (5%), South Asian (4%), or Aboriginal (3%). 12% of the sample identified as Canadian only.

Gender representation was fairly equal; 52% of sample survey respondents were male and 48% were female. In general, the proportion of respondents in each age bracket decreased with increasing age i.e. 27% of survey respondents were 15-34 compared to 15% who were aged 65 years and over. The majority of respondents were married or living common-law (70%) or single (20%). Overall, the sample was well-educated; 58% of respondents had completed either a university degree, or diploma or certificate program. Most respondents had resided in their local communities for 10 years or longer (70%) and lived in large urban centres (80%). 82% of the sample were Canadian citizens by birth but of the 18% of immigrants included in the study, more than half immigrated after the age of 50. Finally, the majority of the sample (30%) had total household incomes of $100, 000 or more and generally, the percentage of respondents in each income range increased with income as illustrated in Figure 3.

Figure 3: Percentage of survey respondents by household income range.



For the majority of social capital measures, most respondents belonged in the lowest social capital category i.e. 81% of respondents said they had nine or less close friends; this was true for social contact with relatives, social contact with friends, social contact with new people, volunteerism and frequency of civic engagement. However, 29% of survey respondents reported seeing or having contact with friends a few times a week compared to the 16% who saw friends less than once a month. And the sample was evenly split between those who believed in general, you can trust people and those who did not (Table 10).

The distribution of respondents for the position generator measures varied. Most respondents accessed between 1 and 7 positions (72%) and had an occupational prestige score of 80.9 for the highest accessed prestige (34%). Table 12 presents the distribution characteristics of the position generator measures. The mean highest accessed prestige for the sample was 68.73 compared to the mean lowest accessed prestige of 0.03. The average number of positions accessed by the sample was 4.6 and the mean accessed prestige was 17.07. It is important to note that the standard deviation value for each position generator measures was quite substantial.

Table 12: Distribution characteristics of position generator measures

Position Generator Measures	Minimum	Maximum	Mean	Std. Dev.	Kurtosis	Skewness
Highest Accessed Prestige	0	80.9	68.73	23.11	8.25	-2.86
Lowest Accessed Prestige	0	52.3	0.03	1.21	1856.81	42.06
Number of Positions Accessed	0	18.00	4.59	3.37	1.46	0.81
Average Accessed Prestige	0	66.38	17.07	12.48	1.37	0.79

Table 13 presents the means of each of the position generator measures by ethnicity. Respondents of British Isles origin had the highest mean values for highest accessed prestige, average accessed prestige and number of positions accessed; respondents who identified as Aboriginal or Other European had slightly lower mean values. Comparatively, respondents who identified as Canadian, French, Chinese or South Asian had much lower mean values for highest accessed prestige, average accessed prestige and number of positions accessed. The lower mean values for highest accessed prestige and average accessed prestige suggests that these ethnicities are connected to individuals in occupations of lower prestige value than respondents of British Isles origin. Similarly, the mean value of number of positions accessed for respondents of Canadian, French, Chinese and South Asian ancestry suggest that these ethnicities are connected to a less diverse network of prestige positions. Therefore, these ethnicities have less social capital as higher prestige positions and greater diversity are more likely to provide access to resources (Van der Gaag et al., 2004).

Table 13: Means of position generator measures, by ethnicity

	Position Generator Measures ((Mean ±Standard Deviation)			
Ethnicity	Highest Accessed Prestige	Lowest Accessed Prestige	Average Accessed Prestige	Number of Positions Accessed
Canadian (n=1118)	64.06 ± 28.91	0.00 ± 0.00	14.27 ± 12.37	3.84 ± 3.34
British Isles origin (n=4547)	70.52 ± 19.32	0.01 ± 0.67	18.71 ± 11.79	5.04 ± 3.18
French (n=1525)	68.09 ± 24.94	0.03 ± 1.35	15.64 ± 12.61	4.18 ± 3.40
Aboriginal (n=295)	70.11 ± 21.27	0.00 ± 0.00	17.81 ± 12.84	4.82 ± 3.48
Other European (n=1829)	70.13 ± 21.71	0.07 ± 2.04	17.90 ± 12.75	4.83 ± 3.45
Chinese (n=294)	64.93 ± 33.80	0.09 ± 2.72	14.14 ± 14.18	3.75 ± 3.80
South Asian (n=250)	64.56 ± 34.68	0.00 ± 0.00	14.14 ± 14.50	3.77 ± 3.87

Table 14 presents the correlation coefficients for the position generator measures. Variables can be interpreted as weakly correlations if the absolute value of the coefficient is less than or equal to 0.35, moderately correlated between 0.36 to 0.67, strongly correlated between 0.68 and 1.00, and very highly correlated if the coefficient is greater than or equal to 0.90 (Taylor, 1990).

Highest accessed prestige is positively correlated to each of the other position generator measures indicating that an increase in highest accessed prestige is related to an increase in the second measure (Table 14). The strength of the correlations vary; highest accessed prestige is very weakly correlated to lowest accessed prestige and moderately correlated to the number of positions accessed and average accessed position. With the exception of lowest accessed

prestige, the correlation between highest accessed prestige and the other measures is statistically significant.

Lowest accessed prestige is significantly, positively, and very weakly correlated to the number of position accessed and the average accessed prestige (Table 14).

Finally, the number of positions accessed is significantly, positively and very highly correlated to the average accessed prestige (Table 14).

Table 14: Correlations between position generator measures.

Position Generator Measures	*Highest*	*Lowest*	*Number*	*Average*
Highest Accessed Prestige	1			
Lowest Accessed Prestige	0.012	1		
Number of Positions Accessed	**0.545**	**0.092**	1	
Average Accessed Prestige	**0.555**	**0.092**	**0.997**	1

Note: Significant Pearson correlations ($p<0.001$) are bolded.

4.2 Binary Logistic Regression Models

Binary logistic regression was used to further investigate whether there was (1) an association between ethnicity and self-rated health, (2) an association between social capital and self-rated health, and (3) if some of the ethnic differences in self-rated health could be accounted for by differences in social capital.

Table 15 presents the odds ratio (OR) and 95% confidence intervals (CI) for the variables in the six models that were estimated. Statistically significant variables ($p<0.05$) are bolded. It is important to note that the models are predicting the odds of reporting poor health.

Table 15: Binary Logistic Regression Model Predicting Poor Health

	Model 1 Odds Ratios (95% CI)	Model 2 Odds Ratios (95% CI)	Model 3 Odds Ratios (95% CI)	Model 4 Odds Ratios (95% CI)	Model 5 Odds Ratios (95% CI)	Model 6 Odds Ratios (95% CI)
Ethnicity						
Canadian	1.00	1.00	1.00	1.00	1.00	1.00
	(--)	(--)	(--)	(--)	(--)	(--)
British Isles origin	1.00	1.011	1.046	1.056	1.031	1.017
	(0.789, 1.267)	(0.797, 1.284)	(0.824, 1.328)	(0.831, 1.343)	(0.810, 1.311)	(0.800, 1.294)
French	0.997	0.994	0.999	1.000	1.014	1.003
	(0.754, 1.319)	(0.751, 1.316)	(0.755, 1.323)	(0.756, 1.321)	(0.765, 1.342)	(0.757, 1.329)
Aboriginal	**1.993**	**1.981**	**2.062**	**2.008**	**2.063**	**2.034**
	(1.312, 3.025)	**(1.302, 3.014)**	**(1.356, 3.134)**	**(1.320, 3.055)**	**(1.360, 3.131)**	**(1.335, 3.098)**
Other European	**1.288**	**1.293**	**1.346**	**1.357**	**1.326**	**1.307**
	(1.008, 1.647)	**(1.010, 1.655)**	**(1.052, 1.721)**	**(1.060, 1.738)**	**(1.037, 1.696)**	**(1.021, 1.673)**
Chinese	**2.827**	**2.800**	**2.869**	**2.955**	**2.821**	**2.738**
	(1.597, 5.002)	**(1.585, 4.946)**	**(1.620, 5.082)**	**(1.674, 5.217)**	**(1.598, 4.982)**	**(1.562, 4.802)**
South Asian	**1.905**	**1.950**	**1.943**	**1.938**	**1.929**	**1.848**
	(1.077, 3.370)	**(1.108, 3.432)**	**(1.098, 3.440)**	**(1.099, 3.419)**	**(1.081, 3.442)**	**(1.035, 3.301)**
Gender						
Male	1.00	1.00	1.00	1.00	1.00	1.00
	(--)	(--)	(--)	(--)	(--)	(--)
Female	0.956	0.954	0.956	0.947	0.957	0.956
	(0.820, 1.115)	(0.817, 1.113)	(0.821, 1.114)	(0.812, 1.105)	(0.821, 1.115)	(0.819, 1.114)
Age						
15-34	1.00	1.00	1.00	1.00	1.00	1.00
	(--)	(--)	(--)	(--)	(--)	(--)
35-44	1.153	1.118	1.102	1.141	1.152	1.123
	(0.867, 1.533)	(0.840, 1.488)	(0.828, 1.467)	(0.860, 1.514)	(0.865, 1.534)	(0.845, 1.493)
45-54	**1.356**	1.311	1.304	**1.364**	**1.346**	**1.324**
	(1.032, 1.781)	(0.999, 1.721)	(0.992, 1.716)	**(1.039, 1.790)**	**(1.024, 1.769)**	**(1.009, 1.737)**
55-64	**1.424**	**1.378**	**1.396**	**1.434**	**1.400**	**1.374**
	(1.074, 1.888)	**(1.038, 1.830)**	**(1.053, 1.849)**	**(1.081, 1.901)**	**(1.054, 1.858)**	**(1.035, 1.825)**
65 years and over	1.311	1.258	1.296	**1.343**	1.254	1.252
	(0.992, 1.733)	(0.949, 1.668)	(0.982, 1.709)	**(1.015, 1.776)**	(0.947, 1.662)	(0.945, 1.658)

	Model 1 Odds Ratios (95% CI)	Model 2 Odds Ratios (95% CI)	Model 3 Odds Ratios (95% CI)	Model 4 Odds Ratios (95% CI)	Model 5 Odds Ratios (95% CI)	Model 6 Odds Ratios (95% CI)
Marital Status						
Single	1.00	1.00	1.00	1.00	1.00	1.00
	(--)	(--)	(--)	(--)	(--)	(--)
Separated or Divorced	1.037	1.023	1.035	1.027	1.028	1.030
	(0.772, 1.393)	(0.759, 1.379)	(0.770, 1.392)	(0.764, 1.381)	(0.766, 1.380)	(0.769, 1.381)
Widowed	0.847	0.845	0.846	0.848	0.836	0.833
	(0.588, 1.221)	(0.589, 1.214)	(0.588, 1.218)	(0.589, 1.222)	(0.580, 1.203)	(0.579, 1.197)
Married or living common-law	0.934	0.924	0.924	0.938	0.931	0.927
	(0.721, 1.210)	(0.711, 1.201)	(0.716, 1.193)	(0.724, 1.213)	(0.719, 1.205)	(0.718, 1.197)
Education						
Some secondary/elementary/no schooling	1.00	1.00	1.00	1.00	1.00	1.00
	(--)	(--)	(--)	(--)	(--)	(--)
High school diploma	**0.663**	**0.669**	**0.679**	**0.670**	**0.677**	**0.657**
	(0.511, 0.860)	**(0.515, 0.869)**	**(0.524, 0.881)**	**(0.517, 0.867)**	**(0.522, 0.877)**	**(0.506, 0.854)**
Some university/community college	**0.699**	**0.710**	**0.733**	**0.718**	**0.726**	**0.699**
	(0.534, 0.914)	**(0.543, 0.928)**	**(0.559, 0.961)**	**(0.549, 0.941)**	**(0.554, 0.951)**	**(0.535, 0.914)**
Diploma/certificate from community	**0.725**	**0.734**	**0.770**	**0.740**	**0.758**	**0.726**
college or trade/technical	**(0.578, 0.909)**	**(0.585, 0.920)**	**(0.615, 0.964)**	**(0.590, 0.929)**	**(0.606, 0.949)**	**(0.580, 0.909)**
Doctorate/masters/bachelor's degree	**0.506**	**0.521**	**0.564**	**0.535**	**0.536**	**0.506**
	(0.387, 0.663)	**(0.399, 0.682)**	**(0.430, 0.710)**	**(0.409, 0.700)**	**(0.410, 0.699)**	**(0.386, 0.662)**
Length of residence in local community						
Less than 5 years	1.00	1.00	1.00	1.00	1.00	1.00
	(--)	(--)	(--)	(--)	(--)	(--)
5 years to less than 10 years	1.025	1.051	1.055	1.039	1.011	1.020
	(0.743, 1.412)	(0.762, 1.450)	(0.765, 1.455)	(0.754, 1.432)	(0.732, 1.396)	(0.740, 1.405)
10 years and over	**1.281**	**1.313**	**1.302**	**1.297**	**1.286**	**1.291**
	(1.015, 1.617)	**(1.036, 1.663)**	**(1.031, 1.645)**	**(1.026, 1.640)**	**(1.020, 1.622)**	**(1.023, 1.630)**
Urban versus Rural						
Large Urban Centre (CMA/CA)	1.00	1.00	1.00	1.00	1.00	1.00
	(--)	(--)	(--)	(--)	(--)	(--)
Rural or Small Town (non-CMA/CA) and	0.942	0.942	0.952	0.945	0.974	0.961
PEI	(0.791, 1.121)	(0.790, 1.122)	(0.798, 1.136)	(0.794, 1.126)	(0.818, 1.160)	(0.808, 1.144)

	Model 1 Odds Ratios (95% CI)	Model 2 Odds Ratios (95% CI)	Model 3 Odds Ratios (95% CI)	Model 4 Odds Ratios (95% CI)	Model 5 Odds Ratios (95% CI)	Model 6 Odds Ratios (95% CI)
Household Income						
Less than $10,000	1.00	1.00	1.00	1.00	1.00	1.00
	(--)	(--)	(--)	(--)	(--)	(--)
$10,000 to $19,999	0.729	0.736	0.704	0.726	0.729	0.732
	(0.459, 1.159)	(0.461, 1.177)	(0.444, 1.117)	(0.457, 1.155)	(0.459, 1.158)	(0.463, 1.158)
$20,000 to $29,999	**0.532**	**0.548**	**0.528**	**0.527**	**0.538**	**0.540**
	(0.334, 0.847)	**(0.341, 0.881)**	**(0.332, 0.839)**	**(0.330, 0.841)**	**(0.337, 0.858)**	**(0.339, 0.859)**
$30,000 to $39,999	**0.434**	**0.437**	**0.438**	**0.435**	**0.441**	**0.435**
	(0.266, 0.709)	**(0.266, 0.717)**	**(0.268, 0.713)**	**(0.266, 0.711)**	**(0.270, 0.719)**	**(0.268, 0.705)**
$40,000 to $49,999	**0.392**	**0.403**	**0.406**	**0.393**	**0.407**	**0.402**
	(0.238, 0.644)	**(0.244, 0.666)**	**(0.247, 0.666)**	**(0.239, 0.647)**	**(0.247, 0.669)**	**(0.245, 0.659)**
$50,000 to $59,999	**0.318**	**0.322**	**0.329**	**0.328**	**0.326**	**0.325**
	(0.193, 0.524)	**(0.194, 0.534)**	**(0.200, 0.541)**	**(0.199, 0.541)**	**(0.198, 0.538)**	**(0.197, 0.535)**
$60,000 to $79,999	**0.264**	**0.271**	**0.279**	**0.268**	**0.272**	**0.265**
	(0.161, 0.432)	**(0.165, 0.447)**	**(0.170, 0.457)**	**(0.163, 0.438)**	**(0.166, 0.446)**	**(0.162, 0.434)**
$80,000 to $99,999	**0.242**	**0.249**	**0.255**	**0.249**	**0.253**	**0.248**
	(0.145, 0.404)	**(0.149, 0.417)**	**(0.153, 0.426)**	**(0.149, 0.417)**	**(0.151, 0.423)**	**(0.148, 0.414)**
$100,000 or more	**0.231**	**0.235**	**0.250**	**0.240**	**0.246**	**0.235**
	(0.142, 0.375)	**(0.144, 0.384)**	**(0.154, 0.408)**	**(0.147, 0.390)**	**(0.150, 0.402)**	**(0.144, 0.382)**
Immigration Status/ Age of respondent when immigrated						
Canadian citizen by birth	1.00	1.00	1.00	1.00	1.00	1.00
	(--)	(--)	(--)	(--)	(--)	(--)
0 to 14	**0.293**	**0.282**	**0.276**	**0.314**	**0.286**	**0.289**
	(0.103, 0.833)	**(0.097, 0.818)**	**(0.096, 0.788)**	**(0.111, 0.884)**	**(0.100, 0.819)**	**(0.102, 0.819)**
15 to 29	0.854	0.838	0.807	0.855	0.847	0.848
	(0.374, 1.948)	(0.366, 1.919)	(0.357, 1.824)	(0.375, 1.948)	(0.366, 1.957)	(0.370, 1.947)
30 to 49	1.704	1.626	1.566	1.727	1.673	1.665
	(0.916, 3.171)	(0.871, 3.033)	(0.840, 2.918)	(0.931, 3.201)	(0.894, 3.133)	(0.896, 3.095)
50 to 94	1.187	1.165	1.148	1.191	1.169	1.168
	(0.928, 1.520)	(0.907, 1.496)	(0.898, 1.468)	(0.931, 1.523)	(0.913, 1.495)	(0.909, 1.500)

	Model 1 Odds Ratios (95% CI)	Model 2 Odds Ratios (95% CI)	Model 3 Odds Ratios (95% CI)	Model 4 Odds Ratios (95% CI)	Model 5 Odds Ratios (95% CI)	Model 6 Odds Ratios (95% CI)
Activity Limitations						
No	1.00	1.00	1.00	1.00	1.00	1.00
	(--)	(--)	(--)	(--)	(--)	(--)
Yes	**7.570**	**7.614**	**7.689**	**7.485**	**7.637**	**7.701**
	(6.412, 8.936)	**(6.447, 8.993)**	**(6.510, 9.081)**	**(6.337, 8.840)**	**(6.467, 9.017)**	**(6.526, 9.088)**
Social Capital Measures						
Social Contact with Relatives						
0-9		1.00				
		(--)				
10-19		0.796				
		(0.642. 0.986)				
20-200		0.962				
		(0.684, 1.353)				
Social Contact with Friends						
0-9		1.00				
		(--)				
10-19		1.033				
		(0.801, 1.331)				
20-200		1.455				
		(0.989, 2.140)				
Frequency of Contact with Friends						
Less than once a month		1.00				
		(--)				
2 or 3 times a month		0.853				
		(0.669, 1.086)				
Once a week		**0.767**				
		(0.607, 0.970)				
A few times a week		**0.768**				
		(0.607, 0.972)				
Every day		0.888				
		(0.675, 1.169)				

	Model 1 Odds Ratios (95% CI)	Model 2 Odds Ratios (95% CI)	Model 3 Odds Ratios (95% CI)	Model 4 Odds Ratios (95% CI)	Model 5 Odds Ratios (95% CI)	Model 6 Odds Ratios (95% CI)
Social Contact with New People						
None		1.00				
		(--)				
1 or 2		0.974				
		(0.784, 1.211)				
3 to 5		0.894				
		(0.692, 1.154)				
More than 6		0.777				
		(0.548, 1.102)				
Volunteerism						
Does not volunteer			1.00			
			(--)			
Less than 1 hour per month			1.507			
			(0.691, 1.616)			
1 to 4 hours per month			0.937			
			(0.725, 1.212)			
5 to 15 hours per month			**0.740**			
			(0.577, 0.949)			
Over 15 hours per month			1.268			
			(0.965, 1.666)			
Frequency of Civic Engagement						
Does not participate in group activities			1.00			
			(--)			
Not in the past year			0.813			
			(0.614, 1.075)			
Once or twice a year			**0.770**			
			(0.594, 0.998)			
Once a month			**0.759**			
			(0.591, 0.976)			
A few times a month			**0.712**			
			(0.541, 0.937)			
At least once a week			**0.670**			
			(0.526, 0.854)			

	Model 1 Odds Ratios (95% CI)	Model 2 Odds Ratios (95% CI)	Model 3 Odds Ratios (95% CI)	Model 4 Odds Ratios (95% CI)	Model 5 Odds Ratios (95% CI)	Model 6 Odds Ratios (95% CI)
Trusts People						
No				1.00		
				(--)		
Yes				**0.710**		
				(0.602, 0.837)		
Position Generator – Number of Positions Accessed						
0					1.00	
					(--)	
1 to 3					0.824	
					(0.647, 1.049)	
4 to 7					0.697	
					(0.539, 0.902)	
8 to 10					0.691	
					(0.500, 0.955)	
11 to 18					0.788	
					(0.541, 1.147)	
Position Generator – Highest Value Position Accessed						
0						1.414
						(0.938, 2.131)
Less than 65						1.00
						(--)
65 to less than 70						0.880
						(0.582, 1.330)
71.7						1.354
						(0.868, 2.112)
76.6						1.289
						(0.834, 1.994)
77.5						0.954
						(0.648, 1.406)
80.9						1.122
						(0.764, 1.648)

4.3 Ethnicity and self-reported health

Table 10 illustrates that there is a significant relationship between ethnicity and self-rated health. As the p-value of the bivariate association was significant, one cannot reject the null hypothesis that ethnicity and self-reported health are independent. Table 15 also confirms the association between ethnicity and self-reported health; without controlling for the potential confounding effects of age, gender and the other covariates, a significant relationship was assessed using the chi-square test of independence.

Table 11 shows descriptively that different ethnic groups have different probabilities of reporting good or poor self-rated health. Around 87% of respondents of Canadian, British Isles or French ethnicity reported being in good health compared to respondents of other European (85%), South Asian (84%), or Chinese (81%) ethnicity. Only 74% of Aboriginal Canadians self-reported good health which is much lower than for the other ethnicities.

Table 15 presents the results of the binary logistic regression. In all models, respondents who identified their ethnicity as Canadian only were used as the reference group. Respondents who identified as British Isles origin or French were no more or less likely to report poor health. Respondents of European, South Asian, Aboriginal or Chinese ethnic ancestry were more likely to report poor health; South Asian and Aboriginal respondents were nearly twice as likely to report poor health and Chinese respondents were nearly three times as likely.

In summary, there is a statistically significant relationship between ethnicity and self-rated health. Furthermore, different ethnic groups have different probabilities of reporting good health.

4.4 Social capital and self-reported health

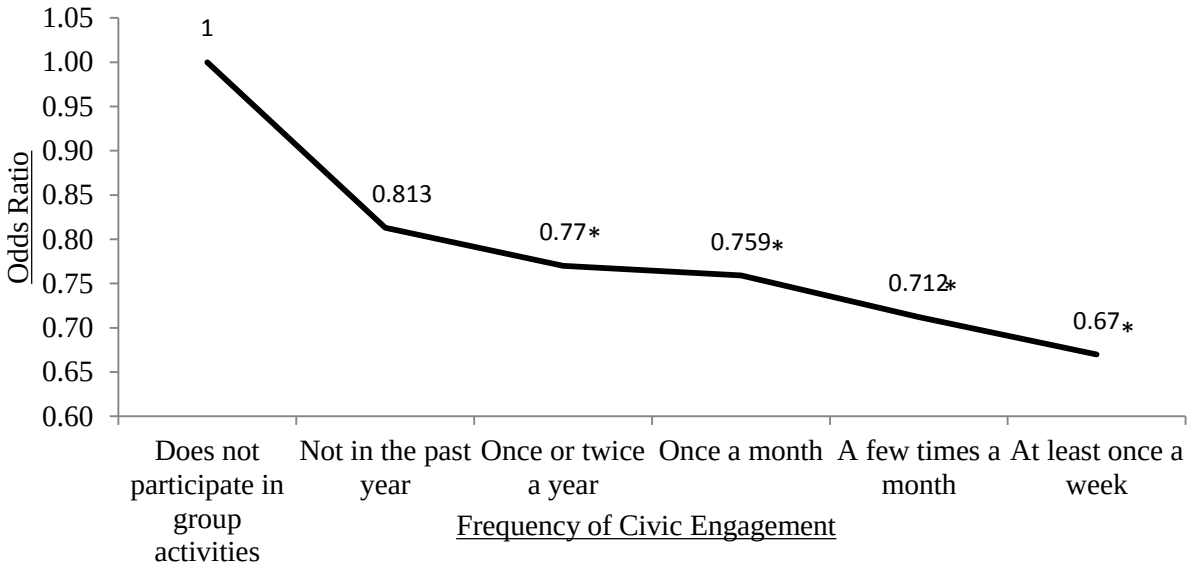
Each of the social capital measures was significantly associated with self-rated health (Table 10). The relationship between social capital and self-rated health was investigated further using binary logistic regression.

In Model 2 (Table 15), four social capital variables – measures of social network – were added to the base model. Though not statistically significant, having a greater number of relatives and meeting new people decreased the odds of reporting poor health. Having greater number of friends increased the odds of reporting poor health but seeing friends more often than once a month, decreased the odds of reporting poor health. Respondents who reported seeing friends between once and a few times a week were significantly less likely to report poor health.

Model 3 studied civic engagement with the inclusion of two variables: volunteerism and frequency of civic engagement. Respondents who volunteered less than 1 hour per month or more than 15 hours per month were more likely, though not significantly, to report poor health as compared to the reference group of respondents who reported that they did not volunteer (Table 15). Respondents who volunteered between 1 and 5 hours per month were less likely to report poor health (not statistically significant); respondents volunteering between 5 and 15 hours per month were significantly less likely as shown in Table 15 (OR= 0.740). Frequency of civic engagement was negatively associated with poor self-reported health; this relationship was significant for respondents who participated in group activities at least once or twice a year (Table 15). Figure 4 presents the odds ratios for frequency of civic engagement.

Model 4 explored the relationship between ethnicity, health and trust. Respondents who reported that in general, people could be trusted, were significantly less likely to report poor health (Table 15).

Figure 4: Association between frequency of civic engagement and poor self-reported health.



Note: Statistical significance is indicated by an asterisk ($p \leq 0.05$). Model adjusted for ethnicity, gender, age, marital status, education, length of residence in local community, urban versus rural location, household income, immigration status, activity limitation and frequency of civic engagement.

In Model 5, the results indicated that the association between number of positions accessed and self-reported health was not significant though respondents who had accessed at least one position were less likely to report poor health (Table 15).

Finally, Model 6 investigated the relationship between the highest position accessed and self-reported health (Table 15). No significant results were found.

Each of the social capital measures were significantly associated with self-reported health. Binary logistic regression illustrated that in general, higher social capital increased the probability of a respondent reporting good health.

4.2.2 Covariates

Generally, older respondents were more likely to report poor health as compared to their younger counter-parts. Across all six models, respondents aged 55-64 were significantly more likely to report poor health compared to respondents aged 15-34 (Table 15).

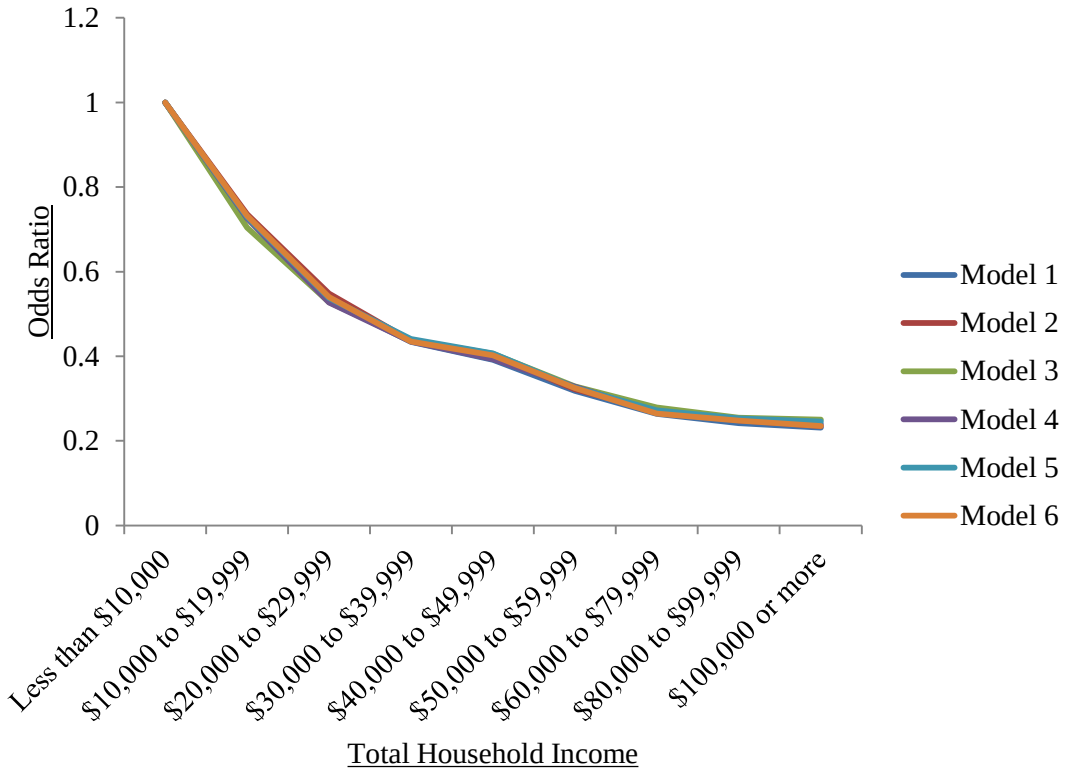
For marital status, respondents who identified as single were chosen as the reference group. Comparatively, separated or divorced individuals were more likely to report poor health and respondents who were widowed, or married or living common-law, were less likely (Table 15).

Education was significantly associated with poor self-reported health and protective; having at least a high school diploma lowered the odds of reporting poor health compared to respondents who did not (Table 15).

The odds of reporting poor health also decreased with increasing household income in each of the models; this relationship was significant for household incomes greater than $20,000. Figure 5 presents the odds ratios for household income for each of the models that are in Table 15.

Greater length of residence in a local community increased the odds of reporting poor health. Compared to Canadian citizens by birth, respondents who immigrated to Canada between the ages of 0 and 14 were significantly less likely to report poor health. Though, not statistically significant, this is also true for respondents who immigrated between the ages of 15 and 39. Conversely, respondents who immigrated after the age of 30 were more likely to report poor health compared to Canadian citizens by birth.

Figure 5: Association between total household income and poor self-reported health.



Respondents who identified as having an activity limitation were significantly more likely to report poor health – around 7.5 times more likely as shown in Table 15.

Neither gender nor urban versus rural status were significantly associated with poor self-reported health.

4.5 Ethnicity, Social Capital and Self-reported Health

In addition to exploring the associations of self-reported health with ethnicity and social capital, respectively, binary logistic regression was used to investigate the relationship between ethnicity, social capital and health (Table 15). The addition of social capital variables to the base model did not significantly change the odds ratios for any of the ethnicities in any of the models.

Therefore, this study cannot conclude that ethnic differences in self-rated health can be accounted for, even partially, by differences in social capital.

4.5.1 Mediation

If social capital were mediating the relationship between ethnicity and health, the inclusion of a social capital variable would dampen the effect of ethnicity on health (Mackinnon et al., 2000). In other words, the effect of ethnicity and health would change significantly. To test this, z-scores were calculated for the null model and each of Models 2-6, for each ethnicity (Table 16). If the addition of the social capital variable had resulted in significant change, the z-score value would have to be greater than 1.96 or less than -1.96. As shown in Table 16, the addition of social capital variables did not result in statistically significant differences in the effect of ethnicity on health therefore this study could not prove that social capital is mediating the relationship.

Table 16: Z-scores for models, as compared to base model

	Model 2	Model 3	Model 4	Model 5	Model 6
British Isles origin	0.0693	0.2645	0.3214	0.1798	0.1020
French	-0.0166	0.0103	0.0117	0.0798	0.0265
Aboriginal	-0.0192	0.1130	0.0258	0.1156	0.0674
Other European	0.0203	0.2454	0.2921	0.1636	0.0799
Chinese	-0.0231	0.0361	0.1080	-0.0046	-0.0776
South Asian	0.0561	0.0478	0.0414	0.0292	-0.0733

4.5.2 Model Fit Characteristics

Table 17 presents the fit characteristics for all the models. The base model (Model 1) had the lowest C-statistic value of 0.814. As all of the other models contained a social capital variable, this would suggest that the addition of a social capital variable improved the models

ability to more strongly predict outcomes better than chance (Hosmer and Lemeshow, 2000). Models 2 and 4 had the highest C-statistic value of the models.

The AIC allows for comparison between non-nested models where the optimal fitted model will have the lower value (Cavanaugh, 2012). Model 4 also had the lowest AIC value and therefore had the greatest fit.

Finally, likelihood ratio tests were conducted for each model compared to the base model. The difference in -2logL values between a model and the base model were assumed to have a chi-square distribution (Kleinbaum and Klein, 2010). The addition of social capital variables for each of the models, significantly improved the fit of the model ($p<0.005$).

Table 17: Model Fit Characteristics

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
-2logL	6474.731	6450.640	6434.799	6447.884	6461.882	6452.326
AIC	6544.731	6542.640	6522.799	6519.884	6539.882	6534.326
c-statistic	0.814	0.816	0.815	0.816	0.815	0.815

Chapter 5: Discussion

5.1 Ethnicity and health

Previous research has evidenced the notion that ethnic differences in health continue to persist in Canada. This study set out to confirm whether or not ethnicity is associated with self-rated health and whether some ethnicities were more or less likely to report poor or good health compared to Canadians (i.e. individuals who identified their ethnic identity as Canadian only) using the *2008 General Social Survey* (GSS).

Quantitative analysis of the GSS confirmed that ethnicity was significantly associated with self-reported health. Few studies have investigated if different ethnicities have different probabilities of reporting poor versus good health. Analysis revealed that such differences do exist. Survey respondents who reported being of British Isles origin or French ethnicity, had almost identical odds or reporting poor health compared to Canadians which is unsurprising given the historical origins of Canada; the country was first colonized by the French and then Great Britain (CIC, 2012). Respondents who reported being German, Italian, Ukrainian, Dutch, Polish, Portuguese, Jewish or some combination of the aforementioned ethnicities were slightly more likely to report poor health compared to Canadians whereas South Asians were nearly twice as likely. This finding is complemented by studies that have found that South Asians and Europeans are more likely to die from heart disease than other ethnicities (Sheth et al., 1999). Aboriginals were also twice as likely to report poor health as compared to Canadians which is supported by a number of studies with similar findings (Young et al., 1999; Trovato, 2001; Wu and Schimmele, 2005; Kobayashi et al., 2008). Finally, respondents reporting Chinese ethnicity were nearly three times as likely to report poor health which due to a lack of literature, cannot be substantiated by previous research.

This study has confirmed that ethnic differences in health exist within Canada even after controlling for age, gender, educational status, marital status, immigration status, household income, urban versus rural status, length of residence in a local community and activity limitations.

5.2 Social capital and health

The relationship between social capital and health is well established in the literature and supported, for the most part, by the findings of this study.

5.2.1 Social networks and health

The model measuring the effect of social networks on self-reported health did not yield significant results. Social networks were measured two ways in this study: (1) in Model 2 by the respondent's number of relatives, number of close friends, number of new people they met in the past month, and the frequency of contact with close friends, and (2) in Models 5 and 6 using the position generator measures, number of positions accessed and highest value position accessed, respectively.

Though not statistically significant, the results suggest that having a greater number of relatives, meeting more new people and more frequent contact with friends lowered a respondents' odds of reporting poor health. These findings are aligned with previous research. Greater social contact can encourage or model healthier behaviours (Berkman and Glass, 2000). Having a larger social network also increases opportunities for knowledge transmission regarding health matters and services (Kawachi, 1999). Finally, more extensive social networks mean larger social support resources i.e. more people who can babysit or do another service (Rocco, 2012). Interestingly, number of close friends was negatively associated with self-reported health – a finding contradictory to most literature. Bolin and colleagues found that

having a close friend had a positive effect on self-assessed health (2003). Similarly, Hyppa and Maki found that number of close friends was significantly and positively related to self-rated health (2001).

Neither of the position generator measures was significantly related to self-reported health. This study did not find evidence to support Lin's postulation that accessing higher prestige positions resulted in greater social capital and access to resources (2001). However the results showed that in general, greater number of positions accessed lowered the odds of reporting poor health. This finding would support the notion that greater network diversity, or accessing a greater number of positions, increases a person's range of informational sources and social support which can provide greater access to materials and resources that foster better health (Legh-Jones and Moore, 2012).

5.2.2 Civic engagement and health

Civic engagement, measured in this study by volunteerism and participation in group activities, is known to benefit health in three main ways: material benefit such as information; solidary benefit such as socializing and group identification; and purposive benefits such as bettering the community or fulfilling a sense of responsibility (Prestby et al., 1990). The positive association between civic engagement and health has been well evidenced at the aggregate level however findings are less consistent at the individual level (Ziersch and Baum, 2004). For example, Veenstra and colleagues found that greater participation in voluntary organizations was positively associated with self-rated health, though not significantly (2005). Similarly, Rose found no relationship between membership in organisations and mental or physical health (2000). On the other hand, studies have found positive relationships between volunteerism and

lower levels of ill health (Joshi et al., 2000) and social participation and health (Bush and Baum, 2001).

This study found that only respondents who volunteered between 5 and 15 hours per month were significantly less likely to report poor health. Volunteering fewer than 5 hours per month did not significantly decrease odds of reporting poor health. Furthermore, volunteering more than 15 hours per month increased a respondents' odds of reporting poor health (though not significantly). These findings are corroborated by a study by Windsor and colleagues who found that the relationship between volunteering and psychological well-being was characterized by an inverted U shape with moderate volunteers reporting higher well-being (2008). Non-volunteers or people who volunteer infrequently are likely not accruing the benefits associated with volunteering. Individuals volunteering at high levels may feel overburdened or stressed which can be detrimental to overall health (Windsor et al., 2008).

This study found a significant and positive association between frequency of participation in group activities and self-reported health (as shown in Figure 4). This relationship is supported by previous research (Lindstrom, 2004; Veenstra et al., 2005; Zunzunegui et al., 2004; Sirven and Debrand, 2008) and can be explained by the aforementioned material, solidary and purposive benefits accrued through social participation (Prestby et al., 1990).

5.2.3 Trust and health

Survey respondents who generally believed that people could be trusted were significantly less likely to report poor health. This finding is aligned with previous research findings (Carlson, 2004; Chavez et al., 2004; Pollack and Knesebeck, 2004; Linstrom, 2004). Higher levels of trust can lead to greater emotional, monetary and logistical resources which

promote health (Pollack and Knesebeck, 2004). Greater generalized trust also results in greater willingness of citizens to cooperate with each other and to engage in civic endeavours collectively (Putnam, 2000; Yamagishi, 2001; Marschall and Stolle, 2004). Such civic endeavours may include lobbying for health infrastructure and other health-promoting facilities such as recreational spaces (Rocco, 2012; Lochner et al., 2003).

5.3 Social capital and ethnic differences in health

This study was unable to conclude that social capital is mediating the relationship between ethnicity and self-reported health. The addition of social capital variables to the base model did not significantly change the effect of ethnicity on health for any model. As no other study has investigated the role of social capital on the relationship between ethnicity and health, these findings cannot be substantiated.

5.4 Model Fit

The base model had a c-statistic of 0.814. In other words, the model was fit really well even before a social capital variable was added. This could suggest a problem with over-fitting and that the ratio of parameter coefficients in the model to the number of observations is too high (Finlay, 2014). In particular, the inclusion of activity limitation as an independent variable may not have allowed for much change in the dependent variable because it is so strongly related to both health and social capital.

5.5 Limitations of the study

A potential limitation of this study is the use of "Canadian" as the reference ethnic group. As the study was conducted in Canada, respondents may be conflating national identity with ethnic identity. Also, Canada's acceptance and integration of multiculturalism has fostered "Canadian pride" and increased self-identification of immigrants as Canadian, especially with increased length of residence in Canada. Although first-generation immigrants are more likely to self-identify as being of the same ethnic origins of their ancestors, nearly 90 percent of third-generation Canadians will identify themselves as at least partially Canadian (Cohen, 2008). Some have theorized that this could explain the increasingly popularity of Canadian as a response option for questions pertaining to ethnic origin – only 18.4% of respondents declared themselves as Canadian only in the 2006 Census compared to 30.6% of respondents in the 2011 National Household Survey (Cohen, 2008; Statistics Canada, 2013). However analysis by Boyd and Norris discovered that previous increases in "Canadian" ethnic origin responses were complemented by losses in "British" origin responses which may lessen concern as this study found that Canadian respondents were statistically similar to British respondents (1999). Notwithstanding, it is generally accepted that ethnicity is a matter of self-perception and that self-identification is the most appropriate manner for determining ethnicity (Senior and Bhopal, 1994; Bhopal, 2007). Furthermore, ethnic is fluid and subject to socialization; immigrants may absorb elements of Canadian identity into their own identities just as individuals of mixed ancestry may self-identify with one ethnicity over another (Howard-Hassmann, 1999).

Individuals identifying with more than one ethnic group were excluded from this study. As previously mentioned, ethnicity is fluid and subject to socialization. However, mixed ancestry individuals are especially vulnerable to this fluidity and may or may not identify more strongly

with one ethnicity over another based upon their own social or political experiences (Howard-Hassmann, 1999; Mays et al., 2003). Controlling for this added level of complexity would be difficult in a study such as this. However by excluding the multiple responses, the sample size for each ethnic group was decreased. Furthermore, the experience of mixed ancestry individuals and social capital could not be captured.

Another limitation of the study is that all measures on the survey were self-reported. For this study, inaccurate self-reporting may have been caused by recall bias, social desirability bias, and errors in self-observation (Raphael, 1987; van de Mortel, 2008). For example, when asked about social contact with friends, a respondent may incorrectly remember how many friends they have (recall bias), report that they have more friends than they actually do (social desirability bias), or simply be unaware of the actual number of friends they have (errors in self-observation). These measurement issues reduce the confidence with which conclusions about causality can be drawn which may diminish the value of the research findings (Razavi, 2001).

The cross-sectional nature of the GSS is also a limitation of the study. It is difficult to make causal inferences from cross-sectional surveys and the data provide information only about one point in time, i.e. the results may have been different if another time frame had been chosen (Levin, 2006). This is particularly relevant for studies of social capital as the bonds and ties individuals have with one another and the institutions around them can be heavily influenced by external events. For example, the sense of solidarity generated after the Second World War resulted in high levels of civic engagement and trust (Sander and Putnam, 2010). Similarly, youth who lived through 9/11 have deeper community engagement (Sander and Putnam, 2010). The data used in this study was collected in 2008 and therefore the results of this study are

reflective of what was happening at that point in time and may not be representative of other time frames.

Finally, the data used for analysis was collected in 2008. It is possible that social capital, and specifically its relationship with ethnic differences in health, could have changed over the seven years since the data was first collected.

5.6 Study Strengths and Implications

This study is one of a very few that have investigated the potentially mediating effects of social capital in the relationship between ethnicity and self-reported health. This study is also one of a few studies that compared self-reported health across several ethnic groups in a single study (Gee et al., 2006). In addition to filling existing gaps in the literature, this study confirmed findings of previous studies and operationalized the measurement of social capital within a health context.

This study could not conclude that social capital was mediating ethnic differences in health. Social capital is difficult to measure because of social desirability bias, recall bias, and errors in self-observation. Inaccurate measures of social capital may have obscured potential effects. Furthermore, genetic/biological mechanisms were not investigated in this study. The potentially large role biology plays in the relationship between ethnicity and health could have concealed the less pronounced effects of social capital as it was not controlled for in the study.

However, this study was able to show that ethnic differences in self-rated health do exist in Canada. Compared to Canadians, those who identified as Aboriginal, South Asian or Chinese were more likely to self-report poor health. Acknowledging and further study into these differences could have significant health benefits for these groups in terms of addressing possible

system inequalities, assessing needs, making health plans and directing resource allocations (Bhopal, 2007).

Several findings from this study confirmed the findings of previous literature. The inverse graded relationship between income and health was very prominent within this study. In all six models, the odds of reporting poor health significantly decreased with increasing household income for household incomes greater than $20,000. The study also confirmed that compared to single respondents, those who were widowed or married or living common-law were less likely to report poor health but that separated or divorced individuals were more likely. Education was also found to be significantly and positively associated with self-reported health as having at least a high school diploma lowered the odds of reporting poor health.

This study was also able to contribute to the body of literature evidencing the significant and positive relationship between two measures of social capital, and self-rated health. Social participation in group activities, measured by frequency of civic engagement, was negatively associated with poor self-reported health; this relationship was significant for respondents who participated in group activities at least once or twice a year. Generalized trust was also found to be significantly and positively associated with self-reported health.

Finally, the study explored the operationalization of social capital measures. Social capital measurement indicators, such as the ones used in this study, have the potential to be incorporated within program evaluation frameworks which may better assess program effectiveness (Franke, 2005). The social capital approach to program evaluation requires special attention for the indirect impacts of program interventions such as improved social networks and increased social ties (Franke, 2005). It is also important to consider an individual's social capital

when designing and developing programs and interventions; differentiating the target population on the basis of social capital may allow for more suitable intervention strategies (Franke, 2005).

5.7 Future Research Directions

This study investigated the relationship between ethnicity and self-reported health and concluded that ethnic differences in health do exist in Canada. Although this study did not find that social capital was mediating the relationship between ethnicity and health, it did find that participation in group activities and generalized trust were found to be significantly and positively associated with self-reported health. Future research could look into social participation or trust as a means for addressing ethnic health inequities. Qualitative research into social capital and ethnic differences in health would also allow for greater exploration of the mechanisms motivating these differences or provide direction for how social capital could be lobbied to better health for vulnerable populations. The effect of social capital on ethnic differences in health is not been well-documented – as far as the author knows, this is the first study of its kind. In general, further research is needed into this topic to confirm the findings of this study.

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