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Social Connectedness, Social Support and the Health of Older Adults: A Comparison of Immigrant and Native-born Canadians

Natalie Iciaszczyk, *The University of Western Ontario*

Supervisor: Professor Rachel Margolis, *The University of Western Ontario*

A thesis submitted in partial fulfillment of the requirements for the Master of Arts degree in Sociology

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Abstract

Considerable research exists on the influence of social relationships for health in old age. However, few studies have compared the associations of social connectedness and social support with the health of older adults. Using data from the CCHS-Healthy Aging, this study examines how these constructs are related to the self-reported health status of immigrant and native-born adults aged 65+. Results show that social connectedness and social support are differently associated with health in later life; whereas connectedness is linked to better health, social support is negatively related with health once levels of social connectedness are considered. Furthermore, these associations hold regardless of whether older adults' experiences or perceptions of connectedness and support are examined. However, results reveal that social connectedness is more strongly related to better health among immigrants than the native-born. Efforts to promote health in later life can focus on ensuring older adults are socially connected, particularly older immigrants.

Keywords

Older Adults; Health; Immigrant Health; Social Connectedness; Social Support; Canada

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Chapter 1

1 Introduction

Identifying and understanding the factors that shape health in later life has become an especially important issue within recent decades both in Canada and globally because most developed countries are experiencing population aging (Kembhavi, 2012). Social relationships and social integration offer a potential pathway for the promotion of health among older populations. Examining how these factors are related to the health of older Canadians has important implications as it can further our understanding of the factors that offer unique benefits for health in later life, and improving the health of the older population is key to improving overall population health.

The Canadian population is aging due to low fertility and increased life expectancy, and in turn, the country has relied primarily on immigration to prevent population decline and sustain population growth (Durst, 2005). However, the immigrant population is also aging, and as a result, both native-born and immigrant older adults now comprise a considerable proportion of the overall population. In 2011, 14.8 % of the Canadian population was aged 65 and over, and immigrants made up roughly 28 percent of this group (Kembhavi, 2012). In fact, the immigrant population in Canada is older than the overall population, as roughly 19% of immigrants were aged 65 and older in 2011 (Kembhavi, 2012). Examining how relationships and social support are associated with health in later life, and whether these associations differ for immigrants, can further help provide an understanding of the various factors that contribute to the health of older Canadians.

A considerable body of evidence demonstrates the importance of social relationships and ongoing social interaction for health and well-being throughout the life course (Seeman, Lusignolo, Albert, & Berkman, 2001). Although social connectedness and social support are among the functional characteristics of social relationships and networks that have been extensively studied in research on aging (Cornwell & Waite, 2009; Thomas, 2009), knowledge on how these two aspects of integration shape health in later life is still needed. This is largely because previous studies have not always conceptualized connectedness and support as separate measures (Ashida & Heaney, 2008), and these constructs have often been examined using a small number of indicators (Cornwell & Waite, 2009). However, equating these aspects of older adults' social network and relying on a small number of indicators has produced a gap in the literature because the full extent of how these separate factors shape health, and whether they do so differently, is still unknown (Ashida & Heaney, 2008).

Not only has the body of work that focuses on social relationships and health in later life frequently examined social connectedness and social support interchangeably, but disciplines in the social science have also mostly remained separate in their research and relied specifically on their own approaches to study social ties and health (Cornwell & Waite, 2009). Studies in psychology have predominantly examined the subjective measures of social connectedness or support, and studies in sociology have emphasized the experiences of social integration (Cornwell & Waite, 2009). As a result, both experience and perception have rarely been examined together (Cornwell & Waite, 2009; Uchino, 2006; Uchino, 2009), and it is still unclear as to whether it is the experience of being socially included and receiving social support that is more important for health in

later life, or whether these relationships operate through individual perceptions of these factors among older adults. It is important to study these differences, given the unique circumstances of older individuals, who may require different levels of support (Ashida & Heaney, 2008), or require different levels of interaction to feel socially connected (Cornwell & Waite, 2009).

This study examines how social connectedness and social support are associated with the health of older Canadians. By using multiple indicators of connectedness and support, comprised of measures of both experience and perception, it aims to better capture these two separate constructs and the role they play in shaping the health of older adults. Such research is important because few studies to date have distinguished social connectedness and social support (Ashida & Heaney, 2008), and there continues to be limited knowledge on how these constructs are separately related to health outcomes in later life. In addition, the current study examines whether these two aspects of older adults' social networks are differently associated with health in later life for the immigrant and native-born populations of older adults in Canada. A limited amount of research has examined the relationship between social integration or isolation and the health status of older adults in the Canadian context (Kobayashi, Cloutier-Fisher, & Roth, 2008), and even fewer studies have considered the specific circumstances of older immigrants (Dunn & Dyck, 2000; Kobayashi et al., 2008). This is a significant concern because studies show that older Canadians are at increased risk of social isolation, and that the risk is particularly severe for older immigrants (Kobayashi et al., 2008).

Chapter 2

2 Literature Review

2.1 Differentiating Social Connectedness and Social Support

Among the different aspects of social relationships that research has considered, a considerable body of work on aging has focused on social connectedness and social support. Social connectedness is the existence and quantity of established social relationships, as well as the extent to which individuals engage with these ties (Ashida & Heaney, 2008; House, Umberson, & Landis, 1988). On the other hand, social support is a functional quality that relationships established with others can include, and involves receiving aid from members of one's social network who provide it with the intention of being helpful or offering care (Ashida & Heaney, 2008; House et al., 1988). Although related, social connectedness and support are not the same. Relationships do not necessarily involve the exchange of support, but rather may only involve interactions that are simply intended for pleasure or leisure, and the reception of social support does not necessarily include high levels of connectedness with others (Rook, 1990). It is therefore possible that older adults remain socially connected but have few available sources of social support (Sorkin, Rook, & Lu, 2002), or that they find themselves surrounded by multiple providers of social support yet remain socially disconnected due to the absence of personal relationships or reduced participation in social activities (Ashida & Heaney, 2008). Thus, given that social connectedness and social support account for different forms of interaction in the lives of older adults, it is also possible that these two forms of social integration differ in how they shape health in later life.

Higher levels of social connectedness and social support have been found to be associated with better physical and mental health outcomes (Seeman et al., 2001). However, previous studies on aging have not always considered social connectedness and social support to be separate measures that have implications for health in old age (Ashida & Heaney, 2008). Instead, studies have often operationalized forms of social support as a measure of social connectedness (Prince, Harwood, Blizard, Thomas, & Mann, 1997), or forms of social connectedness as indicators of social support (Ashida & Heaney, 2008; Stephens, Alpass, Towers, & Stevenson, 2011). Distinguishing between social connectedness and support is important as they account for distinct aspects of older adults' social lives, and of the ties they have established with members of their social network (Ashida & Heaney, 2008; Rook, 1990). Social connectedness can be interpreted as a quantitative dimension of one's social relationships, as it accounts for factors such as one's number of social ties and the frequency of social participation, whereas social support can be interpreted as a qualitative feature of these relationships, a functional characteristic usually only offered and received in specific types of relationships.

Across the disciplines of sociology, psychology and epidemiology, researchers have identified various mechanism through which social connectedness may influence health in older ages. Social scientists, in considering how social network ties shape health, have emphasized that social networks are structured around norms and values that reflect expectations about its' member's behaviors, including behaviors that have consequences for health (Berkman & Glass, 2000). Thus, because relationships in one's network exert a degree of social influence, older adults who are embedded in networks characterized by behaviors that are conducive to good health, such as exercise or healthy nutrition, may be

more likely to engage in such behaviors (Kinney, Bloor, Martin, & Sandler, 2005).

Furthermore, the social influence that extends from relationships can shape both the initiation and adherence (Kinney et al., 2005; Thoits, 2011) of new healthy behavior changes, which in turn, may lead to better health outcomes among older adults (Kinney et al., 2005; Thoits, 2011). Social participation and activities may also help older adults maintain higher levels of cognitive and physical functioning in later life by promoting their continued engagement of these aspects of functioning (Seeman et al., 2001; Luo, LaPierre, Hughes, & Waite, 2012).

On the other hand, researchers have hypothesized that the mechanisms through which social support shapes physical health are related to individuals' psychological states (Ashida & Heaney, 2008; Cacioppo & Hawkley, 2003; Kawachi & Berkman, 2001). Specifically, two pathways related to increased well-being have been put forward to explain the beneficial influence of social support on health outcomes (Ashida & Heaney, 2008). First, receiving social support in old age may effect health directly by increasing psychological well-being through feelings of security and positive affect, which in turn, can protect against distress (Kawachi & Berkman, 2001), strengthen motivation to adopt healthy behaviours (Ashida & Heaney, 2008), or maintain lower levels of autonomic activity and stress hormones (Cacioppo & Hawkley, 2003). Second, social support may be related to better physical health indirectly by buffering the effects of stress (Ashida & Heaney, 2008; Kawachi & Berkman, 2001). Received and perceived social support may prevent older adults from experiences the negative behavioural and psychological responses that are damaging to health when faced with stressful life events (Kawachi & Berkman, 2001).

The need to distinguish between social connectedness and social support has also been substantiated in recent research, with some studies suggesting that connectedness and support are not directly linked among older adults (Cornell & Waite, 2009; Ryan & Willits, 2007; Sorkin et al., 2002). For example, studies have shown that indicators of social connectedness, such as companionship, loneliness and size of social network, are only moderately correlated with indicators of social support (Ashida & Heaney, 2008; Russell, Cutrona, McRae & Gomez, 2012; Rock, 1990; Sorkin et al., 2002). Furthermore, although social connectedness and social support have both been extensively examined as factors that have consequences for physical and mental health, research suggests that these two forms of social integration may be differently associated with health and well-being in later life (Ashida & Heaney, 2008). Unlike social connectedness, which has generally been linked to beneficial health outcomes in older ages (Cornwell & Waite, 2009), findings on social support have been more variable (Thomas, 2009; Uchino, 2006; Uchino, 2009). Although some studies have found that social support has protective effects on the health of older adults (Berkman, 1985; Kobayashi et al., 2008; Seeman, Bruce & McAvay, 1996), other studies suggest that increased levels of social support have negative consequences for physical and mental health, or find no association at all (Everard, Lach, Fisher, & Baum, 2000; Lee, Netzer & Coward, 1995; Silverstein, Chen & Heller, 1996). These findings underscore the fact that there may be an advantage to considering social connectedness and social support as separate constructs that are related to both health and aging. Thus, this paper examines how social connectedness and social support, two distinct aspects of integration, are associated with the health of older adults.

This will help extend previous research by providing valuable information on the social and health-related implications of these separate aspects of older adults' lives.

2.2 Distinguishing Experiences and Perceptions of Social Connectedness and Social Support

The life course of older adults is often marked by numerous changes in their social roles and relationships. As they age, individuals may experience various transitions that shift the number of social roles they occupy, such as retirement or grandparenthood, and the extent to which they maintain or establish ties with others, such as widowhood and increased social participation (Cornwell & Waite, 2009). However, late life is also a period during which older adults' expectations about their social relationships may change, depending on their individual circumstances and experiences, and how they adjust to the changes they encounter.

Distinguishing the experienced and subjective aspects of social connectedness and social support underscores a fundamental feature about how older adults manage their social lives (Cornwell & Waite, 2009), and the manner in which their social ties shape their health and well-being. Specifically, the actual social situations that older adults experience are not necessarily related to the manner in which they perceive their encounters and social resources (Cornwell & Waite, 2009; Uchino, 2009). Older adults with multiple social relationships and ties from which they draw support, may experience feelings of loneliness. On the other hand, older adults may have fewer relationships relative to others of their age from an objective standpoint, yet subjectively feel integrated and discern sufficient social support from family and friends. Older adults under different circumstances may therefore require different levels of support (Ashida &

Heaney, 2008), or social interaction to feel connected (Cornwell & Waite, 2009) and supported by others. For this reason, considering both experiences and perceptions, and understanding whether these aspects shape health differently is important to understanding how social connectedness and support are linked to health in later life.

Experienced aspects of social integration are defined as the structural and situational factors related to individuals' social relationships (Cornwell & Waite, 2009; Uchino, 2006; Uchino, 2000), such as social network size, social interaction, and social support (Cornwell & Waite, 2009; Coyle & Dugan, 2012; Steptoe, Shankar, Demakakos, & Wardle, 2013). Perceptions of connectedness and support are defined as the psychological appraisal of one's relationships and access to social resources, and how these compare to desired or expected social circumstances (Ashida & Heaney, 2008; Cornwell & Waite, 2009; Uchino, 2006; Uchino, 2009; Utz, Swenson, Caserta, & Lund, 2014). Thus, whereas actual levels of social connectedness and support among older adults reflect objective components of their social lives (Cornwell & Waite, 2009; Coyle & Dugan, 2012), perceived connectedness and support reflect their subjective evaluations and experiences (Ashida & Heaney, 2008; Cornwell & Waite, 2009; Coyle & Dugan, 2012; Steptoe et al., 2013).

Among studies that have examined both the objective and subjective dimensions of social integration, measures reflecting actual experiences and individual perceptions have not always been associated in research on both social connectedness and support. For example, studies show that loneliness, a subjective dimension of reduced social connectedness (Rook, 1990), is only weakly correlated with objective components of individuals' social lives such as marital status (Luo et al., 2012), network size (Cornwell

& Waite, 2009; Hughes, Waite, Hawkley, & Cacioppo, 2004), and frequency of interaction with network members (Cornwell & Waite, 2009; Coyle & Dugan, 2012; Utz et al., 2014). Similarly, a number of studies have found that levels of received social support are only weakly related to perceptions of social support (Lakey & Scoboria, 2005; Haber, Cohen, Lucas, & Baltes, 2007). Thus, such findings underscore that although the objective and subjective aspects of social integration are related, they reflect distinct dimensions through which social connectedness and support are experienced, and therefore, are conceptually separable constructs (Coyle & Dugan, 2012; Uchino, 2009).

Only a limited number of studies have examined the link(s) between social connectedness and/or support and health and also distinguished between objective experiences and subjective perceptions (Coyle & Dugan, 2012; Uchino, 2009). However, findings from those that have suggest that these two dimensions have separate effects on health (Ashida & Heaney, 2008; Cornwell & Waite, 2009; Coyle & Dugan, 2012; Uchino, 2009), providing further evidence for a conceptual distinction. Existing research has identified a number of different pathways, related to behavioural and psychological processes, through which objective experiences and subjective perceptions of social relationships potentially affect health outcomes both directly and indirectly (Ashida & Heaney, 2008; Cornwell & Waite, 2009; Coyle & Dugan, 2012). Both dimensions are hypothesized as having direct influences on health, with the various pathways being related to behavioural and psychological processes.

The objective characteristics of older adults' social network may directly affect their health through various factors that are situational such as access to material resources, health promoting behaviours (Cornwell & Waite, 2009), and sustained levels of physical

and cognitive functioning. Perceptions of connectedness and support may be directly related to health by promoting positive psychological states such as increased self-esteem (Cornwell & Waite, 2009), feelings of belonging and security (Ashida & Heaney, 2008) and a greater sense of control (Sheffler & Sachs-Ericsson, 2015). These psychological states may benefit the health of older adults by improving neuroendocrine and immune functioning (Ashida & Heaney, 2008). Both the objective experiences and subjective perceptions of connectedness and support may also indirectly affect physical health among older adults by buffering the negative effects of stressful experiences and life events on physiological responses (Ashida & Heaney, 2008; Sheffler & Sachs-Ericsson, 2015; Uchino, 2009).

Overall, evidence from studies comparing the more objective and subjective measures of social integration suggests that perceptions of social connectedness and social support may be more strongly associated with health outcomes in later life than are situational factors or experienced levels of these constructs (Cacioppo & Hawkley, 2003). Studies that have considered various indicators of social connectedness have found that subjective measures such as loneliness (Luo et al., 2012) and perceived quality of social relationships and interactions (Antonucci et al., 1997; Antonucci, 2001; Ryan & Willits, 2007) are more important for the health and well-being of older adults than are structural characteristics of their social ties such as social network size and composition (Antonucci et al., 1997; Antonucci, 2001; Ryan & Willits, 2007), marital status (Patterson & Veenstra, 2010). However, some existing studies also appear to suggest that subjective feelings of connectedness such as loneliness are more important for mental health outcomes, while objective measures of social connectedness or isolation are more

strongly related to physical health (Coyle & Dugan, 2012; Cornwell & Waite, 2009; Steptoe et al., 2013). On the other hand, in the case of social support, perceptions of social support have more consistently been related to beneficial health outcomes than has the receipt of social support (Thomas, 2009; Uchino, 2006; Uchino, 2009).

Existing studies attribute the relative importance of individual perceptions to the fact that not all relationships and social interactions are beneficial, but rather can include difficulties and stressful exchanges (Rook, 1997). For this reason, researchers note it is important to consider how older adults subjectively perceive the availability and quality of their social ties and resources when considering the implications of social integration for health in later life (Ashida & Heaney, 2008; Cornwell & Waite, 2009). However, distinguishing the experienced and perceived dimensions of social integration has only recently begun to receive attention in research (Cornwell & Waite, 2009; Uchino, 2009) and thus, there continues to be limited knowledge on how both dimensions are related to health in older ages (Cornwell & Waite, 2009). Furthermore, considering the objective characteristics of older adults' social lives and their subjective perceptions is an approach that will better capture their specific social circumstances, which may vary considerably due to various life course transitions and adjustments in later life, and that could lead to potential differences in the relationships between social connectedness and social support and health.

2.3 Social Connectedness, Social Support and Health Among Older Immigrants

Understanding how aspects of social integration such as social networks and support provisions are related to health among older immigrants in Canada is important for a

number of reasons. Immigrants may face unique patterns of social interaction and support in later life relative to native-born older adults due to factors associated settlement in a new country, which in turn, may lead to important disparities in health. On the one hand, immigrants may experience increased social isolation due to factors such as declining network size, language and cultural barriers, and poor access to social resources which hinder their successful settlement and integration following migration (Dunn & Dyck, 2000; Stewart et al., 2008). Therefore, if immigrants in Canada continue to experience greater social isolation in old age, for which there is evidence in existing studies (Kobayashi et al., 2008), than they may be particularly disadvantaged when compared to native-born older adults if social connectedness and support offer protective benefits for health in later life as research suggests (Wong, Yoo, & Stewart, 2007). On the other hand, older immigrants may have larger social networks and better social support to draw on due to the relationships and close bonds they establish with other immigrants through ethnic enclaves, where they face and adapt to shared challenges following their arrival in a new country (Dunn & Dyck, 2000). The availability of social support and community involvement with others of shared cultural background may therefore mean that older immigrants in Canada are not disadvantaged in terms of their social resources, and health, in older ages.

Although social integration has repeatedly been recognized as an important factor for maintaining good health in older ages (Seeman et al., 2001), relationships and social support may have especially strong influences on older immigrants' health due to their circumstances and experiences following settlement in a new country (Dunn & Dyck, 2000). For example, previous research in Canada shows that older immigrants face

barriers that lead to difficulties in accessing social services (Chow, 2010). Social connectedness and social support may therefore be important factors for the health of immigrants as they age in so far as they influence their utilization of social services such as health care. Indeed, evidence from Canada shows that increased isolation among older immigrants is associated with reduced access to and utilization of health services (Kobayashi et al., 2008). Social connectedness and social support may also be more important for the health of older immigrants' than native-born older adults if they play a more consequential role in determining their access to such services or if native-born older adults face fewer overall barriers.

Supportive relationships may also function as an important pathway to good health among older immigrants by moderating the effects of psychological stress on physical health. Older immigrants may experience increased levels of psychological distress in older ages due to factors related to their migration process such as social inequalities or discrimination (Sheffler & Sachs-Ericsson, 2015), adjustment to a new social and cultural environment (Chow, 2010), and social isolation (Dunn & Dyck, 2000). Social connectedness and social support may therefore have protective effects for the health of older immigrants by buffering the psychological consequences of such stressors, and in turn, preventing or reducing the negative physical responses that result from chronic feelings of distress. Indeed, forms of ethnic social support have been shown to help mediate the effects of stressors associated with migration on psychological well-being (Noh & Avison, 1996), which suggests that social support and community involvement among others of shared cultural background may be of particular importance for protecting against stressors and benefiting the health outcomes of this group in later life

(Seeman et al., 2001). Such findings suggest that there may be important differences in how social connectedness and social support are related to the health of older immigrants when compared to their native-born counterparts. For this reason, testing interactions between social connectedness and immigrant status, as well as social support and immigrant status, will provide useful evidence to help establish whether such differences are present.

Due the large number of immigrants currently living in Canada, as well as the continued entry of future newcomers, individuals born outside the country will increasingly account for a larger proportion of the older population (Chow, 2010). Therefore, understanding how forms of social integration affect the health of older immigrants will help to identify important areas of consideration for future health care implementations targeted towards the aging population in general. Examining the role of social connectedness and social support in shaping later-life health specifically will provide an understanding of the relative importance of social resources for the health of this group compared to native-born older adults.

Little research thus far has focused on the social integration of older immigrants in the Canadian context (Kobayashi et al., 2008), and even fewer studies have considered how social resources shape their health relative to native-born older people (Dunn & Dyck, 2000). However, the majority of these studies have focused on immigrants of all ages, and among research that has specifically considered the older population, most studies have focused specifically on separate ethnic groups (Chow, 2010; Durst, 2005). Thus, there remains limited information on how patterns of social integration in old age

influence the health of older immigrants in the Canadian context, and whether these associations differ relative to native-born older adults. However, research suggests that examining the influence that social connectedness and support have on health in later life may be of particular importance when considering the specific experiences of immigrants in Canada, and thus this study aims to fill this gap in the literature.

Chapter 3

3 Research Questions

I address three research questions to examine how aspects of social integration are related to the health of older Canadians. 1) How are social connectedness and social support associated with the health of older adults? 2) Do these constructs differ in their associations with health depending on older adults' experiences and perceptions? 3) Are social connectedness and social support differently associated with health for immigrants as compared with native-born Canadians?

Chapter 4

4 Methods

4.1 Data

4.1.1 Survey

To examine how the health of older adults varies according to different forms of social integration, this analysis uses data from the Canadian Community Health Survey (CCHS) – Healthy Aging, collected in 2008-2009. The CCHS is a series of cross-sectional surveys collected annually by Statistics Canada that gathers health-related information on the Canadian population. The CCHS-Healthy Aging is part of the CCHS program, but is specifically designed to target the older population, and to collect data on factors that impact health and aspects of the overall aging process. Administered in 2008-2009, the CCHS-Healthy Aging is representative of the Canadian population aged 45 and over living in the ten provinces, excluding the institutionalized population, members of the Canadian forces and individuals who are living on Aboriginal reserves or in collective dwellings (Statistics Canada, 2010). The groups excluded from the survey's coverage account for approximately 4% of the target population of older Canadians.

4.1.2 Sampling Design

The CCHS-Healthy Aging survey used a multistage stratified sampling design to target the population of adults 45 years of age or older living in private residences in the 10 provinces of Canada. Before selecting the sample of respondents, the desired sample size and how the sample would be allocated were determined. The goal of the CCHS-Healthy Aging survey was to produce reliable estimates of older adults for five 10-year age

groups (45–54, 55– 64, 65–74, 75–84 and 85+) and by sex for each of the 10 provinces. It was therefore established that the desired sample would include a total of 32,000 responding units, of which 5,000 respondents would be between the ages of 45-54 and 27,000 would be aged 55 or older. Then, to allocate a sample of respondents that would be representative and produce reliable estimates, the CCHS-Healthy Aging sample was first allocated to the 10 provinces, and then subsequently allocated to the urban and rural regions of each province (Statistics Canada, 2010).

A two-step strategy was used to determine how the sample would be allocated to each of the provinces. The total number of respondent units allocated to a province following these two steps was the total sample size of any given province. First, in each of the provinces, 125 respondent units were allocated to each age group of interest for both both men and women. Therefore, because the survey aimed to establish estimates for five age groups (45–54, 55– 64, 65–74, 75–84 and 85+) by sex, 10 groups of interest were allocated 125 units within any given province. This resulted in 1,250 response units per province, which in total accounted for 12,500 response units of the desired 32,000 sample. For the second step of the allocation of the sample, the 19,500 response units left to distribute were assigned to the 10 provinces based on a power allocation method with power $q=0.7$ (Statistics Canada, 2010). Following the allocation of the sample to the provinces, the sample in each province was allocated to urban and rural strata. The sample was allocated to the urban and rural strata according to the number of dwellings having people aged 45 and over in each stratum (Statistics Canada, 2010).

The stratified sampling design used to select respondents for the CCHS-Healthy Aging sample had three stages. First geographical clusters were selected, then households within

each of the sampled clusters were selected, and finally, in the last stage, one respondent was randomly selected per household. The sampling frame used by the CCHS-Healthy Aging is the 2006 Census. Therefore, the sampling population included all dwellings within the 10 Canadian provinces with at least one household member aged 43 and over in the 2006 census, as they would be at least 45 years of age or older at the start of the survey collection period in 2008 (Statistics Canada, 2010).

In the first stage of sampling, roughly 17,000 geographical clusters were created using the 2006 census blocks. In each of the provinces, the geographical clusters were divided into urban and rural strata. Before sampling clusters in every province, the survey established the number of households that would be selected in each cluster as this determined the required number of clusters to sample per province. In an effort to balance collection costs and the potential for the “cluster effect”, the CCHS-Healthy Aging established that urban clusters would have 35 households selected and rural clusters 20 households. Then, the overall number of clusters required to meet the established sample size for each province was derived using the target sample size of 35 and 25 cases per urban and rural cluster. The specific number of urban and rural clusters to select in every province was determined by the proportion of households with a member aged 85 and older in each of the two groups of clusters. Finally, the selection of clusters for the CCHS-Healthy Aging was done using a probability proportional to size sampling approach, where the larger the number of persons aged 45 and older in a given cluster, the higher the probability of that cluster being selected (Statistics Canada, 2010).

The second stage of sampling for the CCHS-Healthy Aging involved selecting households in each of the geographical clusters sampled. Information from the 2006 census was used to target households that were more likely to include individuals aged 45 and older, but only dwellings that included at least one person aged 45 and older were considered for the sample. To select households for the CCHS-Healthy Aging, households in each of the geographical clusters sampled were divided into three strata. The stratification divided dwellings into groups for households with at least one person aged 85 and older, those with only people below the age of 55, and all other dwellings. Clusters were stratified in this way to ensure that the appropriate number of people in each age group would be selected for the sample. Then, depending on whether the clusters selected were an urban or rural cluster, the sample of either 35 or 20 dwellings was allocated across the three strata. The specified number of dwellings allocated to each of the three strata was fixed for all provinces, with the exceptions of Quebec and Ontario. Lastly, the required number of dwellings within each stratum was selected using simple random sampling (Statistics Canada, 2010).

For the third and final stage of sampling, one person from each of the dwellings selected was chosen at random to be the respondent for the CCHS-Healthy Aging survey. In every household, all eligible respondents aged 45 and older were assigned a different selection probability factor. To achieve the targeted number of respondents in each age group, the selection probabilities were based on the five age groups for which estimates were required and varied by province. Households with no eligible respondents, which were either those with only people aged 45 and younger or those not in the target population, were classified as out of scope (Statistics Canada, 2010).

Once respondents for the CCHS-Healthy Aging sample were selected, data were collected using computer assisted interviewing. Valid interviews were conducted between December 2008 and November 2009. The response rates were 80.8% at the household level and 92.1% at the person level, resulting in an overall response rate of 74.4% and a total of 30,865 respondents (Statistics Canada, 2010).

4.1.3 Survey Weight

To obtain estimates that are representative of the Canadian population aged 65 and older and not just the sample, I apply the weight provided in the CCHS-Healthy Aging dataset to all of the analysis. The final CCHS-Healthy Aging weight was derived through seven separate adjustments that were part of the survey's overall weighting strategy. The series of adjustments account for factors such as the stratified sampling design, non-response, and extreme values produced by outliers. The first three stages in the CCHS-Healthy Aging weighting strategy made adjustments at the household-level, followed by three adjustments applied at the respondent-level, and the seventh step calibrated the final weight (Statistics Canada, 2010).

In the first step of the weighting process, the sample was weighted with an initial household weight that covered both the selection of geographical clusters and of households within each cluster (the first 2 stages of the sample design). The initial weight was derived from the cluster weight and the dwelling weight used in the survey. The cluster weight represented the inverse of the probability of selecting a given cluster, and the dwelling weight was the inverse of the probability of selecting the dwelling within each cluster. The initial weight applied to the sample was the product of these two weights. Following the application of the initial household weight to the sample, the

second step in the CCHS-Healthy Aging weighting process accounted for sample units outside of the targeted population. The proportion of dwellings identified as out of scope and their associated weight were removed from the sample. Then, the third step necessary for obtaining the final survey weight involved calculating an adjustment factor to account for non-responding households. In this step, the sample was divided into groups of households with similar response properties. A scoring method based on logistic regression determined the propensity to respond, and these response probabilities were then used to group the sample into response homogeneity groups. Then, weights of the non-responding households were redistributed to the responding households within a given group, after which the non-responding households were dropped from the overall survey weighting process (Statistics Canada, 2010).

For the fourth step, the household level weights computed to this point were converted to the person level given that individuals were the desired sampling units. The person-level weights were obtained by multiplying the household weights at this points by the inverse of the probability of selection for the person selected in the household. Then, in the fifth step of the weighting strategy, an adjustment factor was applied to the weights of respondents to account for person non-response. The same method was used as in the treatment of household non-response, where response homogeneity groups were created and the weights on non-respondents were redistributed within the groups. Once the adjustment factor was applied to the weight, non-responding persons were dropped from the weighting process from this point onward. Following the adjustments applied to respondents, the sixth step of the weighting process adjusted for units that had extreme weights relative to other units within their respective sex-age group. The weights of

respondents were adjusted if they were both an outlier unit that had a large impact on the variance and a unit that represented a large proportion of their respective province-age-sex group. The weights of such respondents were adjusted downward using a trimming approach referred to as “winsorization” (Statistics Canada, 2010).

The seventh and last adjustment used to derive the final CCHS-Healthy Aging survey weight was calibration. Calibration was done using population estimates based on the most recent census counts, counts of births, deaths and migration, as well as the most recent geography. Calibration was done using a method called “Calmar” to derive final weights that when summed, would correspond to the population estimates for all 10 age-sex groups at the province level. In cases where there weren’t enough respondents in a particular group to calibrate at the province by age by sex level, collapsing was done either within the province or by gender (Statistics Canada, 2010).

4.2 Analytic Sample

The CCHS - Healthy Aging includes a sample of 30,865 respondents ages 45 and older living in the ten Canadian provinces. Respondents below the age of 65 (N=14,496) are excluded from the analysis given that the focus is on older Canadians, and 65 is the chronological age generally used as a benchmark to distinguish older adults in both research and policy (Durst, 2005). Respondents with missing data for self-rated health (N=12) are also excluded to prevent biased estimates in the analysis as this is the primary outcome measure examined. In addition, to make comparisons between immigrant and native-born older adults, respondents for whom immigrant status was missing (N=267) are also excluded.

The analysis is also limited to respondents for whom data was available for at least 75% of the variables used to construct the measures of social connectedness and social support. This resulted in the omission of 1,235 respondents from the sample for whom such information was not available. Limiting the sample to respondents for whom data was available for at least 75% of the variables used to construct the measures of social connectedness and social support was a strategy used prevent systematic errors and ensure that sample sizes were comparable across models of social connectedness and social support. Lastly, respondents who had missing data for marital status (N=6) and the reception of homecare (N=5) were also dropped due to collinearity. The final analytic sample includes 14,844 respondents, 90.7% of respondents aged 65 and over in the survey.

Chapter 5

5 Measures

5.1 Outcome Variable: Self-Rated Health

The outcome variable in this analysis is self-rated health. The variable is coded from a question included in the survey that asked respondents how they would describe the general state of their overall health. The possible responses were “excellent” “very good” “good” “fair” and “poor”. For the analysis, self-rated health was coded into a dichotomous variable by combining “excellent” “very good” and “good” to create a category for respondents with “good health”, and “fair” and “poor” into a separate category to account for those with “poor health”. Although self-reported health is a subjective measure, research has repeatedly demonstrated that individuals’ personal ratings of their overall health effectively assess health status, and accurately predict mortality (Jylhä, 2009). Furthermore, self-rated health has been shown to be a reliable measure across age, gender, and different ethnic and racial groups (Finch et al., 2002). The effectiveness of self-rated health has been attributed to the fact that the measure captures a wide range of factors related to both health directly and health trajectories such as symptoms, function, health behaviours, and physical health (Molarius & Janson, 2002), as well as psychological and emotional characteristics (Finch et al., 2002). Thus, self-rated health is a widely employed measure of health, especially in epidemiological and population-based studies, with established validity in empirical research (Cornwell & Waite, 2009; Jylhä, 2009).

5.2 Key Explanatory Variables: Social Connectedness and Social Support

The key explanatory variables are social connectedness and social support. Both of these variables are coded as scales that assess older adults' level of social connectedness and social support. The separate scales are created by combining a range of indicators that capture various aspects of either social connectedness or support, and that reflect both respondents' actual social situations and subjective perception.

The social connectedness scale is constructed by combining sixteen items that assess respondents' level of experienced connectedness with social contacts and different groups, as well as their perceptions of connectedness. Social support is measured with a scale based on 13 items assessing both received and perceived levels of social support from informal sources such as friends and family. Given that respondents needed data for a minimum of 75% of the variables used in the two respective scales, information had to be provided for at least 12 of the 16 variables of connectedness, and 10 of the 13 measures of social support to be included in the sample. The scales are constructed by standardizing each of the respective variables, and then averaging the standardized item scores to provide an overall score of either social connectedness or social support for older adults.

5.2.1 Overall Social Connectedness

The indicators included in the social connectedness scale capture two aspects of respondents' experienced social connectedness: social network characteristics and social participation. In addition, indicators of loneliness, satisfaction with the frequency of social participation, sense of belonging to local community, and availability of positive

social interaction are incorporated into the scale to capture four aspects of perceived social connectedness among respondents. Computing Chronbach's alpha to assess the reliability of the scale generates a score of 0.78, indicating that the items chosen to measure social connectedness (both real and perceived) result in a scale that has an acceptable internal consistency. Scores on the scale range from a -2.13, the lowest possible score, to 1.10, the highest possible score of social connectedness.

5.2.1.1 Experienced Social Connectedness

The two aspects of experienced social connectedness considered in this analysis, social network characteristics and social participation, have been used to conceptualize social connectedness in previous studies on the social integration of older adults (Cornwell, Laumann & Schumm, 2008; Cornwell & Waite, 2009). The characteristics of respondents' social networks are captured with three indicators incorporated into the scale of social connectedness. First, the size of older adults' egocentric social network is assessed with a measure on the number of close relationships respondents report having with both friends and relatives. Respondents were asked "How many close friends and close relatives do you have, that is, people you feel at ease with and can talk to about what is on your mind?" and I recode the variable into the categories: "0", "1", "2 to 3", "4 to 10", and "10 or more". Second, an indicator on respondents' living arrangements is included to capture whether older adults live alone or with other members of their network. The original variable measures the number of persons who usually live in the household, and I recode the variable as "lives alone" for respondents reporting no others, "lives with 1 other" for those with 1 household member, and "lives with 2 or more" for respondents reporting at least 2 other people.

The third indicator of social network characteristics captures older adults' exposure to members of their network. Contact with network members is measured with a single variable that assesses the frequency with which respondents eat meals in the company of others. Respondents were asked "How often do you eat at least one meal each day with someone" and the five possible responses were "never", "rarely", "sometimes", "often" and "always". I recode the variable to differentiate respondents with little, some, and frequent contact by combining "never" and "rarely" into a single category, and "often" and "always" into another. Although frequency of eating meals with others does not capture the full extent of older adults' exposure to their close network members, due to data limitations it is the best available measure to capture regular contact with social ties.

Indicators of social participation and community involvement comprise six of the scale items for social connectedness. These measures capture different activities outside of the home that older adults may engage in, as well as the frequency with which they participate in these activities. The six types of social participation and community involvement considered are: activities with friends or family, volunteering, neighbourhood and community activities, involvement with organized groups, sports or physical activities with other people, and other recreational activities. Each of these indicators was included in the questionnaire and respondents were asked how often they participated in the respective activity. The possible responses were "weekly", "monthly", "yearly" and "never", with weekly being the highest scored item for the scale.

5.2.1.2 Perceived Social Connectedness

The social connectedness scale assesses three aspects of older adults' perceived connectedness: loneliness, sense of community connectedness, and perceived availability

of social relationships. Respondents' loneliness is measured with three indicators. These three items form a scale of loneliness, which was originally developed by Hughes et al. (2004) and is included in the CCHS-Healthy aging questionnaire. The scale has been found to be highly reliable, both in terms of internal consistency and test-retest reliability, as well as valid, supporting both convergent validity and construct validity (Russell, 1996). Respondents were asked "How often do you feel that you lack companionship?", "How often do you feel left out?" and "How often do you feel isolated from others?". Categories for all three questions included "rarely" "sometimes" and "often", with "rarely" coded to receive the highest score on the social connectedness scale and "often" the lowest.

Sense of community connectedness comprises two of the sixteen indicators used to construct the scale of social connectedness. First, an indicator that assesses respondents' desire to participate in more social activities is used to capture older adults' perceived satisfaction with their levels of social participations. Coded as a dichotomous variable with the categories "yes" and "no", respondents answering "no" receive a higher score on the social connectedness scale given that they perceive themselves to be more connected than those who wish to participate more. The second indicator of perceived community connectedness is an item that measures feelings of community belonging. Respondents were asked "How would you describe your sense of belonging to your local community" and the possible responses being "very strong", "somewhat strong", "somewhat weak" "very weak".

Finally, three indicators are included to assess older adults' perceived availability of social interactions that provide positive reinforcement. These measures capture older

adults' perceived social connectedness because they reflect the extent to which they perceive themselves as having established strong social ties that provide positive interactions. The three items used were originally developed as part of the Medical Outcome Study (MOS) Social Support Survey, an instrument created by Sherbourne & Stewart (1991). Although the measures were initially developed as part of a 4-item scale of positive social interaction intended to capture perception of social support, I use three of these items as measures of perceived social connectedness because the questions ask respondents about the availability of interactions with others that or may not involve exchanges of support. Sherbourne & Stewart (1991) define positive social interaction as "the availability of other persons to positively interact with", and therefore these measures do not necessarily capture whether forms of support occurred within these interactions. These three items I use asked respondents "how often they had someone..." "to have a good time with?", "someone to get together with for relaxation?" and "someone to do something enjoyable with?". The possible responses were "none of the time", "little of the time", "some of the time", "most of the time" and "all of the time". I recode the variable to include three categories: "never" "sometimes" and "most of the time", with "most of the time" as the highest scoring category of social connectedness.

5.2.2 Overall Social Support

To construct the scale of social support, actual levels of social support received by older adults are assessed with variables reflecting one potential form of social support: instrumental support. On the other hand, the variables used to measure perceived (availability of) social support consider emotional, instrumental and informational forms of support among older adults. Together, these variables assess the overall level of

support older adults have received with activities of daily living, as well as their perception of social support from family and friends. The social support scale (including both real and perceived support items) has good internal consistency, with an alpha score of 0.81. In addition, the scale ranges from -2.29 to 1.71, with higher scores indicating higher levels of social support.

5.2.2.1 Received Social Support

Five items are included in the social support scale as indicators of received social support. These items are measures of instrumental social support that has been received by respondents, and they assess whether friends and family have provided assistance with personal care, meals, house activities, managing care and transportation. Respondents were asked “During the past 12 months, did you receive short-term or long-term assistance for [...] from family, friends or neighbours?” “for personal care such as assistance with eating, dressing, bathing or toileting”, “meal preparation or delivery”, “help for activities such as housework, home maintenance or outdoor work”, “transportation, including trips to the doctor or for shopping”, and “managing care, such as making appointments”. Each of these variables is coded as a dichotomous variable that includes the categories “yes” or “no”.

5.2.2.2 Perceived Social Support

The indicators of perceived social support also come from the MOS Social Support Survey created by Sherbourne & Stewart (1991). The original survey consisted of 19 items measuring four categories of social support: informational/emotional, instrumental, positive social interaction, and affectionate support. I chose to consider three of these forms of social support, as they are the types of support most consistently identified and

used in research, particularly in studies focusing on older populations (Harvey & Alexander, 2010; Krause & Markides, 1990; Thomas, 2009). Specifically, I consider perceptions of emotional, informational, and instrumental support. Each of the indicators included in the social support scale assessing perceived social support asked respondents “how often if each of the following kinds of support available to you if you need it”.

Perceived emotional support is assessed with two indicators on how often older adults “have someone to confide in or talk about yourself or your problems?” and “someone to love you and make you feel wanted”. The social support scale also includes two indicators on perception of informational support that measure the frequency with which respondents can rely on “someone to give you information in order to help you understand a situation?” and “someone to turn to for suggestions about how to deal with a personal problem?”. 3) Lastly, perceived instrumental support is assessed in the social support scale with 4 items that assessed how often respondents could rely on “someone to help you if you were confined to bed?”, “someone to take you to the doctor if you needed it?”, “someone to prepare your meals if you were unable to do it yourself?” and “someone to help with daily chores if you were sick?”.

All of the variables used as indicators of perceived social support had 5 possible response categories in the original dataset: “none of the time”, “little of the time”, “some of the time”, “most of the time” and “all of the time”. I recode each of the variables to include 3 categories, “Never”, “Sometimes” and “Most of the time”, by combining “little of the time” and “some of the time” into a single category, as well as “most of the time” and “all of the time” into another to reflect “Sometimes” and “Most of the time”, respectively.

5.3 Control Variables: Sociodemographic Characteristics and Health Status

5.3.1 Sociodemographic Characteristics

Demographic characteristics are included in the models to control for potentially confounding factors. The characteristics considered are immigrant status, sex, age, marital status, education, income, race, province, and location of residence. Immigrant Status is coded as a dichotomous variable. Sex is coded as “male” or “female”. Age is coded in 5-year interval categories that are 65-69, 70-74, 75-79, 80-84, and 85 and over. Marital Status is coded into 4 categories: “Married or Common Law”, “Widowed”, “Divorced or Separated” and “Single”. Education is measured as respondents’ highest completed level of education and includes the categories “less than secondary”, “secondary completed”, “some post-secondary” and “post-secondary completed”. Total household income from all sources is used as a measure of income because it considers both personal and household income. The variable takes into account forms of income coming from various sources such as work, investments, pensions or government. The measure therefore not only captures the individual financial situation of respondents, but also whether respondents are living in a household with greater resources. Respondents’ total household income is measured in increments of \$20,000 and coded to include the categories: “less than \$20,000”, “\$20,000 to \$39,000”, “\$40,000 to \$59,000”, “\$60,000 to \$79,000”, and “\$80,000 or more”. The public CCHS-Healthy Aging dataset does not provide detailed information on race, but a measure distinguishing respondents who are “white” or “other” is available. In the analysis, race is measured with the original dichotomous variable to at least make the distinction between visible minority and non-visible minority respondents. The distinction between visible minority and non-visible

minority respondents is important because these groups have different experiences in Canadian society, which in turn, may be related to different health outcomes.

Province of residence is controlled because health in Canada is a provincial jurisdiction, and variations in health status may therefore be present among respondents depending on access to healthcare and health resources available to both the general population and older adults within their respective regions. The provinces of Manitoba, Saskatchewan and Alberta are combined to create a category for respondents living in the “Prairies”. Those living in the “Atlantic” are represented by a category that includes the provinces of Newfoundland and Labrador, Prince Edward Island, Nova Scotia, and New Brunswick. Ontario, Québec and British Columbia are each kept as individual categories because these three provinces are home to largest share of the Canadian population, and account for even larger proportions of the immigrant population (Chui, Flanders, & Anderson, 2011). Nunavut, the Northwest Territories and the Yukon are not included in the analysis because no participants were sampled in these regions. Lastly, location of residence is measured with a dichotomous variable that assesses whether respondents live in a census metropolitan area or not, as more populated areas have a higher availability of health resources and care.

5.3.2 Health Status

I also control for respondents’ current health status by including measures of diagnosed chronic health problem, functional limitation, and receipt of formal homecare services. Controlling for these factors is important because older adults’ health status impacts their ability to remain socially connected, as well as the amount of social support they require. Furthermore, older adults’ health levels and function are also greatly related to

their own self-reports of health (Coyly & Dugan, 2012). Therefore, health-related factors may be confounding the relationships I am examining, or simply covariates that influence self-rated health, making it important to control for health status or function (Zunzunegui, Koné, Johri, Béland, Wolfson, & Bergman, 2004). Respondents' health status may also mediate the associations between social connectedness and social support, and self-rated health (Caetano, Silva & Vettore, 2013). For example, increased contact with social network members and the provision of social support can result in either increased functional health, use of health services, and healthier behaviours (Caetano et al., 2013). On the other hand, reduced relationships and low social support may be related to worse health and function, and lower use of health services. These health related factors and behaviours, in turn, influence individuals' own evaluations of their health. It is therefore important to control for factors related to health and functional ability when examining the ways in which social relationships are associated with the self-reported health of older adults, as has frequently been done in other studies (Caetano et al., 2013; Coyle & Dugan, 2012; Gilmour, 2012; Litwin, 2006; Zunzunegui et al., 2004; Zunzunegui, Beland & Otero, 2001).

To control for a diagnosed chronic health problem, I use a binary indicator that assesses whether respondents have been diagnosed as having at least one or more chronic conditions. Respondents were asked whether they suffered from any of a number of long-term conditions expected to last, or having already lasted, six months or more and that had been diagnosed by health professional. I use the original variable included in the CCHS-Healthy Aging, which was derived by taking into account 26 chronic conditions commonly diagnosed in older ages. Included in the measure are three indicators of

musculoskeletal disorders (arthritis, osteoporosis and back problems), two indicators of cardiovascular disease (hypertension and stroke), three types of coronary heart disease (angina, heart attacks and heart disease), two degenerative disorders (Alzheimer's disease and Parkinson's disease), four respiratory diseases (asthma, chronic bronchitis, emphysema, and chronic obstructive pulmonary disease), two types of digestive disorders (ulcers and bowel disorders), as well as two vision related diseases (cataracts and glaucoma). Other indicators of chronic health problem also included in the variable are whether respondents have been diagnosed with diabetes, cancer, migraines, a thyroid condition, a mood disorder, an anxiety disorder, incontinence, or any other physical or mental condition.

The incidence of a chronic health problem is measured with dichotomous variable rather than as a summative measure of co-morbidity because the public use version of the CCHS-Healthy Aging dataset does not provide the individual variables for diagnoses of alzeihmer's or parkinsons disease. However, research shows that degenerative diseases are among the most functionally debilitating in old age, and often lead to increased levels of social isolation and loneliness (Freedman & Martin, 2000). Accounting for the presence of these conditions is therefore important when analyzing levels of social connectedness and social support among older adults. In addition, studies have also demonstrated the beneficial impact of social connectedness for older adults with degenerative disorders such as alzeihmer's, or as a preventative measure (Cornwell & Waite, 2009), which further underscores the importance of capturing such diseases. Thus, I use this measure to capture a diverse range conditions, of varying levels of severity, by trading off the possibility to examine these conditions individually in the analysis.

Overall, the measure reflects a number of chronic conditions that research has demonstrated are significantly associated with functional limitations among older adults (Freedman & Martin, 2000), making it a variable that is appropriately suited for the analysis.

Respondents' level of functional limitation, the second measure of health status included in the analysis, is a derived variable in the CCHS-Healthy Aging dataset. The variable assesses respondents' functional ability in activities of daily living and then rates them on a five-point scale ranging from no impairment to total impairment. The instrument used to classify respondents was developed by Fellembaum & colleagues at Duke University (CCHS-Healthy Aging Derived Variable Specifications). Included in the measure are seven basic activities of daily living, as well as seven instrumental activities of daily living. Respondents were asked whether they had trouble performing any of the 14 tasks reflecting activities of daily living. The five categories included in the original variable were: 'no functional impairment', 'mild impairment', 'moderate impairment', 'severe impairment' and 'total impairment'. I recode this variable into two categories to distinguish respondents with no functional impairment from those with some form of impairment (includes mild, moderate, severe and total impairment). I code the indicator of functional limitation in this manner for the analysis to differentiate all respondents who may require some form of assistance through social support from family and friends due to reduced functional ability from those who do not.

Last, I control for whether respondents have received professional homecare assistance. This measure is an indicator of health status among older adults, given that those who require or receive daily assistance with activities of daily living are more likely to have

reduced levels of functioning and health. In addition, because the analysis examines the influence of social support received from friends and family on the health of older adults, controlling for formal care is also important given that this could potentially be a confounding factor. The variable used as an indicator of whether respondents have received formal homecare services is also a derived variable that assesses whether respondents received professional assistance at home during the last 12 months due to a health condition or functional limitation. Included in the measure are 8 types of assistance that respondents may have received, which include personal care, medical care, making appointments, house activities, transportation, making meals or other forms of assistance. The variable provided in the dataset groups respondents who received any form of professional assistance, and those who received none, and I keep these original categories.

Chapter 6

6 Analytic Strategy

First, I examine the characteristics of the sample by immigrant status for indicators included in the measures of social connectedness (Table 1) and social support (Table 2). Differences in mean values for immigrant and native-born older adults are tested using one-way analysis of variance. Then, cross-tabulations comparing the distributions of immigrant and native-born older adults across covariates for sociodemographic characteristics and health status are also examined. These results (Table 3) compare percentage distributions between the two groups of older adults, and chi-square tests are used to test the bivariate associations.

Next, I test pairwise correlations between each of the key predictor variables to analyze how strongly the measures of social connectedness and social support are associated with one another. Bivariate correlations are examined using both the overall measures of social connectedness and social support, as well as the respective measures of experience and perception. These analyses, which are presented in Table 4, evaluate to what extent the constructs of connectedness and support account for separate dimensions in the social lives of older adults.

To analyze whether social connectedness and social support are related to the health of older adults, I use binary logistic regression models to estimate the likelihood of good self-rated health. Logistic regression is used due to the dichotomous nature of the self-rated health outcome. In the second step of the analysis (Table 5), bivariate regressions

are run to test the independent relationships between self-rated health and each of the key predictor and control variables.

Next, multivariate regression models are estimated to examine the first research question in this analysis: how the likelihood of good self-rated health differs by levels of social connectedness and social support, controlling for sociodemographic characteristics and health status. These results are presented in Table 6. Sociodemographic controls included in the multivariate models are sex (X_S), age(X_A), partnership status (X_{PS}), educational attainment (X_{ED}), household income(X_{HI}), race (X_R), province (X_P), and region of residence (X_{RR}). In addition, diagnosed chronic conditions(X_{CC}), functional impairment (X_{FI}) and reception of formal homecare by a healthcare professional(X_{FH}) are the measures included as controls for health status.

I estimate a series of five nested models, starting with separate models for social connectedness and social support that control for sociodemographic characteristics, before also introducing controls for health status into each of the two respective models. Then, in the fifth and final model, I examine social connectedness and social support together, to investigate whether these two constructs are independently associated with the health of older adults. The final model also controls for older adults' sociodemographic characteristics and health status.

Where...

Research Question 1:

$$\text{Model (5): } \ln\left(\frac{\pi}{1-\pi}\right) = \beta_0 + \beta_1 X_{SC} + \beta_2 X_{SS} + \beta_3 X_S + \beta_4 X_A + \beta_5 X_{PS} + \beta_6 X_{ED} + \beta_7 X_{HI} \\ + \beta_8 X_R + \beta_9 X_P + \beta_{10} X_{RR} + \beta_{11} X_{CC} + \beta_{12} X_{FI} + \beta_{13} X_{FH} + e$$

π is the Proportion Good Self-Rated Health X_R is Race

X_{SC}	is Social Connectedness	X_P	is Province
X_{SS}	is Social Support	X_{RR}	is Region of Residence
X_S	is Sex	X_{CC}	is Chronic Conditions
X_A	is Age	X_{FI}	is Functional Impairment
X_{PS}	is Partnership Status	X_{FH}	is Formal Homecare
X_{ED}	is Education	e	is Error Term
X_{HI}	is Household Income		

The fourth part of the analysis addresses my second research question on whether there are differences by experience and perception in extent to which social connectedness and social support are associated with older adults' self-reported health. Once again, a series of logistic regression models predicting good self-rated health are estimated, and these results are included in Table 7. The first and second models examine whether the likelihood of good health varies according to levels of experienced and perceived social connectedness, and received and perceived social support, respectively. Both models include controls for sociodemographic characteristics and health status. Then, the third and final model for this research question considers experienced and perceived levels of social connectedness and social support simultaneously, also controlling for sociodemographics and health status.

Research Question 2:

$$\begin{aligned} \text{Model (3): } \ln\left(\frac{\pi}{1-\pi}\right) = & \beta_0 + \beta_1 X_{ESC} + \beta_2 X_{PSC} + \beta_3 X_{RSS} + \beta_4 X_{PSS} + \beta_5 X_S + \beta_6 X_A + \beta_7 X_{PS} \\ & + \beta_8 X_{ED} + \beta_9 X_{HI} + \beta_{10} X_R + \beta_{11} X_P + \beta_{12} X_{RR} + \beta_{13} X_{CC} + \beta_{14} X_{FI} \\ & + \beta_{15} X_{FH} + e \end{aligned}$$

Where...

π	is the Proportion Good Self-Rated Health	X_{HI}	is Household Income
X_{ESC}	is Experienced Social Connectedness	X_R	is Race

X_{PSS}	is Perceived Social Connectedness	X_P	is Province
X_{RSS}	is Received Social Support	X_{RR}	is Region of Residence
X_{PSS}	is Perceived Social Support	X_{CC}	is Chronic Conditions
X_S	is Sex	X_{FI}	is Functional Impairment
X_A	is Age	X_{FH}	is Formal Homecare
X_{PS}	is Partnership Status	e	is Error Term
X_{ED}	is Education		

Last, I investigate whether the extent to which social connectedness and social support are related to health varies for immigrant and native-born older adults, the third research question of this study. Interaction terms are introduced in the models to estimate how the likelihood of good self-rated health by social connectedness and social support differs by immigrant status. The series of three models in Table 8 assess differences between immigrant and native-born older Canadian for measures of overall connectedness and support.

First, interactions for social connectedness and immigrant status, and social support and immigrant status are tested in separate models, and then both interactions are tested together in Model 3. All three models control for respondents' gender, age, partnership status, educational attainment, household income, race, and region of residence, as well as diagnosed chronic conditions, functional impairment and reception of formal homecare.

Research Question 3:

$$\begin{aligned} \text{Model (3): } \ln\left(\frac{\pi}{1-\pi}\right) = & \beta_0 + \beta_1 X_{SC} + \beta_2 X_{SS} + \beta_3 X_S + \beta_4 X_A + \beta_5 X_{PS} + \beta_6 X_{ED} + \beta_7 X_{HI} + \\ & \beta_8 X_R + \beta_9 X_P + \beta_{10} X_{RR} + \beta_{11} X_{CC} + \beta_{12} X_{FI} + \beta_{13} X_{FH} + \beta_{14} X_I + \\ & \beta_{15} X_{SC} * X_I + \beta_{16} X_{SS} * X_I + e \end{aligned}$$

Where...

π	is the Proportion Good Self-Rated Health	X_{RR}	is Region of Residence
X_{SC}	is Social Connectedness	X_{CC}	is Chronic Conditions
X_{SS}	is Social Support	X_{FI}	is Functional Impairment
X_S	is Sex	X_{FH}	is Formal Homecare
X_A	is Age	X_I	is Immigrant Status
X_{PS}	is Partnership Status	$X_{SC} * X_I$	is Interaction between Social Connectedness and Immigrant Status
X_{ED}	is Education	$X_{SS} * X_I$	is Interaction between Social Support and Immigrant Status
X_{HI}	is Household Income	e	is Error Term
X_R	is Race		
X_P	is Province		

Next, in Table 9, a series of four models test whether the relations between older adults' self-rated health, and experienced and perceived measures of both connectedness and support vary by immigrant status. Differences in social connectedness are first examined with a model that includes two interactions: one for experienced social connectedness and immigrant status, and another for perceived connectedness and immigrant status. Similarly, differences between immigrant and native-born older Canadians in the relation of social support to health are examined with a model that includes interactions for experienced social support and immigrant status, as well as perceived social support and immigrant status. Both of these models control for respondents' sociodemographics and health status. Then, I analyze whether variations by nativity in the relations of connectedness and support to health remain when both of these constructs are considered simultaneously. The same two previous models are tested, but this time also controlling for experienced and perceived social support when testing interactions between connectedness and immigrant status (Model 3), and experienced and perceived social connectedness when testing interactions between support and immigrant status (Model 4).

Research Question 3:

$$\begin{aligned} \text{Model (3): } \ln\left(\frac{\pi}{1-\pi}\right) = & \beta_0 + \beta_1 X_{\text{ESC}} + \beta_2 X_{\text{PSC}} + \beta_3 X_{\text{RSS}} + \beta_4 X_{\text{PSS}} + \beta_5 X_{\text{S}} + \beta_6 X_{\text{A}} + \beta_7 X_{\text{PS}} \\ & + \beta_8 X_{\text{ED}} + \beta_9 X_{\text{HI}} + \beta_{10} X_{\text{R}} + B_{11} X_{\text{P}} + \beta_{12} X_{\text{RR}} + B_{13} X_{\text{CC}} + \beta_{14} X_{\text{FI}} \\ & + \beta_{15} X_{\text{FH}} + \beta_{16} X_{\text{I}} + \beta_{17} X_{\text{ESC}} X_{\text{I}} + \beta_{18} X_{\text{PSC}} X_{\text{I}} + e \end{aligned}$$

$$\begin{aligned} \text{Model (4): } \ln\left(\frac{\pi}{1-\pi}\right) = & \beta_0 + \beta_1 X_{\text{ESC}} + \beta_2 X_{\text{PSC}} + \beta_3 X_{\text{RSS}} + \beta_4 X_{\text{PSS}} + \beta_5 X_{\text{S}} + \beta_6 X_{\text{A}} + \beta_7 X_{\text{PS}} \\ & + \beta_8 X_{\text{ED}} + \beta_9 X_{\text{HI}} + \beta_{10} X_{\text{R}} + B_{11} X_{\text{P}} + \beta_{12} X_{\text{RR}} + B_{13} X_{\text{CC}} + \beta_{14} X_{\text{FI}} \\ & + \beta_{15} X_{\text{FH}} + \beta_{16} X_{\text{I}} + \beta_{17} X_{\text{RSS}} X_{\text{I}} + \beta_{18} X_{\text{PSS}} X_{\text{I}} + e \end{aligned}$$

Where...

π	is the Proportion Good Self-Rated Health	X_{CC}	is Chronic Conditions
X_{ESC}	is Experienced Social Connectedness	X_{FI}	is Functional Impairment
X_{PSS}	is Perceived Social Connectedness	X_{FH}	is Formal Homecare
X_{RSS}	is Received Social Support	X_{I}	is Immigrant Status
X_{PSS}	is Perceived Social Support	$X_{\text{ESC}} * X_{\text{I}}$	is Interaction between Experienced Connectedness and Immigrant Status
X_{S}	is Sex	$X_{\text{PSC}} * X_{\text{I}}$	is Interaction between Perceived Connectedness and Immigrant Status
X_{A}	is Age	$X_{\text{RSS}} * X_{\text{I}}$	is Interaction between Received Support and Immigrant Status
X_{PS}	is Partnership Status	$X_{\text{PSS}} * X_{\text{I}}$	is Interaction between Perceived Support and Immigrant Status
X_{ED}	is Education	e	is Error Term
X_{HI}	is Household Income		
X_{R}	is Race		
X_{P}	is Province		
X_{RR}	is Region of Residence		

Chapter 7

7 Results

7.1 Descriptive Statistics

Tables 1 and **2** present descriptive statistics of the sample, comprised of 3,079 older immigrants and 11,765 native-born older adults. **Table 1** presents summary statistics for indicators included in the measures of social connectedness for both immigrant and

native-born older adults. First, the overall measure of social connectedness (Mean=0.09; SD=0.45) shows that older immigrants in Canada are less socially connected than are native-born older adults. As **Table 1** demonstrates, among immigrants aged 65 and older, the average score on the scale of social connectedness is 0.04, compared to 0.11 among their native-born counterparts ($p<.001$). In addition, the discrepancy between the two groups in mean levels of overall connectedness appears to be the result of both differences in the objective experience of social connectedness and varying amounts of perceived social connectedness. The separate measures of experienced and perceived social connectedness in **Table 1** indicate that relative to the native-born, immigrants have significantly lower overall means scores for both of these aspects of social connectedness. For native-born older adults, the average level of experienced social connectedness is 0.14, whereas it is only 0.06 for older immigrants ($p<.001$). Similarly, the mean level of perceived social connectedness is 0.08 among native-born older adults, but only 0.03 among older Canadian immigrants ($p<.001$).

Although native-born and immigrant older adults have significantly different overall mean levels of both experienced and perceived connectedness, the two groups show more substantial variations in their experiences of social connectedness than in their perceptions. This is made evident when the various indicators used to capture either the experiences or perceptions of connectedness are examined individually, and compared between both groups. As **Table 1** demonstrates, older immigrants differ significantly from their native-born counterparts across all nine items assessing the actual experience of connectedness. On the other hand, significant differences between the two groups of

older adults are only present for five of the eight indicators of perceived social connectedness.

Measures on the objective experience of social connectedness demonstrate that, in general, older immigrants in Canada are less socially connected than are native-born older adults across all dimensions of social connectedness. Older immigrants have a slightly smaller mean number of close relationships, and lower community involvement and social participation relative to native-born older adults. On average, immigrants report having 2.85 friends and family members with whom they consider being close, whereas the mean number of close relationships reported by native-born older adults is 2.91 ($p < .001$). Likewise, across all six activities considered in the analysis, immigrants have lower rates of community involvement and social participations than their native-born counterparts. The difference in means is, however, smaller with respect to how often they socialize with friends and family members, as older immigrants, whose average score is 2.26, are only slightly less likely than the native-born, whose mean score is 2.37, to do so on a weekly basis (score of 3=weekly and 2=monthly participation; difference significant at $p < .001$). On the other hand, older immigrants are considerably less likely than the native-born to engage in other social activities such as volunteering or neighbourhood events. As **Table 1** demonstrates, the average frequency of participation is at least 0.20 points lower among older immigrants than native-born older adults for all other activities ($p < .001$).

Although older immigrants are less socially connected than native-born older adults, as reflected by their lower means for seven of the nine measures of experienced social connectedness, an exception to this pattern is in the extent of their social network

connectedness. As **Table 1** shows, older immigrants are less likely to live alone and slightly more likely to eat meals in the company of others than are native-born older adults (0.95 vs 0.77; $p < .001$ and 2.65 vs. 2.61; $p < .001$, respectively).

Despite experiencing lower levels of social connectedness, older immigrants show fewer differences relative to native-born older adults in levels of perceived social connectedness. Specifically, immigrants do not differ considerably from their native-born counterparts with regards to their feelings of loneliness. As **Table 1** demonstrates, there is no statistically significant difference in the extent to which the two groups report feelings of being left out or lacking companionship. However, feelings of isolation are slightly more common among older immigrants than native-born older adults. When compared to the average of 2.82 for the native-born, the average of 2.78 for immigrants is lower and closer to the value of two, which indicates that although it is generally rare for both groups of older adults to experience feelings of loneliness, older immigrants report feeling lonely more often relative to their native-born counterparts ('3'=rarely and '2'=often; $p < .001$).

On the other hand, immigrants report feeling less socially connected than their native-born counterparts across the other dimensions of perceived social connectedness. They are much less likely than the native-born to feel a sense of belonging to their local community (2.79 vs. 2.90; $p < .001$), and they perceive less availability from their relationships for all three forms of positive social interaction. Immigrants and the native-born are, however, comparable in their level of satisfaction with their social participation when assessing feelings of community connectedness within this sample of older adults.

Both groups of older adults have a mean of 0.76, indicating that most older adults have a desire to participate more (1=yes and 0=no).

Descriptive statistics comparing immigrant and native-born older adults for the indicators of social support are presented in **Table 2**. First, the overall measure of social support (Mean=0.02; SD=0.52) shows that there are no significant differences between the two groups of older adults in average levels of social support. However, once the separate measures of received social support and perceived social support are considered, results reveal that social support does in fact differ between immigrant and native-born older adults, but only in the actual amount received. As **Table 2** shows, on average, immigrants receive a greater amount of aid from their family, friends and neighbours. Their mean on the overall measure of social support received is -0.09, whereas it is -0.13 among their native-born counterparts ($p<.001$). On the other hand, immigrant and native-born older adults do not have significant differences in their levels of overall perceived social support.

The separate indicators of social support show that immigrants receive more aid than the native-born for every type of instrumental activity considered, with the exception of personal care and transportation. As **Table 2** shows, older immigrants have higher mean scores relative to their native-born counterparts for the receipt of support with the preparation of meals, housework, and managing care. The difference in means between the two groups of older adults is largest for the amount of aid received with managing care (0.07 vs. 0.04 $p<.001$), followed by housework (0.13 vs. 0.11; $p<.01$), and finally meal preparation (0.08 vs. 0.07; $p<.05$), where immigrants are only slightly more likely than the native-born to have been provided informal assistance. On the other hand, for aid

received with personal care and transportation, the quantity of support does not differ between the two groups of older adults.

When the different indicators of perceived social support in **Table 2** are examined separately, they show that for certain aspects, variations exist between immigrant and native-born older adults, despite no significant differences between the two groups in levels of overall perceived social support. First, although immigrants are the group that receives more social support, native-born older adults generally perceive a higher availability of emotional support. They report higher mean levels of availability for two of the three types of emotional support considered. Native-born older adults are more likely than older immigrants to feel as though they have somebody in their lives who loves them (2.89 vs. 2.87; $p < .001$), and whom they can count to confide in about their personal problems (2.83 vs. 2.81; $p < .01$). On the other hand, there are no significant differences between native-born and immigrant older adults in the perceived availability of having someone with whom to share personal worries. With respect to the other dimensions of perceived social support, findings reveal no trend in levels of support among immigrants and the native-born. For measures of perceived availability of informational support, the two groups do not differ consistently despite showing some statistically significant differences. Older immigrants perceive having less support from others to provide information that will help understand a situation relative to the native-born (2.81 vs 2.83; $p < .10$), whereas the native-born perceive having less support available when seeking advice about a crisis (2.77 vs. 2.79; $p < .05$). Both groups are, however, equally as likely to perceive having someone available who they can turn to for suggestions about how to deal with a personal problem most of the time. Findings for

perceived differences in availability of instrumental support indicate only one significant difference between immigrant and native-born, with the later group perceiving less support for visits to the doctor (2.86 vs 2.88; $p < .001$). On the other hand, both immigrant and native-born older adults perceive similar amounts of support available if they were confined to bed, to prepare their meals, or help with daily chores when sick.

Descriptive statistics on the sociodemographic characteristics and health status of the sample are presented in **Table 3**. All differences between immigrant and native-born older adults are statistically significant at the $p < .001$ level. First, results show that most older adults report being in good health, but that the proportion is lower among immigrants than native-born older adults (75.48% and 78.18%, respectively).

With respect to the sociodemographic characteristics of older Canadians, females comprised a larger proportion of the older population than did males. However, the sex distribution was more even among older immigrants than native-born older adults, with females accounting for roughly 52% of the sample and males 48%, compared to 56% and 44%, respectively. For both immigrants and the native-born, the largest cohort of older adults was 65 to 69 years of age, accounting for 29.73% and 31.83% of their respective populations. The overall composition of marital status was also similar for immigrants and the native-born, with a greater proportion of older adults partnered (married or cohabiting) than not (divorced, separated, single or widowed) in both groups. However, the share of older immigrants (66.77%) who were married or in a cohabiting relationship was higher than among native-born older adults (62.94%). The two groups also shared a relatively similar distribution in income levels, with the highest proportion of older adults earning between \$20,000 and \$39,999 a year. The share of native-born older adults

(30.16%) with incomes in this range was, however, slightly higher than the share among older immigrants (28.42%).

The two groups of older adults differed considerably in their levels of educational attainment, with immigrants being more highly educated than their native-born counterparts. Among older immigrants, 42.15% had completed a post-secondary education compared to 37.8% of native-born older adults. In fact, the completion of a post-secondary degree was the most commonly achieved level of education by older immigrants, whereas native-born older adults were most likely to have dropped out of high school (41.45%). The racial composition of the immigrant and native-born populations was also markedly different, with non-white older adults comprising a much larger proportion of immigrants (28.44%) than native-born older adults (2.34%). Lastly, immigrant and native-born older adults had very different geographic distributions. Among older immigrants, the large majority (82.27%) live in one of Canada's Census Metropolitan Areas rather than in a more rural region (17.73%). On the other hand, the urban/rural distribution was much more evenly split among the native-born, with 55.54% of older adults living in an urban core and 44.46% in more rural areas. The observed differences between immigrant and native-born older adults are a reflection of Canada's immigration patterns. In recent decades, immigrants coming to Canada have increasingly been more highly educated than the native-born, and from Asian countries (Bollman, 2013). Furthermore, immigrants have traditionally settled in Canada's largest cities, where large immigrant communities have been established, namely Toronto, Vancouver and Montreal (Schellenberg, 2004). Thus, these trends in migration offer potential

explanations for large variations observed between older immigrants and native-born older adults in education, race and region of residence.

When considering measures of health status, results show that, in general, most older adults suffer from at least one chronic condition that has been diagnosed by a health care professional. The proportion with a chronic condition is, however, slightly lower among older immigrants (88.40%) than the native-born (90.49%). On the other hand, older adults generally appear to be in good physical condition, with less than a quarter experiencing physical impairment. But, in contrast to chronic conditions, native-born older adults are slightly less likely than older immigrants to experience some form of functional impairment. Despite higher levels of functional impairment among immigrants, however, they are less likely than native-born older adults to have received assistance at home from a health care professional for a health problem.

Table 4 presents pairwise correlations between each of the key predictor variables in the analysis: the measures of overall social connectedness and social support, and the indicators capturing the objective and subjective dimensions of these respective constructs. Higher levels of social connectedness in later life are not always accompanied by greater amounts of social support. As the results show, the overall measures of social connectedness and social support are only moderately positively correlated ($r = 0.45$; $p < .001$). Thus, although social connectedness and support are related, such that older adults who are more socially connected are also likely to have more social support, these aspects of social integration are also distinct and related to other factors.

When examining how experiences of social connectedness are related to perceptions of connectedness, as expected, the objective and subjective dimensions of social connectedness are positively correlated with one another, but only moderately ($r = 0.42$; $p < .001$). These results indicate that older adults who are more socially connected also typically perceive themselves as having higher levels of connectedness, but that to a degree, perceptions of social situations do not reflect actual experiences. On the other hand, the correlation between received and perceived social support surprisingly shows that there is virtually no relationship between these constructs ($r = 0.04$; $p < .001$). Among older Canadians, the perceived availability of social support is entirely unrelated to the actual amount of support received. Instead, perceptions of social support are moderately positively correlated with perceptions of connectedness ($r = 0.64$; $p < .001$), but weakly positively correlated with actual experiences of connectedness ($r = 0.34$; $p < .001$). Therefore, older adults who perceive having higher amounts of available social support also typically perceive themselves to be socially connected, but these subjective perceptions have little to do with their actual social experiences.

These results support that there may be an advantage to considering social connectedness and social support as separate social factors in the lives of older adults. The fact that indicators of social connectedness and social support were only moderately positively correlated with one another among older adults suggests that these constructs may also be differently associated with health in old age. Similarly, because the objective experiences of connectedness are only slightly correlated with older adults' subjective perceptions, and the amounts of support received are not related to the perceived availability of support, these results indicate that perceptions of social factors do not always reflect

actual situations. Therefore, distinguishing the objective and subjective dimensions of varying social factors may also be especially important when considering how they are related to the health of older adults. The next step of the analysis examines whether this is the case, by estimating bivariate associations between these key predictor variables and self-rated health.

7.2 Bivariate Results

Odds ratios from bivariate logistic regression models predicting good self-rated health by each of the key independent variables and covariates are provided in **Table 5**. First, when examining the extent to which social connectedness in later life is related to health among older adults, results indicate that social connectedness has a significant positive association with higher levels of self-rated health. Older adults who scored one standard deviation above the mean in social connectedness had higher odds of reporting good health than older adults with average levels of social connectedness (O.R. 1.81; $p < .001$). In addition, social connectedness was positively associated with self-rated health regardless of whether captured by older adults' actual experiences or their perceptions. As results show, higher levels of both experienced and perceived social connectedness are associated with an increased likelihood of reporting good health among older adults. However, based on the size of the coefficients, actual experiences of social connectedness (O.R. 1.81; $p < .001$) appear to be more strongly associated with good health in old age than are perceptions of social connectedness (O.R. 1.54.; $p < .001$). Thus, when considered alone, and without taking into account older adults' sociodemographic characteristics and health status, social connectedness was found to play a beneficial role for later-life health.

In contrast to social connectedness, higher levels of social support are not statistically significantly associated with better self-rated health among older adults. However, once the separate measures of experienced and perceived social support are considered, the bivariate results indicate that social support is indeed significantly associated with self-rated health. The odds ratios from these analyses show that the receiving social support and the perceived availability of social support are *differently* associated with self-rated health. Receiving more social support is associated with lower odds of reporting good health among older adults (O.R. 0.64; $p < .001$), whereas higher levels of perceived social support are related to greater odds of good health (O.R. 1.24; $p < .001$). Thus, because receiving and perceiving social support are related to later-life health in a different manner, these results explain why when an overall measure of social support is considered in a bivariate model, there is no statistically significant association with older adults' self-rated health.

Bivariate associations between the covariates and self-rated health show that many aspects of older adults' sociodemographic characteristics and physical condition are also statistically significantly related to having good self-rated health. First, as might be expected, older adults are less likely to have good self-rated health if they are older. Those aged 70-74 have almost 30% lower odds of good health compared to those aged 65-69, and the likelihood of good health among older adults continues to decrease for each successive five-year age group. Partnership status is also significantly associated with later-life health, and results show that regardless of the cause, older adults who are not in a romantic partnership (divorced/separated or widowed) have lower odds of good self-rated health than those who are married or cohabiting. However, those who are

divorced or separated (O.R. 0.80; $p < .01$) fare slightly better than widowed older adults (0.78; $p < .001$). An exception is among those who are single, as reflected in the lack of statistical significance for the odds ratio of single older adults. Surprisingly, the bivariate results show no gender difference in the odds of good health among older adults.

However, visible minorities are less likely to report good health than are white older adults (O.R. 0.74; $p < .01$), as are those who live in a rural region relative to those who live in an urban core (O.R. 0.86; $p < .01$).

As expected, the bivariate results in **Table 5** also show that education and income are important predictors of health in later life. Among older adults, the odds of reporting good health become greater with each successive increase in either education or income level. However, with respect to educational attainment, the bivariate association shows that the completion of high school is an especially salient factor for better health in old age. This is reflected in the fact that the odds of good health are 90% higher for older adults who have completed high school than those who have dropped out, but with additional increases in level of education, increases in the greater odds of good health are smaller.

Last, as might be expected, older adults who have health problems face considerably lower odds of reporting good health than those without across all measures of health status. These bivariate results show that self-rated health in old age is associated with the sociodemographic characteristics of older adults, as well as their health status. Correcting for differences in these traits is therefore important when estimating the extent to which social connectedness and social support are related to the health status older adults. By controlling for sociodemographic factors and health status, multivariate analysis will

enable an examination of the specific associations between social connectedness and health, and social support and health.

7.3 Multivariate Results

Table 6 examines to what extent social connectedness and social support are associated with the health of older adults when controlling for sociodemographic characteristics and health status. Odds ratios from a series of multivariate logistic regression models predicting good self-rated health are presented. Models 1 and 3 consider the role of social connectedness, whereas Models 2 and 4 assess that of social support. Each of the two predictors is first examined holding constant sociodemographics, followed by a model that also includes controls for current health status. Social connectedness and social support are assessed simultaneously in Model 5, net of covariates for both sociodemographics and health status.

Social connectedness and social support are differently associated with later-life health. Results in Model 1 and Model 2 show that when older adults' sociodemographic characteristics are taken into account, social connectedness is positively associated with health, whereas social support is negatively associated with health. An increase of one standard deviation in social connectedness is associated with 1.83 ($p < .001$) the odds of reporting good health, whereas an increase of one standard deviation in social support is associated with 0.95 ($p < .10$) the odds of good health. In fact, controlling for older adults' sociodemographic characteristics strengthens the positive association between social connectedness and health. The greater odds of good health among older adults with higher levels of connectedness increase relative to the bivariate result in Table 5 (O.R. 1.81, $p < .001$). On the other hand, the negative association between social support and

health becomes statistically significant once sociodemographic covariates are held constant (O.R. 0.95; $p < .10$), unlike the bivariate tabulation in Table 5 which is not statistically significant. The association also becomes stronger, as the lower odds of good health associated with higher levels of social support have decreased compared to the unadjusted estimate in Table 5 (O.R. 0.98). Thus, net of a number of sociodemographic characteristics, social connectedness and social support are differently related to the health of older adults.

Social connectedness remains positively associated with self-rated health among older adults even when taking into account the existing condition of their physical health. As results in Model 3 show, when controls for health status are added, older adults who score one standard deviation above the average in social connectedness have 65% greater odds of reporting good health (O.R. 1.65, $p < .001$). The reduction in the odds of reporting good health relative to Model 1 indicates that older adults' health status accounts for part of the relationship between social connectedness and good self-rated health.

Nevertheless, these results indicate that net of both sociodemographic characteristics and health status, social connectedness remains a significantly strong predictor of better health in later life.

The association between social support and self-rated health, however, becomes markedly different when holding constant older adults' health status to correct for the fact that older adults who receive higher levels of support are likely to be in worse health. In Model 4, adding controls for health status changes the direction of the relationship and social support becomes positively associated with good self-rated health. Net of sociodemographics and health status, an increment of one standard deviation above the

mean in social support is associated with 6% greater odds of reporting good health among older adults ($p < .10$). These results suggest that social support may be beneficial for health in later life, and that the negative association observed in Model 2 is possibly due to declines in health experienced in later life. Old age is a period during which declines in health are likely to occur, and older adults who have more health problems are likely require larger amounts of support compared to those who are healthier, and are less likely to report having good health. Therefore, the negative association previously observed may be due to the mediating role of health status, which once held constant, reveals a positive association between social support and self-rated health.

However, when social connectedness and social support are examined together in Model 5, social support once again becomes significantly negatively associated with good self-rated health. This is the case despite the fact that both respondents' sociodemographic characteristics and health status are taken into account. Older adults who score one standard deviation above the mean in social support face 17% lower odds of rating their health as good than those with average levels of support (O.R. 0.83, $p < .001$). Social connectedness, on the other hand, remains significantly positively related with better self-rated health among older Canadians (O.R. 1.84, $p < .001$). In fact, controlling for social support does not weaken the relationship but rather strengthens the extent to which social connectedness is associated with good health in later life. Relative to Model 3, that examines social connectedness controlling for sociodemographics and health status (O.R. 1.65; $p < .001$), results in Model 5 indicate that once the same regression also includes social support, the greater odds of good self-rated health increase by nearly 20%. Thus, these analyses show that more socially connected older adults are more likely to have

better self-rated health, whereas social support decreases the odds of reporting good health in later life.

Do social connectedness and social support remain differently associated with health when older adults' experiences and perceptions are considered? **Table 7** presents results from analyses that incorporate separate measures of experience and perception to examine whether the likelihoods of good health by connectedness and support vary according to these dimensions. Results show that even experiences and perceptions are taken into account, the overall manner in which social connectedness and social support are each related to the health of older adults remains the same: social connectedness is positively associated with health, whereas social support is negatively associated with health in later life.

When measures of social connectedness are first examined in Model 1, results indicate that older adults with higher levels of both experienced and perceived connectedness are significantly more likely to rate their health as good. However, the odds ratios show that experiencing greater amounts of social connectedness (O.R. 1.40, $p < .001$) benefits the health of older adults more than do perceptions of being more connectedness (O.R. 1.32, $p < .001$). On the other hand, results from Model 2, which analyzes social support, indicate that higher levels of received and perceived support are *differently* associated with health of older adults. Receiving more social support is associated with lower odds of reporting good health (O.R. 0.81 $p < .001$), but perceiving a greater availability of social support is related to greater odds of good health (O.R. 1.21 $p < .001$).

However, once social connectedness and social support are simultaneously examined in Model 3, the benefits of perceived social support for health disappear. Controlling for older adults' experiences and perceptions of connectedness reveals that perceptions of social support become negatively associated with the health of older adults, even when controlling for sociodemographics and health status. Thus, social support is significantly related to lower odds of good health in later life, regardless of whether aid from family and friends has been actually received or is only perceived. Older adults whose perceived availability of social support is one standard deviation above the mean face 8% lower odds of good self-rated health ($p < .05$), and those who receive greater amounts of support face 16% lower odds ($p < .001$). Conversely, results in Model 3 indicate that both experienced and perceived connectedness are significantly related to greater odds of good self-reported health among older adults (O.R. 1.41 $p < .001$ and O.R. 1.38; $p < .001$, respectively). These results provide further support for the health-related benefits of social connectedness in later life, as both older adults who are more socially connected and who have a higher sense of social connectedness face a greater odds of reporting that they are in good health.

Results in Model 3 also suggest, however, that experiences play a larger role in shaping later-life health than do perceptions. In the case of both social connectedness and social support, older adults' experiences were more strongly associated with self-reported health status than were their perceptions. Findings in **Table 7** therefore indicate that social connectedness and social support have differential associations with health in later life, regardless of whether older adults' experiences or perceptions are considered, but that the relationships involving experiences are stronger.

Tables 8 and 9 examine the last research question of this study, which is whether social connectedness and social support are differently related to health among older immigrants than native-born older adults. **Table 8** presents results from analyses comparing the overall measures of social connectedness and social support. First, differences in the association of social connectedness and health are considered in Model 1, which presents an interactive effect of social connectedness and immigrant status on self-rated health. The interaction term is statistically significant, indicating that the relationship between social connectedness and health is different for immigrants than it is for native-born older adults (O.R. 1.15, $p < .05$). Furthermore, the positive interaction shows that social connectedness plays a more important role for the health of older immigrants because they experience greater increases in the odds of good health as social connectedness increases compared to the native-born. For every increment of one standard deviation in social connectedness, increases in the odds of good health among immigrants are 1.15 those of native-born. Social connectedness thus has a stronger effect on the odds of good health among older immigrants than the native-born (Buis, 2010). Therefore, net of sociodemographic characteristics and health status, older immigrants experience greater benefits to their health when they are socially connected than do native-born older adults.

The moderating role of immigrant status on social connectedness is again assessed in Model 3, but while simultaneously testing an interaction for immigrant status and social support. These results indicate that even when controlling for levels of social support, differences in the association between connectedness and health for immigrant and native-born older adults remain significant (O.R. 1.17; $p < .05$). In fact, results reveal that

controlling for social support increases the gains in health associated with social connectedness among older adults in general, but that the increase is larger among immigrants than the native-born. The main effect of social connectedness shows that the odds of good self-rated health associated with higher levels of connectedness have increased to 1.75 ($p < .001$) among the native-born, up from 1.59 in Model 1 ($p < .001$). However, relative to Model 1, the interaction term has also increased from 1.15 ($p < .05$) to 1.17 ($p < .05$). This indicates that the increase in the odds of good health associated with an increment of one standard deviation in social connectedness is now 1.17 times greater among immigrants than the increase among the native-born. Therefore, remaining socially connected benefits the health of older adults in general, but controlling for social support further increases the relative importance of social connectedness for the health of older immigrants.

To examine actual changes in health status among immigrants and the native-born in relation to social connectedness, **Figure 1** presents predicted probabilities of good self-rated health. These results are based on the third model in **Table 8**, and probabilities of good self-rated health are estimated across levels of social connectedness while holding the covariates at their mean values for both groups of older adults. First, the patterns illustrate the strong positive relationship between social connectedness and health in later life. For both immigrant and native-born older adults, higher levels of social connectedness are consistently associated with better physical health. In addition, differences in health status between high and low levels of social connectedness are very large. Older adults who are socially connected have substantially higher probabilities of good health than those who are socially disconnected. As **Figure 1** shows, those who are

the most socially connected, in general, have a nearly 0.95 probability of reporting good health. On the other hand, among older adults with extremely low levels of connectedness, the native-born have only a 0.29 probability of reporting good physical health, while immigrants fare even worse with a 0.12 probability of good self-rated health.

The second pattern that **Figure 1** therefore shows is that at lower levels of social connectedness, older immigrants face a considerable health disadvantage. Immigrants with low levels of connectedness are not only less likely to report good health than their immigrant counterparts who are socially connected, but they also have a lower probability of reporting good health relative to native-born older adults with equally low levels of social connectedness. However, despite their health disadvantage when socially disconnected, the patterns in **Figure 1** underscore that social connectedness plays an especially important role for the health of immigrants.

Specifically, the patterns illustrate that as levels of social connectedness increase among older adults, immigrants experience greater gains in health relative to their native-born counterparts. That is, with every successive increment in connectedness from the lowest level, the increase in the probability of good self-rated health is larger among older immigrants than native-born older adults. As a result, the health gap between immigrants and the native-born decreases markedly with increasing social connectedness, and eventually disappears entirely. As illustrated in **Figure 1**, the lines plotting predicted probabilities for the two groups of older adults converge as levels of connectedness increase and overlap at roughly the mean, after which the probability of good self-rated health is shown to be slightly higher among immigrants. Interestingly, analyses testing

the health difference between immigrants and the native-born revealed that the predicted probabilities of good self-rated health are significantly different for the two groups of older adults from the lowest level (approximately -2.1) up to the mean level of connectedness (approximately 0). However, from the mean of connectedness to the highest possible level of connectedness among older adults (approximately 1.1), the differences in health are not statistically significant, indicating that immigrants and native-born older adults have the same predicted probability of good self-rated health.

Therefore, the third trend observed in **Figure 1** is that older immigrants benefit more from being socially connected than native-born older adults. The greater gains in health experienced by immigrants with increasing levels of connectedness reduce the health gap that occurs at every level of connectedness below the mean. Furthermore, the more substantial increases among immigrants eventually lead their health levels to reach those of native-born older adults. At levels of connectedness above the mean, older immigrants experience similar increases in the probability of good health, and have an equal likelihood of good health as native-born older adults. Therefore, social connectedness not only plays a more important role for the health of but works to eliminate the health disadvantage they face relative to native-born older adults, at least when controlling for sociodemographics, health factors and social support.

Conversely, when differences in social support are considered in **Table 8**, results reveal that social support is similarly related to health among older immigrants and native-born older adults. The lack of statistical significance for the interaction between immigrant status and social support in both Models 2 and 3 reveals that there are no differences between immigrants and the native-born in how social support is associated with health.

That is, for both groups of older adults, social support is not significantly associated with the self-reported health status when controlling for sociodemographics and health status in Model 2, and negatively associated with health once social connectedness is also taken into account in Model 3 (O.R. 0.83, $p < .001$). Controlling for connectedness reveals that both immigrants and the native-born face declines in health as levels of social support increase, and that they experience the same degree of disadvantage. Regardless of whether they are an immigrant or Canadian-born, older adults whose levels of social support are one standard deviation above the mean are 17% less likely to report being in good health than are older adults with average levels of social support. Thus, immigrant status does *not* moderate the relationship between social support and health in later life. The answer to the first part of the third research question is therefore that social connectedness benefits the health of older immigrants more than that of native-born older adults, while there are no differences between the two groups of older adults in the relation of social support to self-rated health.

Next, I examine the second part of the final research question, which is whether there are differences in how connectedness and support are related to later-life health for immigrants and the native-born when both their experiences and perceptions are taken into account. These results are presented in **Table 9**. Overall, results reveal that subjective perceptions appear to be an especially important factor for the health of older immigrants relative to their native-born counterparts. Testing interactions between experienced connectedness and immigrant status, as well as perceived connectedness and immigrant status in Model 1 reveals that the two groups differ only in how perceptions of connectedness are related to their self-reported health status. The statistically significant

interaction between perceived connectedness and immigrant status (O.R. 1.14, $p < .05$) indicates that older immigrants experience greater increases in the odds of good health as perceptions of connectedness increase relative to the native-born. Older adults who perceive themselves as more highly connected with others are, in general, more likely to report being in good health than are those with low levels of perceived connectedness. However, older immigrants benefit more when they perceive higher levels of companionship and interaction with others, as they face more substantial improvements in health across levels of perceived connectedness than do native-born older adults.

Differences in the extent to which perceptions of connectedness are associated with health between immigrants and the native-born remain even when the roles of received and perceived social support are taken into account in Model 3. In fact, as might be expected based on the previous results with the general measure of social connectedness (Table 8), controlling for social support in Model 3 strengthens the positive relationship between perceived connectedness and health among older adults in general. However, once again, perceptions of connectedness are more strongly associated with the health of older immigrants than of native-born older adults. The odds of good health among the native-born, as reflected in the main effect of perceived social connectedness, increase to 1.33 ($p < .001$) from 1.27 ($p < .001$) in Model 1. Although in Model 3, the interaction term remains at the same value as in Model 1 (O.R. 1.14; $p < .05$), increases in the odds of good health as levels of perceived social connectedness increase are 1.14 times greater among immigrants than the now even higher odds among the native-born. Thus, perceived connectedness remains relatively more important to the health of older immigrants than native-born older adults.

To examine how differences in the association of perceived connectedness with self-reported health status translate into health levels among immigrants and the native-born, **Figure 2** illustrates predicted probabilities of good self-rated health by perceived social connectedness. These results, estimated from Model 3 in **Table 9**, reveal similar trends to those observed with the overall measure of social connectedness. Older adults who perceive low levels of connectedness have a markedly lower probability of reporting good health than do those who perceive high levels of companionship and interaction with others. However, at lower levels of perceived connectedness, immigrants once again face a health disadvantage relative to their native-born counterparts. Among older adults who perceive themselves to be extremely socially disconnected, immigrants have a 0.82 probability of having good health, whereas the probability is nearly 0.90 for the native-born. Yet, higher perceptions of connectedness appear to lessen this disadvantage. As levels of perceived connectedness increase, the health gap is reduced because older immigrants face greater gains in health with every increment than do native-born older adults. Analyses testing the health difference between both groups of older adults revealed that immigrants' lower probability of good health are significant from the lowest level of perceived connectedness to roughly half a standard deviation below the mean (approximately -0.30). For increases in perceptions of connectedness above this level, the health status of immigrants, as well as their improvements in health, are similar to those of the native-born. At the highest levels of perceived connectedness, immigrants and the native-born are equally likely to report good health (0.91). **Figure 2** therefore shows that perceived connectedness has a stronger association with the health of older immigrants, which, in turn, helps improve their health status relative to their native-born counterparts.

On the other hand, results in **Table 9** show that there are no significant differences in health for immigrant and native-born older adults as experiences of social connectedness increase. This is the case regardless of whether measures of connectedness are assessed when only controlling for respondents' sociodemographics and health status in Model 1, or when also controlling for measures of social support in Model 3. These results therefore indicate that perceptions of social connectedness are an especially important factor in the health of older immigrants, as higher levels of perceived connectedness improve their self-reported health status to a greater degree than among native-born older adults.

When experiences and perceptions of social support are examined in **Table 9**, results from the interaction in Model 2 indicate that perceptions of support are also differently related to health of immigrant and native-born older adults (O.R. 1.12; $p < .10$). The same is true in Model 4, when controlling for both the objective and subjective dimensions of social connectedness (O.R. 1.12; $p < .10$). Running the analyses separately for immigrant and native-born older adults (not shown) revealed that the native-born have lower odds of good health as perceptions of social support increase, while the health of older immigrants is not significantly related to their perceived availability of support. These results are supported by **Figure 3**, which presents predicted probabilities of good self-rated health by levels of perceived social support estimated from Model 4. As the figure illustrates, native-born older adults experience declines in the probability of reporting good health as perceptions of support increase. On the other hand, among older immigrants, the probability of good health remains consistent across levels of perceived social support.

At the lowest levels of perceived social support, the native-born, who have a probability of roughly 0.90, are more likely than immigrants to be in good health (0.83). However, once native-born older adults' health levels have converged with those of immigrants at higher levels of perceived support, both groups of older adults have roughly a 0.83 probability of reporting good health. These patterns reveal that social support does not help lessen the health disadvantage experienced by older immigrants relative to the native-born. Instead, health status becomes comparable between the two groups of older adults at higher levels of perceived support because the health of native-born older adults worsens to the same level as that of immigrants. Thus, in accordance with results from **Table 9** when testing the interaction between social support and immigrant status in Model 4, **Figure 3** shows that the association between social support and health is different for both groups of older adults. While the native-born experience declines in health, older immigrants differ in that their health levels do not change regardless of how much support they perceive.

Conversely, results in both Model 2 and Model 4 show that the two groups of older adults do not differ in how levels of received social support are associated with their self-reported health status. That is, when controlling for sociodemographic factors and health status, both immigrant and native-born older adults who receive greater amounts of social support have a 14% lower likelihood of rating their health as good than do those who receive average amounts of support in old age.

Overall, findings of the final research question in this analyses reveal that, in general, social connectedness is more important to the health of older immigrants than native-born older adults, but once experiences and perceptions are considered separately, differences

between the two groups remain only in how perceptions of social connectedness are associated with health. Higher levels of perceived social connectedness are more important for the health of immigrants when compared to the native-born older adults, even when taking into account sociodemographics, health status and levels of social support among respondents. Furthermore, although the relationship between perceived social support and health is negative among older native-born adults, perceptions of social support do not appear to be related to the health of older immigrants. Thus, these findings suggest that older immigrants' perceptions play a key role in the manner in which social factors are related to their health specifically.

7.4 Sensitivity Analyses

To account for the subjective nature of self-rated health, I performed sensitivity analyses to test whether results differed when a more objective measure of health was used as the outcome. These results are presented in Appendix A. All models predicting the health of older adults in the analyses were run again using ordinary least squares regression and the Health Utilities Index as the dependent measure. The Health Utilities Index is an overall measure of health status calculated based on eight different attributes of functional health that is included in the CCHS- Healthy Aging dataset (CCHS-Healthy Aging Derived Variable Specification, 2011). All results from these analyses were similar to those presented here, with the exception of findings on the differences between immigrant and native-born older adults in perceptions of connectedness.

Whereas results with self-rated health as the outcome revealed significant differences by immigrant status in the association between perceived connectedness and self-rated health, results with the HUI outcome indicated that experiences of connectedness play a

more important role in the health of older immigrants. Specifically, the interactive effect between immigrant status and perceived connectedness was no longer statistically significant as observed in this analysis, but the interaction for immigrant status and experiences of connectedness, which was not found to be responsible for differences in this study, was found to be significant at the $p < .05$ level. However, results in the sensitivity analyses for the general measure of social connectedness were consistent with those presented here, and indicated a stronger relationship among immigrants than the native-born. Therefore, it is likely that the varying results for experiences and perceptions are the results of the measures being used rather than a lack of significance in the relationship between social connectedness and health among immigrants in old age.

To the extent that self-reported health is also a subjective measure, subjective perceptions of connectedness may have stronger links to self-rated health among older adults because individuals recognize the important role their social ties have played to their health. It is possible that those with higher levels of perceived connectedness, who are also in good health from an objective standpoint, subjective rate their health levels as higher than those who perceive themselves as disconnected because they attribute their good levels of health to these ties. If older adults are consciously aware of the health-promoting behaviours, resources and lifestyle factors they have benefited from due to their established social ties, than they may be more likely to perceive themselves as in better health than those who are socially disconnected. This may especially be the case among older immigrants, as social relationships may be more consequential for health due factors related to the migration process such as language barriers or varying beliefs about health. On the the other hand, if good health among older adults is strongly related to

their social networks and the actual experiences they provide throughout the aging process, than the greater improvements in health related to actual experiences of connectedness observed when health is also measured objectively correspond entirely with the findings of this study.

The sensitivity analyses provide further evidence that connectedness is strongly related to health in later life, and distinctly meaningful for older immigrants. Rather than raise into question the present study's findings, they show that this is the case regardless of whether social connectedness is perceived or experienced by older adults. Therefore, the positive association between experienced social connectedness and an objective measure of health such as the HUI further underscores the overall significance of social connectedness for later-life health among immigrants.

Chapter 8

8 Discussion

The Canadian population is aging, which has made it increasingly important to understand the factors that contribute to good health in old age. Social connectedness and social support have been widely researched as social factors that offer potential benefits for health in later life (Cornwell & Waite, 2009). However, various forms of connectedness or support have rarely been examined simultaneously, with most studies focusing on a few selective measures (Ashida & Heaney, 2008; Cornwell & Waite, 2009). Furthermore, indicators of connectedness and support have frequently been used interchangeably when conceptualizing the social integration of older adults (Ashida & Heaney, 2008). As a result, the health-related implications of social connectedness and social support in later life are still not fully understood. These consequences may also vary according to how individuals experience and perceive their social contexts, yet a limited amount of research has explicitly compared how the objective and subjective dimensions of social integration are related to health among older populations (Cornwell & Waite, 2009).

The aim of this study was to fill these gaps in the literature by examining social connectedness and social support as separate constructs with potential implications for health in later life. In addition, this study sought to take into account an important distinction about how older adults manage their social lives; that subjective perceptions do not necessarily reflect actual situations. Therefore, the goal of this analysis was also to examine whether there are differences in how social connectedness and social support shape health depending on older adults' experiences and perceptions. Finally, this study

aimed to compare how the consequences of these factors for health in old age differ for older immigrants relative to native-born older adults.

By using multiple indicators to capture social connectedness and social support as separate aspects of older adults' social lives, this study has built on previous research in health and aging by highlighting the importance of differentiating these constructs. It was consistently observed that higher levels of social connectedness was significantly positively associated with the health of older Canadians. Conversely, the overall measure of social support was significantly negatively associated with health, even when controlling for respondents' current health status. These differential associations of social connectedness and social support remained even when older adults' perceptions and experiences were considered separately. These findings show that social connectedness and social support are not interchangeable measures, especially when considering their health-related implications. Instead, they capture different features of the social networks in which older adults are embedded and the relationships they have established, and appear to have distinct associations with health in later life. While frequent contact with family and friends has positive implications for health in older ages, higher levels of social support are not necessarily beneficial. Thus, the results of this study emphasize the need to avoiding equating relationships that older adults maintain, and that offer potential sources of support, from actual support they receive when considering the different aspects of social integration in later life (Krause & Markides, 1990).

This study has also demonstrated that distinguishing experiences and perceptions as separate dimensions of social connectedness and social support validates important differences about how older adults manage their social lives, and the ways in which

relationships shape health in later life (Cornwell & Waite, 2009). The analysis revealed that both the perception of being socially connected and the experiences play a beneficial role in the health of older adults. Thus, these findings suggest that both the quantity of social interactions and the ways in which older adults subjectively perceive their social relationships have significant consequences for health (Rokach, 2011). However, because findings also indicated that experiences of social connectedness are more important than are perceptions of connectedness for the health of older adults, they highlight the importance of social integration and engagement in later life. Establishing a network social relationships, frequent contact with network members, and social and community participation all offer effective avenues to help maintain good health in later life.

The fact that perceptions of connectedness were also found to be positively related to health in old age, even when taking into account actual experiences, is also an important finding. This is because previous research suggests that people's subjective perceptions of their social resources are only moderately influenced by actual social context factors, and instead are strongly determined by their personal expectations about social relationships and interactions, as well as individual-level characteristics (Uchino, 2006; Uchino, 2009). Thus, the significant role of perceptions for health found in this study highlights the importance of focusing on the unique and individual circumstances of aging adults rather than solely on the structural characteristics of their social networks when considering how social factors shape the health of the older population.

Considering both the situational factors experienced by older adults and their subjective perceptions provides a potential strategy for future health care implementations targeted towards the older population to meet the specific needs of aging Canadians, who may

require different levels of support (Ashida & Heaney, 2008), or require different levels of interaction to feel socially connected (Cornwell & Waite, 2009).

Lastly, by considering how social connectedness and social support are related to later-life health among immigrants relative to the native-born, this analysis has helped provide a better understanding of the social factors that shape the health of older immigrants.

Although a large amount of literature exists on the health of immigrants in general, relatively little research has focused on the older immigrant population (Newbold & Filice, 2006; Vang, Sigouin, Flenon, & Gagnon, 2015). This is because old age is an often overlooked period of the migration process (McConatha, Stoller & Oboudiat, 2001). Within the existing migration literature, most studies focus on the transitions and adjustments related to settlement in a new country, or immigrants' experiences and outcomes of integration following settlement (Newbold & Filice, 2006). Such a focus, combined with the fact that new immigrants entering Canada tend to be younger, has resulted in a lack of attention to the older immigrant population (Wu & Hart, 2002; Newbold & Filice, 2006). However, because immigrants account for a large and growing share of the older population in Canada (Da & Garcia, 2015), it is important to identify the mechanisms that shape their health, and to understand if they do so differently relative to the native-born.

This study has contributed to filling this gap by demonstrating that social connectedness is linked to better health among older immigrants in Canada. Furthermore, the results revealed that the positive association between connectedness and health is stronger for immigrants than the native-born. Strong relationships and social engagement may benefit older immigrants more for various reasons that are related to the migration process. For

example, social ties may help overcome experiences and circumstances of disadvantage that have negative consequences for health such as discrimination or language barriers. Research in Canada has shown that among immigrants, strong social ties are an especially important factor for buffering the negative effects of stress related to discrimination (Noh & Avison, 1996), and in helping overcome accessibility barriers to health care such as language problems (Wu, Penning & Schimmele, 2005). In addition, social connectedness may play a larger role for the adoption of healthy behaviours and lifestyle changes among immigrants, in turn, contributing to better health in old age. Previous studies show that immigrants may have different expectations and behaviours related to health (Harvey & Alexander, 2012; Wu, Penning & Schimmele, 2005) which, in turn, can contribute to the worsening of their health relative to the native-born. For example, research has identified that immigrants may have less awareness of health risks (Dunlop, Coyte & McIsaac, 2000; Harvey & Alexander, 2012; Prus & Lin, 2005), place less emphasis on the implications of symptoms they experience (Dunn & Dyck, 2010), and have different attitudes about the benefits of preventative care and medical treatments (Wu et al., 2012). Therefore, establishing and maintaining connections to a strong social network in old age may be especially important among immigrants if they provide sources of information regarding health and promote healthy behaviours that are otherwise less available. These findings thus underscore that connectedness provides a pathway to maintaining better health among older immigrants in Canada.

In addition to the finding that overall social connectedness plays a more important role for the health of immigrants, results of this analysis revealed that perceptions of connectedness are more strongly related to better health among immigrants than the

native-born. Immigration to a new country involves adjusting to a new social context and cultural environment, and often results in the loss of social ties or reduced contact with close network members (Da & Garcia, 2015; Dunn & Dyck, 2010). The personal beliefs older immigrants have about their ability to establish a supportive network and integrate into their communities may therefore be a particularly significant factor in shaping their health. Perceptions of connectedness may be strongly linked to the health of older immigrants by moderating the effects of stressful life events (Ashida & Heaney, 2008) or increasing feelings of belonging and security which, in turn, may lead to improved physical health outcomes (Ashida & Heaney, 2008; Sheffler & Sachs-Ericsson, 2015). Future efforts to enhance older adults' social relationships can focus on strategies that will allow immigrants to develop high quality friendships and feel socially engaged in society by paying particular attention to their subjective perceptions.

Finally, the findings of this analysis also suggest that social connectedness offers a pathway through which inequalities in health between immigrants and the native-born can be reduced in later life. At the lower levels of social connectedness, older immigrants were considerably less likely than native-born older adults to be in good health. However, when older immigrants were socially connected to an average degree, their health was comparable to that of their native-born counterparts who also reported average levels of connectedness. Therefore, the results indicate that social connectedness improves the health status of immigrants to the point of eliminating their health disadvantage relative to the native-born. This is an especially important finding because it not only suggests that social connectedness can contribute to improving the health of older immigrants, but

that typical amounts of social interaction appear to be sufficient for reducing disparities in health and providing immigrants with substantial health benefits.

The present study is not without limitations. First, the CCHS-Healthy Aging dataset was collected in 2008 and 2009, making it less recent dataset. However, because it is the most recently available source of data in Canada with extensive content on social factors related to the health of the older population, it offers the most suitable source of data for this project.

Second, the study relies on cross-sectional data, limiting the reliability of the findings as neither social relationships or health in later life are fixed. Instead, old age is a period during which numerous life course transitions are potentially experienced such as the loss of social roles and ties or declines in health (Cornwell & Waite, 2009). Thus, the extent to which older adults engage with networks members and rely on social support, and how these factors shape their health, will inevitably shift across differing periods of later life (Cornwell & Waite, 2009). Longitudinal data will be useful for examining whether the associations observed in the present study remain consistent over time in later life.

Third, this analysis did not include information on immigrants' country or region of origin. However, research shows that levels of both social network connectedness and support, as well as expectations and perceptions of these social factors, may vary among immigrants according to their region of origin and cultural or ethnic background (Sheffler & Sachs-Ericsson, 2015). Therefore, future research should consider whether levels of social connectedness and support in Canada's older population show substantial

variations depending on cultural or ethnic background, and what factors may be contributing to these potential differences.

Ethnic or cultural differences in perceptions among immigrants highlights another limitation of the present study, which is that it employs a self-reported measure of health. Existing evidence shows that personal evaluations and expectations of health vary by ethnic group (Chow, 2010), which could mean that there are differences among immigrant groups in levels of self-reported health. However, because this study was not able to incorporate information on immigrants' backgrounds, it was not possible to observe whether the associations between connectedness and support and self-rated health differed according to the region of origin or ethnic background of immigrants. However, this study makes the important contribution of showing that overall, these social factors associated with connectedness appear to play a more significant role for the health older immigrants than native-born older adults in Canada, and future studies should examine whether these associations remain when using more objective measures of health such as disability or chronic conditions.

Lastly, this analysis was unable to take into consideration the Aboriginal population in Canada. The public version of the CCHS-Healthy Aging dataset did not provide information on aboriginal status, nor did the survey sample respondents on aboriginal reserves. As a result, this study misses a key subgroup within the Canadian population for whom social connectedness and social support may be especially important for health in old age. Previous research highlights the greater emphasis on family and community connectedness within aboriginal communities (Thomas & Bellefeuille, 2006), and suggests that forms of social connectedness and support are especially effective for

improving the health of this group (Iwasaki, Bartlett, & O'Neil, 2005; Thomas & Bellefeuille, 2006). Such findings therefore suggest that both the levels of connectedness and support exchanged within indigenous populations, as well as how these factors are related to the health of Aboriginal Canadians, may be different relative to the native-born older population. Future studies that examine these relationships among aboriginal older adults will provide rich insight into the relative importance of connectedness and support for later-life health.

Overall, the findings of this analysis, which show that connectedness and support are both independently but differently associated with the health of older adults, help further our understanding of the social factors that have implications for health in later life.

Social connectedness appears to be especially important for good health, whereas actual aid received through forms of social support may have negative consequences for the physical health of older populations. The fact that social support was associated with poorer health in this study, even when controlling for respondents' physical health status, and that this was the case for both received and perceived levels of aid, underscores that relying on others in old age may potentially lead to unfavourable health outcomes. On the other hand, the positive relationships between connectedness and health suggest that social connectedness may be more important for improving health among older adults. Enhancing older adults' opportunities to develop relationships and remain actively engaged within their communities, while also focusing on strengthening their subjective social connectedness and feelings of belonging may be important factors to consider in future health care measures aimed at maintaining health in later life, particularly among immigrants.

Table 1. Weighted Summary Statistics for Indicators Included in the Social Connectedness Scale Among Immigrant and Native-born Adults Ages 65+ (CCHS-Healthy Aging, 2008-2009)

	Immigrant Population N=3,079	Native-born Population N= 11,765	Immigrant vs. Native-born
	Mean (SD)	Mean (SD)	
Social Connectedness	0.04 (0.45)	0.11 (0.45)	***
Experienced Social Connectedness	0.06 (0.48)	0.14 (0.51)	***
<i>Social Network</i>			
Live Alone (0= "yes", 1= "no")	0.95 (0.67)	0.77 (0.58)	***
Number of Close Friends & Family Members (0= "none", 1= "1", 2= "2-3", 3= "4-10")	2.85 (0.83)	2.91(0.82)	***
Frequency of eating meals with others (1= "never/rarely", 2= "sometimes", 3= "often/always")	2.65 (0.66)	2.61(0.70)	***
<i>Social Participation</i>			
Frequency of ... (range 0= "never" to 3= "at least once a week")			
Socializing with friends & family	2.26 (0.89)	2.37 (0.82)	***
Participating in neighborhood and community activities	0.48 (0.91)	0.58 (0.98)	***
Participating in activities of organized group	0.69 (0.93)	0.83 (0.96)	***
Volunteering	0.55 (1.05)	0.79 (1.16)	***
Participating in physical activities or sports involving people	0.82 (1.26)	1.06 (1.35)	***
Participating in other activities involving people	0.68 (1.12)	0.96 (1.25)	***
Perceived Social Connectedness	0.03 (0.61)	0.08 (0.57)	***
<i>Loneliness</i>			
How often do you... (1= "often", 2= "sometimes", 3= "rarely")			
Feel left out?	2.79 (0.48)	2.80 (0.48)	
Feel that you lack companionship?	2.67 (0.59)	2.66 (0.59)	
Feel isolated?	2.78 (0.51)	2.82 (0.46)	***
<i>Sense of Community Connectedness</i>			
Desire to participate more (0= "no", 1= "yes")	0.76 (0.43)	0.76 (0.43)	
Sense of belonging to local community (4= "very strong" to 1= "very weak")	2.79 (0.94)	2.90 (0.91)	***
<i>Perception of Social Relationships</i>			
How often is someone available to... (1= "never", 2= "some-times", 3= "most of the time")			
Have a good time with?	2.81 (0.44)	2.85 (0.41)	***
Get together with for relaxation?	2.79 (0.47)	2.80 (0.46)	†
Do something enjoyable with?	2.80 (0.45)	2.84 (0.42)	***

p<.001 *** p<.01 ** p<.05 * p<.10 †; Immigrant vs. Native-born reports results of Anova test.

Table 2. Weighted Summary Statistics for Indicators Included in the Social Support Scale Among Immigrant and Native-born Adults Ages 65+ (CCHS-Healthy Aging, 2008-2009)

	Immigrant Population N=3,079	Native-born Population N= 11,765	Immigrant vs. Native-born
	Mean (SD)	Mean (SD)	
Social Support	0.03 (0.55)	0.02 (0.51)	
Received Social Support	-0.09 (0.70)	-0.13 (0.62)	***
How often have family, friends or neighbours provided assistance with... (1= "never", 2= "sometimes", 3= "most of the time")			
<i>Instrumental Support</i>			
Personal care	0.04 (0.20)	0.04 (0.19)	
Meal preparation or delivery	0.08 (0.27)	0.07 (0.26)	*
Housework, home maintenance or outdoor work	0.13 (0.34)	0.11 (0.32)	**
Transportation	0.13 (0.34)	0.13 (0.33)	
Managing care	0.07 (0.25)	0.04 (0.19)	***
Perceived Social Support	0.06 (0.72)	0.07 (0.69)	
How often can you count on having someone... (1= "never", 2= "sometimes", 3= "most of the time")			
<i>Emotional Support</i>			
To love you?	2.87 (0.39)	2.89 (0.36)	***
To confide in or talk about yourself or your problems?	2.81 (0.46)	2.83 (0.45)	**
To share your most private worries with?	2.77 (0.50)	2.76 (0.53)	
<i>Informational Support</i>			
To give you information in order to help you understand a situation?	2.81 (0.45)	2.83 (0.44)	†
To turn to for suggestions about how to deal with a personal problem?	2.78 (0.48)	2.78 (0.49)	
To give you advice about a crisis?	2.79 (0.47)	2.77 (0.52)	*
<i>Instrumental Support</i>			
To help you if you were confined to bed?	2.69 (0.57)	2.68 (0.59)	
To take you to the doctor if you needed it?	2.86 (0.42)	2.88 (0.38)	***
To prepare your meals if you were unable to do it yourself?	2.77 (0.52)	2.75 (0.53)	
To help with daily chores if you were sick?	2.76 (0.51)	2.75 (0.52)	

p<.001 *** p<.01 ** p<.05 * p<.10 †; Immigrant vs. Native-born reports results of Anova test.

Table 3. Weighted Summary Statistics for Covariates Among Immigrant and Native-born Adults Ages 65+ (CCHS-Healthy Aging, 2008-2009)

	Immigrant Population N=3,079	Native-born Population N= 11,765	Immigrant vs. Native-born
	%	%	
Self-Rated Health			***
Good, very good, excellent	75.48	78.18	
Fair or poor	24.52	21.82	
Demographic Characteristics			
Sex			***
Female	51.75	56.24	
Male	48.25	43.76	
Age			***
65-69	29.73	31.83	
70-74	27.17	24.55	
75-79	18.88	20.18	
80-84	13.50	13.25	
85+	10.72	10.20	
Partnership Status			***
Married or cohabiting	66.77	62.94	
Divorced or separated	23.91	25.24	
Widowed	6.64	7.88	
Single	2.68	3.94	
Education			***
Less than high school	36.55	41.45	
High school completed	17.12	14.72	
Some post secondary	3.18	5.23	
Post secondary completed	42.15	37.77	
Missing	1.00	0.83	
Income			***
Less than \$20,000	12.58	13.78	
\$20,000 - \$39,999	28.42	30.16	
\$40,000 - \$59,999	17.68	17.45	
\$60,000 - \$79,999	7.58	9.69	
\$80,000 or more	12.47	11.16	
Missing	21.27	17.76	
Race			***
White	71.56	97.41	
Non-white	28.44	2.34	
Missing	0.00	0.25	
Province of Residence			***
Ontario	57.45	32.13	
Québec	10.55	30.53	
British Columbia	20.01	11.20	
Prairies	10.71	16.14	
Atlantic	1.27	10.00	
Region of Residence			***
Lives in urban region	82.27	55.54	
Lives in rural region	17.73	44.46	
Health Status			
Diagnosed with chronic conditions			***
Has a chronic condition	88.40	90.49	
Does not have a condition	10.48	7.83	

(Continued)

Table 3(Continued)

Missing	1.12	1.68	
Any mobility limitations			***
Suffers from some form of Impairment	21.38	20.53	
Does not suffer from impairment	78.53	79.24	
Missing	0.10	0.23	
Received formal homecare			***
Has received homecare	8.45	11.55	
Has not received homecare	91.55	88.45	

p<.001 *** p<.01 ** p<.05 *

Immigrant vs. Native-born reports results of Chi² test.

Table 4. Correlations Among Indicators of Social Connectedness and Social Support (CCHS-Healthy Aging, 2008-2009)**Total Population N=14,844**

	Social Connectedness	Experienced Connectedness	Perceived Connectedness	Social Support	Received Support	Perceived Support
Social Connectedness	1.00					
Experienced Connectedness	0.83***	1.00				
Perceived Connectedness	0.86***	0.42***	1.00			
Social Support	0.45***	0.23***	0.51***	1.00		
Received Support	-0.16***	-0.17***	-0.11***	0.48***	1.00	
Perceived Support	0.59***	0.34***	0.64***	0.90***	0.04***	1.00

p<.001 ***

Table 5. Odds Ratios from Weighted Bivariate Logistic Regression Models Predicting Good Self-Rated Health Among Adults Ages 65+ (CCHS-Healthy Aging, 2008-2009)

Total Population N=14,844	Bivariate
Social Connectedness	1.81***
Experienced Connectedness	1.81***
Perceived Connectedness	1.54***
Social Support	0.98
Experienced Social Support	0.64***
Perceived Social Support	1.24***
<i>Demographic Characteristics</i>	
Sex (Male)	
Female	1.00
Age (65-69)	
70-74	0.71***
75-79	0.64***
80-84	0.50***
85+	0.48***
Partnership Status (Married/Cohabitation)	
Widowed	0.78***
Divorced/Separated	0.80**
Single	0.87
Education (Less than High School)	
High School Completed	1.92***
Some Post Secondary	1.95***
Post Secondary Completed	2.15***
Missing	1.05
Income (Less than \$20,000)	
\$20,000 - \$39,999	1.40***
\$40,000 - \$59,999	2.16***
\$60,000 - \$79,999	2.62***
\$80,000 or more	3.05***
Missing	1.40***
Race (White)	
Non-White	0.74**
Missing	0.56
Province of Residence (Ontario)	
Québec	1.11
British Columbia	1.12
Prairies	1.04
Atlantic	0.84*
Region of Residence (Lives in Urban Region)	
Lives in Rural Region	0.86**
<i>Health Status</i>	
Chronic Conditions (No Conditions)	
Diagnosed Chronic Condition(s)	0.07***
Missing	0.03***
Daily Impairment (No Impairment)	
Some Form of Impairment	0.21***
Missing	0.25**
Formal Homecare (No Homecare)	
Homecare Received	0.32***

p<.001 *** p<.01 ** p<.05 *

Table 6. Odds Ratios from Weighted Logistic Regression Models Predicting Good Self-Rated Health by Social Connectedness, Social Support and Covariates Among Adults Ages 65+ (CCHS-Healthy Aging, 2008-2009)

Total Population N=14,844	Model 1	Model 2	Model 3	Model 4	Model 5
Social Connectedness	1.83***		1.65***		1.84***
Social Support		0.95†		1.06†	0.83***
<i>Demographic Characteristics</i>					
Age (65-69)					
70-74	0.78**	0.76**	0.93	0.92	0.92
75-79	0.73***	0.70***	0.94	0.93	0.93
80-84	0.59***	0.56***	0.90	0.89	0.91
85+	0.62***	0.56***	1.32*	1.28	1.34*
Sex (Male)					
Female	1.12†	1.14*	1.48***	1.51***	1.50***
Union (Married/Cohabitation)					
Widowed	1.65***	1.11	1.65***	1.26**	1.61***
Divorced/Separated	1.51***	0.87	1.41**	0.98	1.32*
Single	1.69***	0.93	1.52**	1.05	1.34†
Education (Less than High School)					
High School Completed	1.59***	1.70***	1.56***	1.67***	1.53***
Some Post Secondary	1.53**	1.65***	1.66**	1.79***	1.61**
Post Secondary Completed	1.60***	1.75***	1.64***	1.78***	1.58***
Missing	0.94	0.96	1.10	1.18	1.11
Income (Less than \$20,000)					
\$20,000 - \$39,999	1.09	1.33**	1.12	1.30**	1.12
\$40,000 - \$59,999	1.39**	1.80***	1.42**	1.70***	1.44**
\$60,000 - \$79,999	1.50**	2.08***	1.58**	2.04***	1.58**
\$80,000 or more	1.65**	2.42***	1.88***	2.50***	1.92***
Missing	1.03	1.28*	1.06	1.26*	1.07
Race (White)					
Non-White	0.80†	0.72***	0.78*	0.71**	0.79*
Missing	0.70	0.54	0.95	0.71	1.04
Province (Ontario)					
Québec	1.30**	1.29**	1.28**	1.27**	1.27**
British Columbia	1.03	1.07	0.95	0.98	0.95
Prairies	1.00	1.06	0.94	0.97	0.93
Atlantic	0.91	0.95	0.93	0.96	0.94
Lives in Urban Region (Yes)					
Lives in Rural Region	0.86**	0.91	0.90	0.94	0.91
<i>Health Status</i>					
Chronic Conditions (No Condition)					
Diagnosed Chronic Condition(s)			0.08***	0.08***	0.08***
Missing			0.04***	0.04***	0.04***
Daily Impairment (No Impairment)					
Some Form of Impairment			0.26***	0.23***	0.28***
Missing			0.29*	0.25**	0.32†
Formal Homecare (No Homecare)					
Homecare Received			0.69***	0.62***	0.72***
Log-likelihood	-1959919.2	-2058134.9	-1787551.8	-1846418.2	-1779006.3

p<.001 *** p<.01 ** p<.05 * p<.10 †

Table 7. Odds Ratios from Weighted Logistic Regression Models Predicting Good Self-Rated Health by Experience and Perception of Social Connectedness, Reception and Perception of Social Support and Covariates Among Adults Ages 65+ (CCHS-Healthy Aging, 2008-2009)

Total Population N=14,844	Model 1	Model 2	Model 3
Social Connectedness			
Experienced Social Connectedness	1.40***		1.41***
Perceived Social Connectedness	1.32***		1.38***
Social Support			
Received Social Support		0.81***	0.84***
Perceived Social Support		1.21***	0.92*
<i>Demographic Characteristics</i>			
Age (65-69)			
70-74	0.93	0.92	0.92
75-79	0.94	0.93	0.94
80-84	0.91	0.93	0.93
85+	1.34*	1.32*	1.37*
Sex (Male)			
Female	1.47***	1.52***	1.50***
Union (Married/Cohabitation)			
Widowed	1.65***	1.36***	1.63***
Divorced/Separated	1.42**	1.10	1.36**
Single	1.53**	1.19	1.39*
Education (Less than High School)			
High School Completed	1.55***	1.62***	1.52***
Some Post Secondary	1.64**	1.81***	1.62***
Post Secondary Completed	1.62***	1.73***	1.57***
Missing	1.09	1.23	1.14
Income (Less than \$20,000)			
\$20,000 - \$39,999	1.12	1.26*	1.12
\$40,000 - \$59,999	1.41**	1.67***	1.44**
\$60,000 - \$79,999	1.55**	2.01***	1.59**
\$80,000 or more	1.84***	2.48***	1.94***
Missing	1.05	1.23*	1.07
Race (White)			
Non-White	0.78*	0.74**	0.80*
Missing	0.96	0.80	1.06
Province (Ontario)			
Québec	1.28**	1.27**	1.27**
British Columbia	0.95	0.99	0.95
Prairies	0.93	0.98	0.94
East Coast	0.93	0.94	0.93
Lives in Urban Region (Yes)			
Lives in Rural Region	0.91	0.92	0.91
<i>Health Status</i>			
Chronic Conditions (No Condition)			
Diagnosed Chronic Condition(s)	0.08***	0.08***	0.08***
Missing	0.04***	0.04***	0.04***
Daily Impairment (No Impairment)			
Some Form of Impairment	0.26***	0.27***	0.30***
Missing	0.29*	0.27*	0.33†
Formal Homecare (No Homecare)			
Homecare Received	0.69***	0.73***	0.76**
Log-likelihood	-1786928.8	-1824959.2	-1775503.9

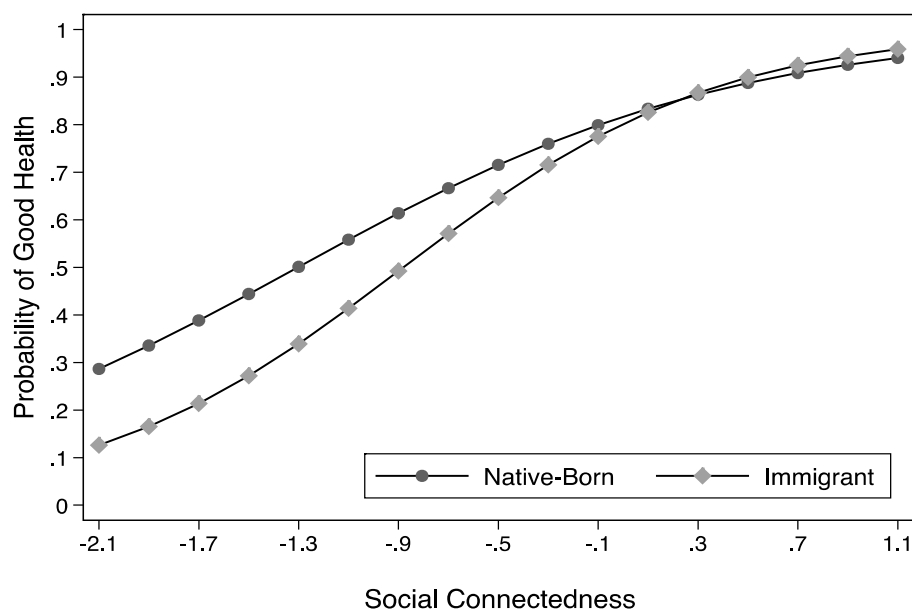
p<.001 *** p<.01 ** p<.05 * p<.10 †

Table 8. Odds Ratios from Weighted Logistic Regression Models Predicting Good Self-Rated Health by Social Connectedness, Social Support and Covariates Among Immigrant and Native-born Adults Ages 65+ (CCHS-Healthy Aging, 2008-2009)

Total Population N=14,844	Model 1	Model 2	Model 3
Social Connectedness	1.59***		1.75***
Social Support		1.04	0.83***
<i>Demographic Characteristics</i>			
Age (65-69)			
70-74	0.93	0.93	0.92
75-79	0.94	0.93	0.94
80-84	0.91	0.90	0.91
85+	1.33*	1.29*	1.36*
Sex (Male)			
Female	1.48***	1.51***	1.50***
Union (Married/Cohabitation)			
Widowed	1.65***	1.26**	1.61***
Divorced/Separated	1.40**	0.98	1.31*
Single	1.49**	1.04	1.32†
Education (Less than High School)			
High School Completed	1.56***	1.67***	1.53***
Some Post Secondary	1.65***	1.76***	1.60**
Post Secondary Completed	1.65***	1.79***	1.59***
Missing	1.12	1.20	1.12
Income (Less than \$20,000)			
\$20,000 - \$39,999	1.13	1.30**	1.13
\$40,000 - \$59,999	1.42**	1.69***	1.44**
\$60,000 - \$79,999	1.58**	2.01***	1.59**
\$80,000 or more	1.88***	2.47***	1.93***
Missing	1.06	1.26*	1.06
Race (White)			
Non-White	0.83	0.78*	0.83
Missing	0.92	0.72	1.00
Province (Ontario)			
Québec	1.25*	1.22*	1.25*
British Columbia	0.95	0.98	0.95
Prairies	0.93	0.95	0.93
East Coast	0.91	0.92	0.92
Lives in Urban Region (Yes)			
Lives in Rural Region	0.89†	0.92	0.90
<i>Health Status</i>			
Chronic Conditions (No Condition)			
Diagnosed Chronic Condition(s)	0.08***	0.08***	0.08***
Missing	0.04***	0.04***	0.04***
Daily Impairment (No Impairment)			
Some Form of Impairment	0.26***	0.23***	0.28***
Missing	0.28*	0.24**	0.32*
Formal Homecare (No Homecare)			
Homecare Received	0.68***	0.62***	0.71***
<i>Interaction Variables</i>			
Immigrant (Native-born)	0.94	0.84*	0.97
Social Connectedness x Immigrant	1.15*		1.17*
Social Support x Immigrant		1.05	0.98
Log-likelihood	-1785986.2	-1844892	-1777492.5

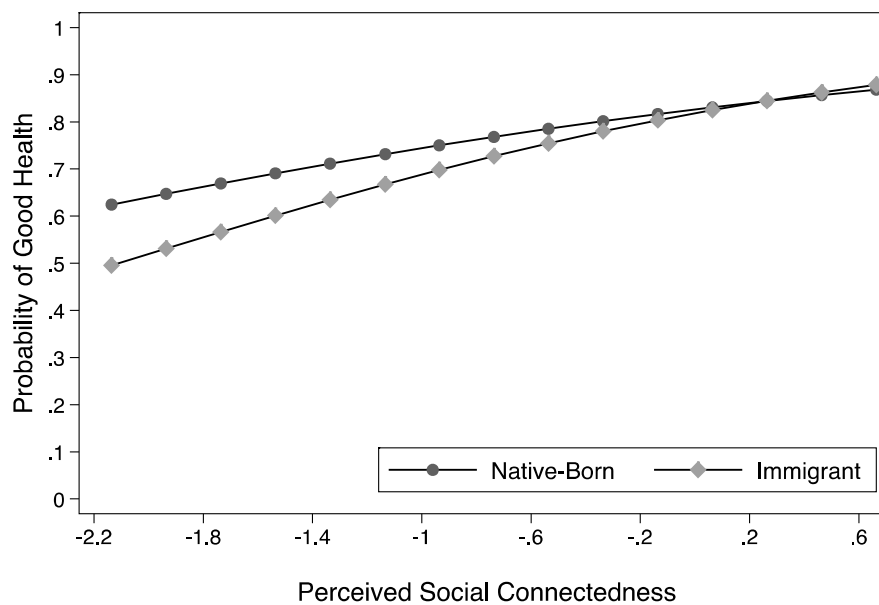
p<.001 *** p<.01 ** p<.05 * p<.10 †

Figure 1. Predicted Probabilities of Good Self-Rated Health Among Immigrant and Native-born Older Adults by Social Connectedness



Notes: Predicted Probabilities are calculated from Model 3 in Table 8, holding other covariates at mean levels. Values on the social connectedness scale range from -2.13 to 1.13, with a mean of 0.09 and standard deviation of 0.45

Figure 2. Predicted Probabilities of Good Self-Rated Health Among Immigrant and Native-born Older Adults by Perceived Social Connectedness



Notes: Predicted Probabilities are calculated from Model 3 in Table 9, holding other covariates at mean levels. Values on the perceived social connectedness scale range from -3.05 to 0.59, with a mean of 0.06 and standard deviation of 0.59

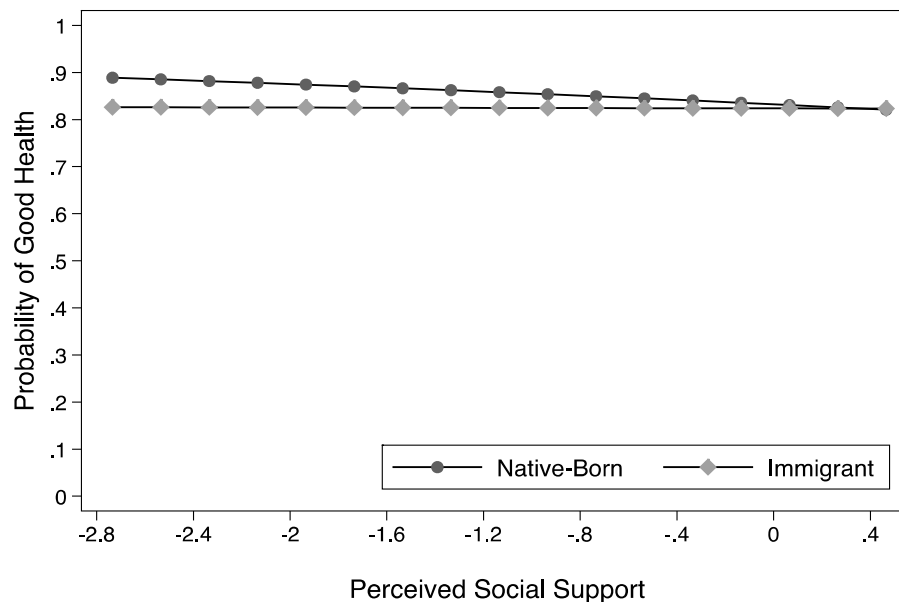
Table 9. Odds Ratios from Weighted Logistic Regression Models Predicting Good Self-Rated Health by Experience and Perception of Social Connectedness, Reception and Perception of Social Support and Covariates Among Immigrant and Native-born Adults Ages 65+ (CCHS-Healthy Aging, 2008-2009)

Total Population N=14,844	Model 1	Model 2	Model 3	Model 4
Social Connectedness				
Experienced Connectedness	1.39***		1.40***	1.41***
Perceived Connectedness	1.27***		1.33***	1.38***
Social Support				
Received Support		0.83***	0.84***	0.86***
Perceived Support		1.17***	0.92*	0.89**
<i>Demographic Characteristics</i>				
Age (65-69)				
70-74	0.93	0.93	0.92	0.92
75-79	0.95	0.93	0.94	0.94
80-84	0.92	0.94	0.93	0.93
85+	1.35*	1.33*	1.36*	1.37*
Sex (Male)				
Female	1.47***	1.52***	1.50***	1.50***
Union (Married/Cohabitation)				
Widowed	1.66***	1.36***	1.64***	1.63***
Divorced/Separated	1.41**	1.10	1.35*	1.35*
Single	1.51*	1.18	1.38*	1.38*
Education (Less than High School)				
High School Completed	1.55***	1.62***	1.51***	1.51***
Some Post Secondary	1.62**	1.77***	1.61**	1.60**
Post Secondary Completed	1.63***	1.74***	1.58***	1.58***
Missing	1.11	1.24	1.15	1.15
Income (Less than \$20,000)				
\$20,000 - \$39,999	1.12	1.26*	1.12	1.12
\$40,000 - \$59,999	1.41**	1.66***	1.44**	1.44**
\$60,000 - \$79,999	1.56**	1.99***	1.60**	1.59**
\$80,000 or more	1.85***	2.48***	1.95***	1.96***
Missing	1.05	1.22*	1.06	1.06
Race (White)				
Non-White	0.83	0.80†	0.83	0.83
Missing	0.93	0.78	1.02	1.03
Province (Ontario)				
Québec	1.26*	1.22*	1.25*	1.25*
British Columbia	0.95	0.99	0.95	0.95
Prairies	0.93	0.96	0.93	0.93
East Coast	0.91	0.91	0.92	0.92
Lives in Urban Region (Yes)				
Lives in Rural Region	0.89	0.91	0.90	0.90
<i>Health Status</i>				
Chronic Conditions (No Condition)				
Diagnosed Chronic Condition(s)	0.08***	0.08***	0.08***	0.08***
Missing	0.04***	0.04***	0.04***	0.04***
Daily Impairment (No Impairment)				
Some Form of Impairment	0.26***	0.27***	0.30***	0.30***
Missing	0.29*	0.27*	0.32†	0.33†
Formal Homecare (No Homecare)				
Homecare Received	0.68***	0.72***	0.75**	0.75***

(Continued)

Table 9 (Continued)				
Interaction Variables				
Immigrant (Native-born)	0.94	0.88	0.96	0.95
Social Connectedness x Immigrant				
Experienced Connectedness x Immigrant	1.03		1.03	
Perceived Connectedness x Immigrant	1.14*		1.14†	
Social Support x Immigrant				
Received Support x Immigrant		0.94		0.93
Perceived Support x Immigrant		1.12†		1.12†
Log-likelihood	-1785124	-1822840.9	-1773916.2	-1773959.5
p<.001 *** p<.01 ** p<.05 * p<.10 †				

Figure 3. Predicted Probabilities of Good Self-Rated Health Among Immigrant and Native-born Older Adults by Perceived Social Support



Notes: Predicted Probabilities are calculated from Model 4 in Table 9, holding other covariates at mean levels. Values on the perceived social support scale range from -3.52 to 0.48, with a mean of 0.07 and standard deviation of 0.70.

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Appendices

Appendix A: Analyses Predicting Health Among Older Adults by Social Connectedness and Social Support Using the Health Utilities Index

Table 1. Coefficients from Weighted Ordinary Least Squares Regression Models Predicting Health Utilities Index Scores by Social Connectedness, Social Support and Covariates Among Adults Ages 65+ (CCHS-Healthy Aging, 2008-2009)

Total Population N=14,844	Model 1	Model 2	Model 3
Social Connectedness	.056***		.069***
Social Support		.003	-.026***
Control Variables			
<i>Demographic Characteristics</i>			
Age (65-69)			
70-74	.001	.001	.001
75-79	-.005	-.006	-.005
80-84	-.022**	-.025**	-.022**
85+	-.046***	-.048***	-.045***
Sex (Male)			
Female	.014**	.018***	.015**
Union (Married/Cohabitation)			
Widowed	.032***	.004	.028***
Divorced/Separated	.014	-.026*	.005
Single	.056***	.016	.040***
Education (Less than High School)			
High School Completed	.014*	.022**	.011
Some Post Secondary	.013	.024*	.009
Post Secondary Completed	.019**	.032***	.015**
Missing	.002	.005	.002
Income (Less than \$20,000)			
\$20,000 - \$39,999	.006	.024**	.006
\$40,000 - \$59,999	.013	.037***	.014
\$60,000 - \$79,999	.017	.048***	.017
\$80,000 or more	.022*	.057***	.023*
Missing	.001	.021*	.001
Race (White)			
Non-White	.008	-.004	.011
Missing	-.057	-.078	-.047
Province (Ontario)			
Québec	.045***	.045***	.044***
British Columbia	.002	.005	.001
Prairies	-.010†	-.007	-.012†
Atlantic	.010	.014*	.011†
Lives in Urban Region (Yes)			
Lives in Rural Region	.002	.006	.003
<i>Health Status</i>			
Chronic Conditions (No Condition)			
Diagnosed Chronic Condition(s)	-.070***	-.078***	-.069***
Missing	-.140***	-.161***	-.136***
Daily Impairment (No Impairment)			
Some Form of Impairment	-.222***	-.242***	-.209***
Missing	-.254***	-.271***	-.241***
Formal Homecare (No Homecare)			
Homecare Received	-.064***	-.077***	-.058***

p<.001 *** p<.01 ** p<.05 * p<.10 †

Table 2. Coefficients from Weighted Ordinary Least Squares Regression Models Predicting Health Utilities Index Scores by Experience and Perception of Social Connectedness, Reception and Perception of Social Support and Covariates Among Adults Ages 65+ (CCHS-Healthy Aging, 2008-2009)

Total Population N=14,844	Model 1	Model 2	Model 3
Social Connectedness			
Experienced Social Connectedness	.022***		.021***
Perceived Social Connectedness	.044***		.047***
Social Support			
Received Social Support		-.048***	-.043***
Perceived Social Support		-.026***	-.008
Control Variables			
<i>Demographic Characteristics</i>			
Age (65-69)			
70-74	.001	.002	.001
75-79	-.007	-.005	-.007
80-84	-.025**	-.017*	-.021**
85+	-.050***	-.043***	-.046***
Sex (Male)			
Female	.015**	.019***	.015**
Union (Married/Cohabitation)			
Widowed	.032***	.015*	.030***
Divorced/Separated	.014	-.007	.009
Single	.055***	.034**	.044***
Education (Less than High School)			
High School Completed	.016*	.018**	.012†
Some Post Secondary	.017	.024*	.016
Post Secondary Completed	.022**	.027***	.018**
Missing	.003	.013	.001
Income (Less than \$20,000)			
\$20,000 - \$39,999	.007	.018*	.008
\$40,000 - \$59,999	.016†	.032***	.018*
\$60,000 - \$79,999	.021*	.043***	.024*
\$80,000 or more	.027**	.052***	.033***
Missing	.003	.017†	.003
Race (White)			
Non-White	.007	.003	.011
Missing	-.060	-.045	-.031
Province (Ontario)			
Québec	.045***	.043***	.042***
British Columbia	.003	.007	.004
Prairies	-.009	-.006	-.008
East Coast	.010	.011	.009
Lives in Urban Region (Yes)			
Lives in Rural Region	.001	.006	.003
<i>Health Status</i>			
Chronic Conditions (No Condition)			
Diagnosed Chronic Condition(s)	-.069***	-.073***	-.066***
Missing	-.139***	-.140***	-.125***
Daily Impairment (No Impairment)			
Some Form of Impairment	-.223***	-.199***	-.186***
Missing	-.255***	-.251***	-.233***
Formal Homecare (No Homecare)			
Homecare Received	-.063***	-.043***	-.037***

p<.001 *** p<.01 ** p<.05 * p<.10 †

Table 3. Coefficients from Weighted Ordinary Least Squares Regression Models Predicting Health Utilities Index Scores by Social Connectedness, Social Support and Covariates Among Immigrant and Native-born Adults Ages 65+ (CCHS-Healthy Aging, 2008-2009)

Total Population N=14,844	Model 1	Model 2	Model 3
Social Connectedness	.054***		.065***
Social Support		.004	-.023***
Control Variables			
<i>Demographic Characteristics</i>			
Age (65-69)			
70-74	.001	.001	-.000
75-79	-.005	-.006	-.005
80-84	-.022**	-.024**	-.022**
85+	-.046***	-.048***	-.044***
Sex (Male)			
Female	.014**	.018***	.015**
Union (Married/Cohabitation)			
Widowed	.032***	.003	.028***
Divorced/Separated	.014	-.026**	.005
Single	.056***	.015	.040***
Education (Less than High School)			
High School Completed	.014*	.022**	.011
Some Post Secondary	.013	.023*	.009
Post Secondary Completed	.019**	.031***	.014*
Missing	.002	.005	.003
Income (Less than \$20,000)			
\$20,000 - \$39,999	.006	.024**	.006
\$40,000 - \$59,999	.013	.036***	.014
\$60,000 - \$79,999	.018	.047***	.018
\$80,000 or more	.022*	.056***	.024*
Missing	.001	.021*	.001
Race (White)			
Non-White	.010	.001	.010
Missing	-.059	-.079	-.050
Province (Ontario)			
Québec	.045***	.043***	.044***
British Columbia	.002	.005	.001
Prairies	-.010	-.009	-.011†
East Coast	.010	.011*	.011†
Lives in Urban Region (Yes)			
Lives in Rural Region	.002	.005	.003
<i>Health Status</i>			
Chronic Conditions (No Condition)			
Diagnosed Chronic Condition(s)	-.070***	-.079***	-.069***
Missing	-.140***	-.162***	-.136***
Daily Impairment (No Impairment)			
Some Form of Impairment	-.222***	-.242***	-.208***
Missing	-.254***	-.273***	-.243***
Formal Homecare (No Homecare)			
Homecare Received	-.065***	-.078***	-.058***
Interaction Variables			
Immigrant (Native-born)	.000	-.010	.003
Social Connectedness x Immigrant	.009		.014*
Social Support x Immigrant		-.005	-.011

p<.001 *** p<.01 ** p<.05 * p<.10 †

Table 4. Coefficients from Weighted Ordinary Least Squares Regression Models Predicting Health Utilities Index Scores by Social Connectedness, Social Support and Covariates Among Immigrant and Native-born Adults Ages 65+ (CCHS-Healthy Aging, 2008-2009)

Total Population N=14,844	Model 1	Model 2	Model 3	Model 4
Social Connectedness				
Experienced Connectedness	.019***		.019***	.022***
Perceived Connectedness	.045***		.048***	.047***
Social Support				
Received Support		-.044***	-.043***	-.038***
Perceived Support		.025***	-.008*	-.008*
Control Variables				
<i>Demographic Characteristics</i>				
Age (65-69)				
70-74	.001	.002	.001	.001
75-79	-.007	-.005	-.007	-.007
80-84	-.024**	-.016*	-.024**	-.020**
85+	-.050***	-.043***	-.050***	-.046***
Sex (Male)				
Female	.016**	.019***	.018***	.018***
Union (Married/Cohabitation)				
Widowed	.031***	.015*	.030***	.030***
Divorced/Separated	.013	-.007	.009	.009
Single	.054***	.034**	.043***	.044***
Education (Less than High School)				
High School Completed	.016*	.018*	.012†	.011
Some Post Secondary	.017	.024*	.017	.015
Post Secondary Completed	.022***	.027**	.018**	.018**
Missing	.004	.013	.004	.010
Income (Less than \$20,000)				
\$20,000 - \$39,999	.007	.018*	.008	.008
\$40,000 - \$59,999	.016†	.031***	.018*	.018*
\$60,000 - \$79,999	.021*	.043***	.024*	.024*
\$80,000 or more	.027**	.053***	.032***	.032***
Missing	.003	.016†	.004	.004
Race (White)				
Non-White	.009	.006	.011	.011
Missing	-.061	-.049	-.033	-.035
Province (Ontario)				
Québec	.044***	.041***	.041***	.042***
British Columbia	.003	.007	.004	.004
Prairies	-.009	-.007	-.008	-.008
East Coast	.010	.009	.009	.009
Lives in Urban Region (Yes)				
Lives in Rural Region	.001	.005	.002	.002
<i>Health Status</i>				
Chronic Conditions (No Condition)				
Diagnosed Chronic Condition(s)	-.070***	-.073***	-.066***	-.066***
Missing	-.139***	-.139***	-.125***	-.124***
Daily Impairment (No Impairment)				
Some Form of Impairment	-.223***	-.199***	-.186***	-.186***
Missing	-.256***	-.252***	-.233***	-.233***
Formal Homecare (No Homecare)				
Homecare Received	-.064***	-.045***	-.037***	-.038***
Interaction Variables				
Immigrant (Native-born)	-.002	-.006	.001	.001
Social Connectedness x Immigrant				
Experienced Connectedness x Immigrant	.012*		.011*	
Perceived Connectedness x Immigrant	-.002		-.004	
Social Support x Immigrant				
Received Support x Immigrant		-.013†		-.013†
Perceived Support x Immigrant		.005		.003

p<.001 *** p<.01 ** p<.05 * p<.10 †

Curriculum Vitae

Name:	Natalie Iciaszczyk
Post-secondary Education and Degrees:	<p>The University of Western Ontario London, Ontario, Canada 2010-2014 B.A. (Honors Specialization)</p> <p>The University of Western Ontario London, Ontario, Canada 2014-2016 M.A.</p>
Honours and Awards:	<p>Canadian Sociological Association Outstanding Graduating Student Award 2015</p> <p>The University of Western Ontario Gold Medal 2014</p>
Related Work Experience:	<p>Research Assistant The University of Western Ontario 2014-2016</p> <p>Teaching Assistant The University of Western Ontario 2014-2015</p>

Publications:

Margolis, R., & Iciaszczyk, N. (2015). The changing health of Canadian grandparents. *Canadian Studies in Population*, 42(3-4), 63-76.

Conference Presentations:

Social Connectedness, Social Support and the Health of Older Adults: A Comparison of Immigrant and Native-born Canadians. Congress 2016: Canadian Population Society Annual Meeting, Ottawa, ON.

The Changing Health of Canadian Grandparents. Congress 2015: Canadian Population Society Annual Meeting, Ottawa, ON.