

**EXAMINING SOCIAL CAPITAL AND DEPRESSIVE SYMPTOMS: TACKLING
MEASUREMENT DEBATES, NEIGHBOURHOOD CORRELATES, AND GENDER
DIFFERENCES.**

by

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Abstract

Depression is the most common mental illness worldwide, and although aspects of the social environment, including social capital and neighbourhood disadvantage, have been linked to depression, the underlying mechanisms are not well understood. Debates within the social capital and neighbourhood disadvantage literatures have yielded mixed findings in studies of depression and an understanding of how social capital may differentially relate to symptomatology in men and women must be solidified. In the first manuscript of this thesis, I assess whether (1) network and psychosocial measures of individual social capital are each associated with depressive symptoms, and (2) the association varies according to whether the capital lies outside or inside an individual's neighbourhood. The second manuscript investigates whether: (1) neighbourhood disadvantage has a stronger association with depression in women compared to men and (2) if specific social capital factors mediate the association between neighbourhood disadvantage and depression. Data came from the Montreal Neighbourhood Networks and Healthy Aging Study conducted in 2008. Data included telephone interview responses from 2624 adults from 300 census tracts in the Montreal metropolitan area. The CESD-10 instrument was used to assess depressive symptoms. Name and position generator instruments and self-reported questions were used to assess psychosocial and network components of social capital. Multilevel logistic regressions adjusted for a range of socio-demographic and economic characteristics. Manuscript 1 results indicated that core tie diversity as well as the psychosocial measures of generalized trust, trust in neighbours, and perceptions of neighbourhood cohesion may be beneficial to those suffering from depressive symptoms. Manuscript 2 results, stratified by gender, indicated that neighbourhood disadvantage was associated with depressive symptoms in women only and

that perceived neighbourhood cohesion mediated this association. Core tie diversity, generalized trust and trust in neighbours were associated with depression in women but did not act as mediating variables. It is suggested that network and psychosocial, as well as general- and neighbourhood specific measures of social capital be included in studies of depressive symptoms. Health promotion initiatives meant to combat depression may wish to consider the gender differences in the design and implementation of neighbourhood or peer-based programs.

Co-Authorship

SM and EB designed the research questions and contributed to the conceptualization of the study. EB conducted data analysis and drafted the initial version of each manuscript. SM was the nominated principal investigator on the Montreal Neighbourhood Networks and Healthy Aging Study, gave advice and input on the data analyses, and edited the manuscript for intellectual content and clarity. Both authors assume responsibility for the final content and approve the manuscript for submission. There are no conflicts of interest to report.

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Chapter 1

General Introduction

Major depressive disorder includes symptoms such as loss of pleasure, feelings of hopelessness and decreased interest in nearly all daily activities (American Psychiatric Association, 2000). A major depressive episode occurs when symptoms persist for at least two weeks, however many cases take on a chronic course with episodes often recurrent throughout the life-course (American Psychiatric Association, 2000). The debilitating symptoms of depression are a major national concern, directly impacting the quality of life of millions of Canadians. According to the Canadian Community Health Survey that was conducted in 2002, 4.0% of Canada's population experienced major depression that year, and 10.8% of the population had experienced major depression in their lifetime (Patten, et al., 2006). Women are at particularly high risk of experiencing depression, with studies consistently finding women's rates of depression to be double that of men's (Noelen-Hoeksema, 2001). There is a need to understand which social and environmental factors contribute to depression and how these contributors may vary by gender.

Ever since the work of Emile Durkheim, researchers have acknowledged the importance of exploring the links between social relationships and depressive symptoms. The concept of social capital has more recently become a fixture of this line of research. Social capital refers to the material, informational and affective resources to which individuals and, potentially, groups have access through their social connections (Moore et al., 2009). Social capital can be measured generally, or in more specific contextual boundaries, such as within neighbourhoods. Assessing social capital both inside and outside individual's neighbourhoods allows for an understanding of where resources are accessed (Moore et al.,

2011). Despite the development of social capital research in recent years, the definition of social capital and its operationalization are still debated. A common debate is whether the mechanisms linking social capital to health are psychosocial or network based, and researchers typically side with one of these approaches. The psychosocial approach to social capital focuses mainly on general themes of trust, reciprocity and cohesion (Putnam, 1995). A network approach, on the other hand, assesses how and to whom individuals are connected within their social structures by investigating the size, range, and diversity of individual's social connections and the quality and types of resources people are able to access and mobilize through their connections. Most studies of social capital and depression have followed a psychosocial approach however the inclusion of both psychosocial and network measures may allow for clarification as to which components are most relevant when examining depression. There is also a need to understand how social capital varies between geographic contexts, especially when aiming to improve mental health at a population level. However, researchers have yet to examine how general and neighbourhood-specific social capital is associated with depression.

Although contextual effects of social capital have not been studied when examining depression, researchers have investigated the effects of broader environmental characteristics, including neighbourhood disadvantage. Recent research on neighbourhood social environments and health has suggested that neighbourhood disadvantage can impact individual risk of depression. Complex relationships between social capital and neighbourhood disadvantage have been suggested with studies finding different components of social capital to moderate and mediate associations between neighbourhood disadvantage and depressive symptoms (Caughy et al., 2003; Haines et al., 2011). However, these studies

have used disparate measures of social capital and have rarely included both psychosocial and network components.

Public Health Implications

This thesis work aims to contribute to the fields of research and public health in the domains of mental health and social capital. Implications may be particularly relevant for prevention and treatment programs of depression, and for the general promotion of positive mental well being in populations. Knowledge of whether the benefits of social capital for health arise from within or outside the neighbourhood may be important for community-based programming. For example, if neighbourhood social capital is a significant predictor of depressive symptoms, programs that enhance resources, promote interaction between neighbours, and foster a sense of cohesion within neighbourhoods may increase overall social capital and decrease rates of depressive symptoms within communities. If neighbourhood disadvantage is also a contributor and is predictive of social capital within a neighbourhood, programs may first wish to enhance the socioeconomic conditions of neighbourhoods to in turn promote social capital and improved mental health. Such population-based approaches are beneficial in that they target multiple groups at once, allowing for more widespread outcomes than typical mental health treatments aimed at the individual level.

Objectives and Hypotheses

This thesis will contribute to the existing literature by investigating how psychosocial and network components of social capital are associated with depressive symptoms in a sample of adults from the Montreal metropolitan area. Chapter 2 describes the importance of

examining depression, current critiques of social capital and its relevance to studies of depression, and gaps within the current literature. My first manuscript will examine general and neighbourhood-specific social capital to develop an understanding of how the association between depressive symptoms and individual social capital varies as a function of the location of a person's social ties. Two main research questions guide the first manuscript: (1) Are network or psychosocial dimensions of social capital associated with depression when controlling for socio-demographic variables and the other dimension?; (2) Does the geographical source (i.e., inside or outside one's neighbourhood) of a person's social capital matter in terms of the association between social capital and depression?

My second manuscript will then build on these findings by examining how neighbourhood-level measures of disadvantage are associated with depressive symptoms in men and women, and whether social capital factors potentially alter neighbourhood environmental associations. Social capital measures will be investigated as potential moderators or mediators of the association between neighbourhood disadvantage and depressive symptoms. Research questions are as follows: (1) Is neighbourhood disadvantage associated with depressive symptoms in men and women when controlling for socio-demographic and socio-economic factors? (2) Are components of social capital associated with depressive symptoms in men and women? And (3) Do social capital measures moderate or mediate associations between neighbourhood disadvantage and depressive symptoms in men and women? Findings from this research will aim to enhance understanding of which social capital and neighbourhood determinants are most important when examining depressive symptoms in men and women.

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Chapter 2

Literature Review

Depression: Prevalence and Importance

Depression is the most common mental illness in the world, affecting 3.2% of the world's population (Moussavi, Chatterji, Verdes, Tandon, Patel, & Ustun, 2007). In 2000, the World Health Organization rated depression as the fourth leading cause of disease burden worldwide and projected that by 2020 depression would rank second (Moussavi et al., 2007). Major depressive disorder includes symptoms such as loss of pleasure, feelings of hopelessness and decreased interest in nearly all daily activities (American Psychiatric Association, 2000). A major depressive episode occurs when symptoms persist for at least two weeks, however many cases take on a chronic course with episodes often recurrent throughout the life-course (American Psychiatric Association, 2000).

Depression causes debilitating psychological distress and negatively impacts individual's quality of life at home, work, school, and in social settings (Government of Canada, 2006). The Canadian Community Health Survey estimated that 4.0% of Canada's population experienced major depression in 2002, and 10.8% of the population had experienced major depression in their lifetime (Patten, et al., 2006). Rates of undiagnosed and subsyndromal levels of depression are likely much higher than those of the diagnosed illness, and should also concern health professionals. Those with elevated symptoms of depression are more than four times as likely to develop major depressive disorder a year later compared to individuals without depressive symptoms (Judd et al., 2002). Thus, there is

a need not only to understand the causes of major depressive disorder, but also to understand predictors and risk factors for elevated levels of depressive symptoms.

To understand which factors are predictive of depression and who is most at risk there is a need to understand how determinants of various kinds may work together to help or hinder mental well-being and to examine how predictive factors may vary between groups. This chapter will describe the background of social capital and the ways in which it may be connected to health related outcomes, including depression. The importance of examining neighbourhood environments in studies of social capital and in studies examining neighbourhood disadvantage will also be discussed in relation to depression. Exploring such relationships have important public health implications, since understanding the dynamics of such associations may be used to inform prevention and treatment programs of communities. It may be particularly beneficial to investigate how determinants of depression differ between men and women, and current research on gender and depression will be discussed. Finally, limitations of current research will be reviewed and goals of the current thesis work will be outlined.

Definition and Brief Overview of Social Capital

Social capital refers to the material, informational and affective resources to which individuals and, potentially, groups have access through their social connections (Moore et al., 2009). Social capital is most often associated with concepts such as trust, norms, power, relationships, and networks and although it is relatively new to health and social sciences research as a whole, its separate components have been studied for centuries (Whitley & McKenzie, 2005). At the basis of social capital is the notion that people invest in social relations with expected returns (Lin, 1999). While theorists tend to agree upon this

underlying understanding, the specific definitions and measurements used in the social capital literature are often disputed (Lin, 1999). In fact, discrepancies have existed since the very first attempts to define social capital beginning in the late 1980s and early 1990s. Bourdieu, Coleman, and Putnam are often referred to as early theorists of social capital, and their approaches have influenced the ways in which social capital is viewed in the field of health sciences today (Lin, 1999; Moore et al., 2005). Bourdieu was interested in the distribution of social capital within society and explained that like economic or cultural capital, social capital was unequally distributed among individuals and groups (Lin, 1999; Moore et al., 2005). Coleman's approach to social capital was similar to Bourdieu's in that they both emphasized the importance of examining social networks however their approaches to social capital differed. Bourdieu, viewed social capital as a source of exchangeable resources mediated by networks, whereas Coleman perceived social capital as a source of social control, crime, and neighbourhood security (Lin, 1999; Portes, 2000). Rather than considering structural measures of social networks, as Bourdieu and Coleman suggested, Putnam focused on relational factors including norms of trust and reciprocity (Lin, 1999). Despite advances in social capital, there has tended to be a divide between those who follow approaches that are more in line with Putnam's work and those who support Bourdieu or Coleman's definitions of social capital.

Debates within the Literature

1) Communitarian versus network approaches to social capital.

A central debate within social capital research is whether it is a communitarian- or network-driven phenomenon. Communitarian approaches to social capital typically include measures that are psychosocial or cognitive (e.g perceptions of trust or cohesion) in nature as

well as indicators of community participation (Moore et al., 2005). Putnam's definition, which focuses on community-level communitarian social capital, has been the most dominant in health sciences to date. In his definition, social capital encompasses five main principles: (1) 'community networks'; the number and density of voluntary, state, and personal networks, (2) 'civic engagement'; the amount of participation in civic networks, (3) 'local civic identity'; the degree to which there is a sense of belonging, solidarity, and equality between community members, (4) 'reciprocity and cooperation norms'; the degree to which there is a sense of obligation to help others, as well as feelings that others will reciprocate in the future, and (5) 'community trust'; the degree of trust held by individuals within the network (Putnam, 1993; Whitley & MacKenzie, 2005). Although community networks are listed within this definition, Putnam and others who follow a communitarian approach typically focus on the latter four components. A network approach, as represented in the work of Bourdieu, defines social capital as resources that are accessed within social networks for the benefit of individuals or groups (Carpiano, 2006). Network approaches to social capital measure directly how and to whom individuals are connected within their social structures by investigating the size, range, and diversity of individual's social connections, and the resources potentially available within those networks. Although researchers typically adhere to one or the other of these two approaches, some recent studies have sought to compare communitarian and network measures within their work to understand better the potential mechanisms linking social capital to health (Moore et al., 2009; Moore et al., 2011). This thesis work supports the incorporation of both communitarian and network dimensions of analysis in studies of social capital. An all-encompassing approach to social capital will provide researchers and health professionals with a greater understanding of how cognitive,

participatory, network and resource-related elements may work together to influence health outcomes. Investigation of these relationships is difficult if social capital dimensions are examined separately.

Critiques of the communitarian approach

Although the communitarian approach to social capital is the most prevalent in health research today, several concerns have been outlined by researchers that must be addressed. First, the predominance of communitarian approaches in public health research has been largely due to the ways in which social capital was initially translated and cited in the field of public health (Moore et al., 2005). Novel concepts within the public health field are often shaped by prominent researchers or articles that gain a popular status from the beginning, forcing other views to be overlooked and stunted before they are fully explored. Moore et al. (2005) demonstrate that this is largely the case with the development of social capital and the apparent predominance that the communitarian approach has taken in the field. Early leading papers on social capital focused on communitarian aspects of social capital, which has resulted in less attention to its actual network dimensions (Moore et al., 2005). Ease of measurement may be an important factor contributing to the predominant uptake of the communitarian approach. The inclusion of network measures in research centred on social capital may give a more complete picture of the association of social capital and depression than currently found in the literature.

Second, communitarian measures have often been labelled as proxy, or indirect, measures of social capital since they do not directly assess access to resources (Moore et al., 2009). Hence, the communitarian approach has often been criticized for measuring concepts that more closely relate to theories of social cohesion than social capital (Lin, 1999;

Carpiano, 2006). For example, perceptions of trust may be more suited to measure social cohesion than an individual's general access to resources. Network measures may be advantageous in deciphering the types of resources accessible to individuals and groups within social networks.

A third critique of the communitarian approach lies in its supposed inability to address issues of inequality and power (Moore et al., 2005). Other forms of capital (i.e., economic and human) have historically addressed these issues and it seems appropriate that social capital should do the same. Although social capital has been criticized for falling short in this regard, it may not be the concept itself that is ill suited to address distributions and inequalities in societies, but the communitarian concepts often used in its measurement. Network measures then, may offer insight into distributions of inequality in society due to their abilities to compare and contrast the types of resources accessed by certain individuals and groups.

2) Dimensions and levels of social capital

Debates within the social capital literature also surround discussions of levels and dimensions of analysis. Dimensions of social capital include the aforementioned approaches of psychosocial, participation, and network. In terms of the level of analysis debate, researchers sometimes differ in their opinions as to whether social capital should be measured with individual- or ecological-level measures. Table 1 provides examples of common individual- and ecological-level measures of social capital according to each dimension. Individual-level measures of social capital are more commonly used than ecological-level measures and mostly consist of self-reported questions of social networks and perceptions of social relationships (De Silva et al., 2005). At an ecological level, social

capital measures tend to reflect group and neighbourhood levels of connectivity (Poortinga, 2005; Whitley et al., 2005). Multilevel studies are increasingly used to assess associations between social capital and health outcomes, and have the benefit of deciphering how individual- and neighbourhood-level characteristics differentially contribute to the outcome of interest (Poortinga, 2005). However, debate within this line of research has arisen since ecological-level social capital is often derived from aggregated data of individual-level social capital measures (De Silva et al., 2005; Poortinga et al., 2005). For example, ecological measures capture elements of the community that are often not measurable through individual-level data (De Silva et al., 2005) and the potential for aggregated individual-level data to also capture these broader constructs is unclear. It has been suggested that aggregate data is a proxy measure of exogenous characteristics and more direct measures of neighbourhoods must be created to address this issue (Diez-Roux, 2007).

Table 1. Dimensions and levels of analysis in social capital.

| Dimension/Level | Individual | Ecological (area) |
|------------------------|--------------------|----------------------------------|
| Cognitive/Psychosocial | Trust, Perceptions | Community Trust, Social cohesion |
| Participation | Participation | Area participation |
| Network | Ego networks | Network structures |

Another debate that has arisen from researchers' attempts to define social capital has led to the question of whether social capital is a concept that should be assessed generally or within certain environments, such as within neighbourhoods. General social capital would represent an individual's general levels of trust towards others, their overall participation in associations, and resources obtained from their entire social networks. Others postulate that although social capital may be measured generally, it can also be assessed in

more specific contextual environments (Haines et al., 2011). For instance, examining social capital both inside and outside individual's neighbourhoods allows for identifying where people are accessing valued resources (Moore et al., 2011). Knowledge of whether the benefits of social capital for health arise from network sources within or outside the neighbourhood may be important for research and health promotion purposes.

Neighbourhood social capital may be measured at an individual-level and is most commonly measured through self-report. With regards to each dimension of social capital, psychosocial measures assess perceived neighbourhood cohesion or trust in neighbours; participation measures would assess involvement in neighbourhood associations; and network measures would examine resources accessed within the neighbourhood. Both general- and neighbourhood-specific measures of social capital are being included in health research to gain a more well-rounded understanding of how and where individuals access their resources.

Social Capital and Health

Research on social capital has examined a range of health outcomes which have included health-related behaviours, as well as physical and mental illnesses. According to Kawachi et al. (1999), social capital may influence health outcomes within neighbourhoods through mechanisms that include: (1) rapid promotion and diffusion of health information, (2) ensuring that health behaviours and norms are adopted, and (3) minimizing opportunities for negative health behaviours. These mechanisms more closely relate to the communitarian rather than the network approach to social capital due to their focus on norms and social cohesion. Several broad areas of physical health are associated with social capital in the communitarian sense, and include mortality and life expectancy, self-rated health,

cardiovascular disease, cancer, obesity, diabetes, and infectious disease (Kawachi et al., 2008).

Nackhaie et al. (2010) however, recognize the importance of network connectivity when examining health outcomes in relation to social capital. Nackhaie et al. (2010) report that high levels of social capital at group, neighbourhood, and network levels provides individuals with increased resources in terms of finance, care, and transportation which in turn is found to benefit overall health. The measurement of resources accessed by individuals as a result of their social connections, along with the emotional support received from these connections, are said to reinforce physical and mental health (Nackhaie et al., 2010). For example, those with large social networks are likely to have higher access to social support, which in turn leads to better health (Haines et al., 2011). Furthermore, those who have access to network members leading healthy lifestyles may turn to these connections for information which may in turn influence their own health behaviours (Haines et al., 2011). Moore et al. (2009) highlight the benefits of network capital by relating those to the potential positive health benefits that may result from a person's or a group's greater access to informational, material, and socially supportive types of resources. Health-related outcomes associated with network components of social capital include self-rated health and obesity (Moore et al., 2009; Moore et al., 2011; Verhaeghe et al., 2012). Thus, research indicates important connections between social capital and health outcomes in both communitarian and network dimensions. As research moves forward, it is important to understand how both dimensions may work together to influence health outcomes.

Depression and Social Capital

Ever since the work of sociologist Emile Durkheim, who studied the social causes of suicide, researchers have acknowledged the importance of exploring the relationship between social relationships and depressive symptoms (Durkheim, 1951). The concept of social capital has more recently been investigated in mental health research. Most studies of social capital and depression have used communitarian measures of social capital, such as trust and participation. Several studies have shown individual-level generalized trust to be inversely related to depressive symptoms (Aslund et al., 2010; De Silva et al., 2005; Fujiwara & Kawachi, 2008; Sund et al., 2007; Veenstra, 2005; Webber et al., 2010). In studies measuring perceived neighbourhood trust, higher trust in neighbours has also been shown to be a protective factor of depression (Fujiwara & Kawachi, 2008; Webber et al., 2010). Studies of community participation, volunteer work, and depression have not found social capital to be related to depression (Fujiwara & Kawachi, 2008). While individual-level studies have lent some support for the relationship between depression and social capital, the measures of social capital used in these studies are problematic since they tend to include only communitarian measures such as trust and participation.

Less research has examined social capital and depression using formal social network data. Analyses that have examined social networks and depression have shown that individuals who report being socially isolated within their social networks are more likely to have depression than those who report more network ties (Berkman, 1995; Bruce & Hoff, 1994; Fujiwara & Kawachi, 2008; Walters et al., 2004; Webber et al., 2010). Using a resource generator to measure access to specific types of resources within individual's neighbourhoods, Webber et al. (2010) did not find any association of social capital with depression over a six-month period (Webber, Huxley, & Harris, 2010). Rosenquist and

colleagues (2011) conducted a particularly comprehensive study which investigated the spread of depression through social networks. Individuals with several core ties and those who were located centrally within their networks had lower rates of depression (Rosenquist et al., 2011). It was found that depressive symptoms do spread within social networks and individuals with depression are more likely to have close ties that also suffer from depression (Rosenquist et al., 2011). In fact, having close ties with depression doubled the probability that the respondent will develop depressive symptoms themselves (Rosenquist et al., 2011). Initial findings thus demonstrate that both network and communitarian components of social capital may be associated with depressive symptoms, and such relationships require further exploration.

Neighbourhood Environments and Depression

Neighbourhood characteristics have generally been included in studies of social capital and depression in two capacities: (1) neighbourhood-specific measures of social capital (e.g., neighbourhood network ties, perceived neighbourhood cohesion, or trust in neighbours), and (2) effects of neighbourhood disadvantage on social capital. With regards to the former capacity, researchers have yet to define clearly the differences between general- and neighbourhood- social capital when investigating depression. Self-rated health has been investigated in these capacities which may have indirect implications for depression due to negative associations between self-rated health and depressive symptoms (Mulsant, Ganguli, & Seaberg, 1977). Specifically, in the case of self-rated health, outside-neighbourhood social ties may be more beneficial than inside-neighbourhood ties (Moore et al., 2011). Thus, if an individual's self-rated health is linked with depressive symptoms, outside-neighbourhood social ties may not only be beneficial for one's self-rated health, but may decrease their

likelihood of depression as well. Yet, studies of social capital and depression in this capacity remain limited. To gain a better understanding of the potential psychosocial or network mechanisms by which social capital might be associated with mental health, more research that examines differences between general and neighbourhood-specific social capital is needed. Understanding the contextual effects of social capital and depression may guide and inform policy and practice as to where to allocate social resources. For example, if neighbourhood social capital is associated with depression to a higher degree than general social capital, programs may wish to foster social capital within neighbourhoods with high prevalence rates of depression.

The second capacity in which research has included neighbourhood characteristics in studies of social capital and depression considers neighbourhood disadvantage as a potential contributor (Echeverria et al., 2008; Mulvaney et al., 2005; Veenstra, 2005). Several studies suggest that neighbourhood disadvantage is associated with increased rates of depressive symptoms (Cutrona et al., 2005; Echeverria et al., 2008; Haines et al., 2011; Matheson et al., 2006; Mulvaney et al., 2005; Rajaratnam et al., 2008; Ross, 2000; Silver et al., 2002; Veenstra, 2005). Subjective measures of neighbourhood-level disadvantage, e.g., individual's perceptions of neighbourhood disorder, have also been shown positively associated with depression (Curry et al., 2008; Ross, 2000). Increased stress brought on by living in a disadvantaged area may be a mechanism that links neighbourhood disadvantage to depression and poor mental health outcomes (Curry et al., 2008). Yet, findings have tended to be somewhat inconsistent with other studies reporting no associations between neighbourhood disadvantage and depression when controlling for individual- or neighbourhood-level factors (Dupere & Perkins, 2007; Hybels et al., 2006; Ross, 2000).

Higher neighbourhood connectedness is sometimes seen in poorer neighbourhoods and may be one potential explanation as to why neighbourhood disadvantage is detrimental in some instances but not in others (Small, 2004). Studies examining neighbourhood disadvantage in conjunction with social capital measures in studies of depression have tended to use communitarian measures and have examined direct pathways between social capital, neighbourhood disadvantage, and depressive symptoms. However, it has been suggested that relationships between disadvantage and depression may be more complex than these studies reveal. For example, recent findings suggest that neighbourhood network components of social capital play a moderating role whereas overall network capital plays a mediating role between neighbourhood characteristics and depressive symptoms (Caughy, O'Campo, & Muntaner, 2003; Rajaratnam et al., 2008).

Caughy et al. (2003) found that parental ties within the neighbourhood moderated the association between neighbourhood disadvantage and depressive symptoms in children. In wealthy neighbourhoods, children whose parents knew many neighbours were less likely to have anxiety and depression than children whose parents knew fewer neighbours. In contrast, children in poor neighbourhoods whose parents knew fewer neighbours were less likely to have anxiety and depression than children whose parents knew many neighbours (Caughy et al., 2003). Rajaratnam et al. (2008) reported that in low-crime neighbourhoods, women with no close social ties had higher rates of depression than those reporting one or more close ties. There were no differences in depression rates for those in high-crime neighbourhoods (Rajaratnam et al., 2008). Overall, these findings broadly suggest that while ties within networks may be protective of depressive symptoms in some neighbourhood circumstances, these relationships may differ in other types of neighbourhoods. Thus, components of social

capital may moderate the ways in which neighbourhood disadvantage is associated with depressive symptoms.

Social capital has also been found to mediate associations between neighbourhood disadvantage and depression. Haines and colleagues (2011) investigated network social capital to better understand how the variability and range of networks, as well as how resources accessed through networks are associated with depressive symptoms. Results indicated that network social capital plays a mediating role between neighbourhood disadvantage and depressive symptoms (Haines et al., 2011). These findings demonstrate the importance of examining indirect pathways when looking at social capital, neighbourhood disadvantage and depression and lend support to further exploring network social capital in relation to depressive symptoms.

Determinants of Depression and Gender

Women's rates of diagnosed depression are typically double the rates of men across all adult age groups (Noelen-Hoeksema, 2001). Gender differences have been seen in studies of social environmental factors and depression, indicating that men and women have different risk factors for depressive symptoms. For example, it has been found that women differ from men in their social roles, the degree to which social networks influence their mental health, and their access to social support (Piccinelli & Wilkinson, 2000). It has been theorized that stressors associated with gender roles partially explain why women are more likely to experience depression (Piccinelli & Wilkinson, 2000). Gender roles in the work force, at home, or as a parent typically differ by gender, even in developed societies (Piccinelli & Wilkinson, 2000). Even in societies where women's daily activities are similar

to men's (ie. at work and at home), underlying socially constructed ideas of "gender" shape the ways in which men and women's mental health are affected by various social stimuli.

Social capital and gender

Initial research suggests that there may be important gender differences in access to social capital. Divergences are potentially caused by differential social network structures of men and women, which result in exposure to different types of resources (Gidengil et al., 2003). When measuring knowledge of politics as a resource obtained through one's social network, men's knowledge was far greater than women's in all regards (Gidengil et al., 2003). Differences were attributed to the likelihood that knowledge of politics is a resource accessed much more easily through men's work-dominated social network compared to women's kin-based networks (Gidengil et al., 2003). In a study investigating social capital within faculty members, men did not differ from women in their ability to develop emotional realms of social capital (i.e., social support) through their social networks - a finding contrary to assumptions that women are more effective in emotional capacities than men (Van Emmerik, 2005). Another research group explored gender differences in social capital and self-rated health and reported that social trust was associated with positive self-rated health in men, whereas perceptions of neighbourhood safety was important for women (Kavanagh et al., 2006). Yet another study examined the effects of trust and neighbourhood closeness on health-related behaviours and found that women with high levels of trust in others were less likely to smoke than women with low trust in others, and women reporting high levels of neighbourhood closeness were less likely to drink alcohol than those reporting low levels of neighbourhood closeness (Chuang & Chuang, 2008). Effects were significantly greater in

women compared to men in their study (Chuang & Chuang, 2008). Differences in social capital between men and women may carry important implications when examining health-related outcomes, as was seen in studies of health-behaviours and self-rated health. More research is needed to clarify how gender differences in social capital may impact other health outcomes, including depression.

Neighbourhoods and gender

Few studies have investigated gender differences in the effects of neighbourhood environments on depressive symptoms. Initial hypotheses by Matheson et al. (2006) proposed that women are likely to be most affected by neighbourhood disadvantage because of their tendencies to be more socially embedded within their neighbourhoods. Findings in their study found no gender differences in depression due to neighbourhood-level chronic stress, but emphasized that there is a need to replicate such analyses in future studies (Matheson et al., 2006). Another study that recognized the need to examine contextual environments, gender and depressive symptoms measured county-level deprivation. In adolescents, high deprivation at the county level was predictive of depressive symptoms in males, but not in females (Uddin et al., 2010). County-level measures however carry different implications to neighbourhood-level ones making it impossible to directly compare results.

Limitations in Current Research

Having compiled and evaluated the literature, it is evident that more research, particularly from a network perspective, is needed to understand how social capital and neighbourhood characteristics contribute to depression. Moreover, social capital research has

not yet clearly identified gender differences in associations between depression and components of social capital. With several debates surrounding the definition and measurement of social capital, it is evident that researchers must work towards building a consensus. The incorporation of network-, communitarian-, general- and neighbourhood-specific measures into studies of social capital may aid in the clarification of which mechanisms better explain the association between depression and social capital. Neighbourhood disadvantage may be an additional factor that plays a role between associations, and must also be further explored in studies of social capital and depression. An all-inclusive approach may thus be particularly beneficial when examining health outcomes, such as depression, since it will allow for clearer depictions of contributing factors to the illness.

A second major limitation includes measurement issues that have arisen when attempting to define neighbourhood boundaries. Specifically, there may be discrepancies within individual- and ecological- level measures of neighbourhoods. For example, whereas neighbourhood-level disadvantage can be measured by census tract data, individual-level perceptions of neighbourhood disadvantage are based upon respondent's own mental frames of where their neighbourhood boundaries lie. Respondent's perceptions likely differed somewhat from the strictly-defined census tract boundaries. Moving forward, individual- and neighbourhood-level measures of neighbourhood disadvantage should be designed in a way that allows them to be more directly comparable.

Lastly, limitations exist when attempting to understand the causal relation between social capital and depressive symptoms. Studies to date have tended to use cross-sectional designs which make the establishment of cause-effect relationships difficult. For example, it

may be that having low social capital results in a higher likelihood of depressive symptoms. On the other hand, those suffering from depression may become disconnected within their networks, which decreases their access to resources and consequentially lowers their levels of social capital. Previous research has shown complex reciprocal effects when it comes to the relationship between depression and social relationships (Chou & Chi, 2003; Patten et al., 2010; Ramos & Wilmoth, 2003).

Purpose of Study

With determinants that range from psychosocial processes that exist within the individual to broader constructs of the social environment, it is clear that studies should incorporate multidimensional measures to gain a clearer and more accurate depiction of factors that best predict depressive symptoms. Furthermore, research should consider gender differences to fully understand how determinants of various kinds may differentially impact the mental health of men and women. This thesis will contribute to the existing literature by investigating how communitarian constructs, often labelled as psychosocial measures, and network constructs of social capital are associated with depressive symptoms in a sample of adults from the Montreal metropolitan area. My first manuscript will examine general and neighbourhood-specific social capital to develop an understanding of how the association between depressive symptoms and individual social capital varies as a function of the location of a person's social ties. Two main research questions guide the first manuscript: (1) Are network or psychosocial dimensions of social capital associated with depression when controlling for socio-demographic variables and the other dimension?; (2) Does the geographical source (i.e., inside or outside one's neighbourhood) of a person's social capital matter in terms of the association between social capital and depression?

My second manuscript will then build on these findings by examining how neighbourhood-level measures of disadvantage are associated with depressive symptoms in men and women, and whether social capital factors potentially alter neighbourhood environmental associations. Social capital measures will be investigated as potential mediators of the association between neighbourhood disadvantage and depressive symptoms. Research questions are as follows: (1) Is neighbourhood disadvantage associated with depressive symptoms in men and women when controlling for socio-demographic and socio-economic factors? (2) Are components of social capital associated with depressive symptoms in men and women? And (3) Do social capital measures moderate or mediate associations between neighbourhood disadvantage and depressive symptoms in men and women? Findings from this research will aim to enhance understanding of which social capital and neighbourhood determinants are most important when examining depressive symptoms in men and women.

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Chapter 3

Social Capital and Depressive Symptoms:

The association of psychosocial and network mechanisms with depressive symptoms generally and within individuals neighbourhoods.

Abstract

Depression is the most common mental illness worldwide, and although aspects of the social environment, including social capital, have been linked to depression, the underlying mechanisms are not well understood. In this study, we assessed whether (1) network and psychosocial measures of individual social capital were each associated with depressive symptoms, and (2) the association varied according to the location of the capital, i.e., outside or inside a person's neighbourhood. The current study used data from the Montreal Neighbourhood Networks and Healthy Aging Study (MoNNET-HA). MoNNET-HA consisted of a representative sample of 2707 adults from 300 census tracts in the Montreal Metropolitan Area. The CESD-10 instrument was used to assess the presence of depressive symptoms with a cut off of more than three symptoms used to indicate depressive symptomology. Name and position generator instruments were used to assess the existence of a core tie, core tie diversity, and network social capital both inside and outside the neighbourhood. Questions on generalized trust, trust in neighbours, and neighbourhood cohesion were used to assess psychosocial dimensions of social capital inside and outside the neighbourhood. Community and general group participation were also included as structural measures of social capital. Analyses adjusted for a range of socio-demographic and economic characteristics. Results from multilevel logistic regressions indicated that the core tie diversity as well as the psychosocial measures of generalized trust, trust in neighbours, and perceptions of neighbourhood cohesion reduced the likelihood of depressive symptoms in urban-dwelling adults. Network and psychosocial components of social capital within neighbourhood contexts should be considered when examining social capital and depressive symptoms.

Social Capital and Depressive Symptoms: The association of psychosocial and network mechanisms with depressive symptoms generally and within individuals neighbourhoods.

Major depressive disorder is the most common mental illness worldwide, affecting 3.2% of the world's population, and includes symptoms such as low mood and loss of interest in daily activities (American Psychiatric Association, 1994; Moussavi, Chatterji, Verdes, Tandon, Patel, & Ustun, 2007). It has been projected that by 2020, depression will rank as the second leading disease burden worldwide (Moussavi et al., 2007). Ever since the work of Emile Durkheim, researchers have acknowledged and sought to examine the influence of the social environment and social relationships on mental health and depression. Social capital is a relatively more recent construct in social epidemiological research in this field, and refers to the resources which individuals and, potentially, groups have access to through their social connections (Moore et al., 2009). Social capital is often considered to be a feature of one's social environment and to have psychosocial, structural, and network components. Despite recent advances in research on social capital and mental health, less is known about the contribution of network versus psychosocial mechanisms in the link between social capital and depression. To develop a greater understanding of those links, more research needs to investigate the relative associations between psychosocial and network components of social capital and depression.

A person may be able to draw on their social capital within various contexts, including workplace, school, and neighbourhood. Assessing the contextual sources of a person's social capital, specifically, in this case, inside and outside one's neighbourhood, may be important for research and health promotion purposes (Moore et al., 2011). For example,

outside-neighbourhood social capital may be more beneficial than inside-neighbourhood social capital for a person's self-rated health (Moore et al., 2011). Outside ties may indicate greater heterogeneity in social connections and access to a greater diversity of resources (Moore et al., 2011). Yet, few studies have differentiated between general- and neighbourhood-specific social capital when examining social capital and depression. Results from such findings might better guide the content and types of treatment and prevention programs targeting depression.

Components of Social Capital

Within public health research, the concept of social capital is often operationalized using measures of trust, community participation, and individual- and community-level networks (Whitley & McKenzie, 2005). Differences in the operationalization of social capital have led to the rise of two main approaches - psychosocial and network - to understanding the link between social capital and health. The psychosocial approach includes constructs that are both social and psychological in nature and typically include measures of trust, norms, reciprocity, and perceptions of surrounding social environments (Legh-Jones & Moore, 2012). Those who use psychosocial measures typically also include measures of community participation in their studies and consider this to add a structural element to their research (Fujiwara & Kawachi, 2008; Veenstra, 2005). Strong associations have been found between the psychosocial components of individual social capital and various health outcomes, including depression (Aslund et al., 2010; De Silva et al., 2005; Fujiwara & Kawachi, 2008; Sund et al., 2007; Veenstra, 2005; Webber et al., 2010). The psychosocial approach has however been criticized for measuring indirect or proxy measures of social capital, as well as concepts that more closely relate to social cohesion than social

capital (Carpiano, 2006; Lin, 1999). For example, perceptions of trust may be better suited to measure social cohesion of networks (Carpiano, 2006).

The network approach to social capital argues that social capital measures should directly assess how resources are accessed within social networks for personal benefit (Carpiano, 2006). Rather than focusing on measures of trust, network approaches measure directly how and to whom individuals are connected within their social structures, and how those connections give people access to a range of socially-valuable resources (Lin, 1999). Position generators have been used to assess a person's access to social capital. Position generators include a list of various occupations, ranked according to their level of prestige (Lin, 1999). An individual with high levels of network capital would be someone who could reach higher ranked positions but who also has access to a diverse range of occupational positions (Lin, 1999). Someone with high network capital is thought to be at an advantageous position in terms of their health due to the knowledge, behavioural norms and resources that are accessible through their social connections.

Given the additional costs and research time often required to collect network data, only a limited number of studies have been able to include both psychosocial and network measures when examining the relationship between social capital and health. Whereas most researchers tend to focus on one approach, the inclusion of both types of measures in studies of social capital can provide insight into which are most strongly associated with particular health outcomes, and which mechanisms might more closely link social capital to those outcomes. Recent studies that have included both types of measures have shown psychosocial, participation, and network measures to have different associations with health depending on the specific outcome being examined. For example, Carpiano and Hystad

(2011) found network, psychosocial, and participation components of social capital to be associated with better self-reported mental health. With the exception of the network measure asking respondents to report the number of neighbourhood ties known well enough to ask for a favour, network measures (ie. network diversity and having close ties within the local community) and psychosocial/structural measures (ie. group participation and community belonging) are associated with better self-reported mental health. In another study, network diversity but not generalized trust decreased the likelihood of physical inactivity suggesting that network mechanisms may be more closely linked to physical inactivity than psychosocial mechanisms (Legh-Jones & Moore, 2011). Yet, for other health indicators such as self-reported health, network and psychosocial mechanisms may both play a role (Moore et al., 2011). Findings from such studies provide the type of information needed to understand more accurately the mechanisms by which social capital influences health, and to develop effective social capital interventions that improve population health.

Social Capital and Depression

Research on individual social capital and depression has tended to rely on psychosocial measures of social capital, such as trust, and structural indicators of community participation. Several such studies have shown generalized trust at the individual level to be inversely related to depressive symptoms (Aslund et al., 2010; De Silva et al., 2005; Fujiwara & Kawachi, 2008; Sund et al., 2007; Veenstra, 2005; Webber et al., 2010). In studies measuring perceived neighbourhood trust, higher trust in neighbours has also been shown to be a protective factor of depression (Fujiwara & Kawachi, 2008; Webber et al., 2010). Community participation is often measured alongside psychosocial measures in studies of social capital and depression. One particular study that measured respondents' volunteer

work however, did not find community participation to be related to depression (Fujiwara & Kawachi, 2008).

Less research has examined individual social capital and depression using network measures of social capital. Research that has examined depression and social networks, more broadly, have shown that individuals who report being socially isolated are more likely to have depression than those who report more network ties (Fujiwara & Kawachi, 2008). Using a resource generator to measure social capital as individual access to specific types of resources in their neighbourhoods, Webber et al. (2010) did not find any association of social capital with depression over a six-month period. Haines et al. (2011) examined the association among neighbourhood disadvantage, network social capital and depressive symptoms, and found network capital to mediate the association between disadvantage and depressive symptoms (Haines et al., 2011).

Research on social networks and depression has highlighted the importance of social relationships for depressive symptoms. For example, studies investigating structural components of individuals' networks have found that people located centrally within social networks are less likely to be depressed than those on the periphery (Rosenquist et al., 2011). Individuals are more likely to have depression if their direct (ie. friends) and indirect social ties (ie. friends of friends) also report depressive symptoms (Rosenquist et al., 2011). To gain a better understanding of the potential network mechanisms by which social capital might be associated with depression, more research using formal network measures of social capital are needed. There may also be a need to understand differences between the potential influences of a person's overall social networks from those specific to the person's neighbourhood. Identifying how the source of person's social capital is associated with

depressive symptoms may aid in the design of health promotion programs that serve to target or not target a person's neighbourhood setting.

Purpose

The current study aims to better understand the association of social capital and depressive symptoms using network, psychosocial, and participation measures of social capital. Adjusting for each type of measure in our models will enable the study to identify more clearly which mechanism may be more strongly associated with depressive symptoms. In addition, this study assesses whether the association between social capital and depressive symptoms differs depending on a person's general or neighbourhood-specific social capital. This leads us to two research questions. First, are network, structural, or psychosocial dimensions of social capital more strongly associated with depressive symptoms when controlling for socio-demographic variables? Second, does the geographical source (i.e., generally or inside one's neighbourhood) of a person's social capital matter in terms of the association between social capital and depressive symptoms? Findings from this research will contribute to a clearer understanding of the potential mechanisms linking social capital to mental health, and better-defined social capital interventions seeking to address mental health issues.

Methods

Ethics Statement

Prior to taking part in the study's telephone interview, participants were read the study's letter of information and consent form. If individuals gave verbal consent to participate, they were administered the questionnaire by trained interviewers. Verbal consent

was recorded on the computer-administered telephone interviewing system. This interview protocol was documented in the study's ethics application. Ethics approval for the study was given by the Committee of Scientific Evaluation and Research Ethics of the Centre de Recherche at the Centre Hospitalier de l'Université de Montréal (CHUM) in October 2007 (N.D. 07.049).

Study Design

Data come from the 2008 Montreal Neighborhood Networks and Healthy Aging Study (MoNNETs-HA). Montreal Metropolitan Area (MMA) census tracts (N=862) were stratified into tertiles of high, medium, and low SES areas using median household income data from the 2001 Canada Census. Of the 862 census tracts in the MMA, one hundred were selected from each tertile for a total of 300 census tracts. To collect data from a range of age groups, respondents were stratified into three age categories: (1) 25-44 years old, (2) 45-64 years old, and (3) 65 years and older. Within each census tract, three respondents were randomly selected from each age category for a total of nine respondents per census tract. In seven tracts, four respondents were selected due to the random polling procedure. Selection criteria required that respondents 1) had lived at their current address for at least 12 months, 2) were not currently institutionalized, and 3) were able to complete the questionnaire in either English or French. Random digit dialing of listed telephone numbers was used to contact potential household respondents. The questionnaire was then administered and data inputted using a computer aided telephone interview system. The final MoNNET-HA sample size was 2707 Montreal residents.

Measures

Depressive symptoms. Depressive symptoms were measured with the Center for Epidemiologic Studies 10-item Depression Scale (CES-D Scale), which can be used to assess current levels of depressive symptoms in adults (Radloff, 1977). Respondents were asked how often they had experienced a series of depressive symptoms in the past week (Bradley, Bagnell, & Brannen, 2010). For example, participants were asked to respond either “yes” or “no” to items such as “I felt happy” or “I felt everything I did was an effort” (Bradley et al., 2010). Based on the recommended cut-off score of four, participants who had replied affirmatively to four or more items were classified as having depressive symptoms (Irwin, Haydari Artin, & Oxman, 1999). The CES-D scale has been shown to be reliable and valid in the general adult population, as well as in older adults (Irwin et al., 1999).

Network social capital. A name generator/interpreter instrument sequence and a position generator were used to collect network data in the MoNNET-HA study (please refer to Moore et al., 2011 for further descriptions of these instruments). The instruments allow the development of a range of network measures of social capital. To assess the importance of the source of social connections (i.e., inside or outside the neighbourhood) with depressive symptoms, social capital measures were differentiated according to whether people's connections or perceptions were specific to the neighbourhood or more general in orientation.

Four network social capital variables were measured: (1) core social ties, (2) core tie diversity (3) general network capital, and (4) neighbourhood network capital. Whereas (1) and (3) measured general network social capital, (2) and (4) were specific to individual's neighbourhoods.

Core social ties and core tie diversity. Core social ties and core tie diversity were measured with the name generator and name interpreter instruments. The name generator asked respondents to list up to three individuals with whom they had discussed important matters within the last 6 months. Respondents who had not discussed important matters with anyone in the past 6 months were grouped into a “no core ties” category. In instances where no core ties were reported, respondents were asked whether this meant that they had no core ties or whether they did not want to respond to the question. Those who did not want to respond were excluded from analyses (n=72). The core social ties measure compared those with one or more social tie to those with no social ties. Following the name generator, the name interpreter asked respondents whether those they had named resided in their households, neighbourhoods, within the MMA, or outside the MMA. Core tie information was used to create four categories of core tie source: (1) no core ties, (2) neighbourhood ties only (core ties living within the respondent’s neighbourhood), (3) both neighbourhood and non-neighbourhood core ties (i.e., having core ties in the neighbourhood, and either in the household or outside the neighbourhood), and (4) non-neighbourhood ties only (i.e., having household or outside neighbourhood ties). Because our focus was on the relative contribution of neighbourhood ties to depressive symptoms, we used as the reference group those with strictly neighbourhood ties. Because network measures are relatively recent in development, the reliability of such measures has gained recent attention. Similar network questions asking respondents to list core ties have been shown to have high reliability in other works (Hlebec & Ferligoj, 2002). While rigorous testing of construct validity is still needed, network measures used in this study likely have good content validity. Content validity assesses whether a measure adequately captures the social construct of interest. In

the case of network measures, (ie. Core ties) it is probable that individuals are connected to the social connections listed, rendering this particular measure of social capital to have good construct validity.

General and neighbourhood network capital. Network social capital was measured with a position generator, which asked respondents if they knew someone on a first-name basis holding specific occupations. If they indicated knowing someone in the occupation, they were then asked if the person lived in their neighbourhood, outside their neighbourhood, within the MMA, or outside the MMA. The position generator consisted of 10 occupations ranging from low to high in occupational prestige (Moore et al., 2011). Occupational prestige scores were used to calculate scores for three dimensions of network social capital: diversity, range, and upper-reachability. Diversity represents the number of different occupations accessed; range is the difference between the highest and lowest prestige occupation accessed; while upper reachability represents the highest prestige occupation in the respondent's network (Lin, 2001). Factor analysis was used to create a general network social capital score. General network social capital consisted of scores from their social connections, regardless of residence location, whereas neighbourhood network social capital included only those social ties that resided within respondents' neighbourhoods.

Psychosocial and participation measures of social capital.

Generalized trust. Generalized trust was measured with the question “Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?” Participants selected one of the following options: (1) most people can be trusted, (2) can't be too careful, (3) depends, (4) most people cannot be trusted, and (5)

don't know. Responses were recoded into a dichotomous variable so that those who replied, "most people can be trusted" (i.e., high trust) were contrasted with those who answered affirmatively to one of the other four categories (i.e., low trust).

Trust in neighbours. A single item measure was used to assess trust in neighbours. Respondents were asked "would you say you have trouble with your neighbours" and responded based on a five-point Likert scale ranging from strongly disagree to strongly agree. Responses were coded so that a higher score represented higher trust in neighbours.

Perceived neighbourhood cohesion. Neighbourhood social cohesion was measured by asking respondents to report the extent to which they agreed with the following four statements: (1) you have trouble with your neighbours, (2) people in your neighbourhood are willing to help each other, (3) most people in your neighbourhood know you, and (4) your neighbourhood is clean. A five-point Likert scale ranging from "strongly disagree" (-2) to "strongly agree" (2) was used. Item one was reverse-coded and all items summed to create a perceived cohesion score for each participant so that higher scores indicated greater perceived cohesion. Scores were completed only in instances where respondents answered at least three questions. The perceived neighbourhood cohesion scale had a low Cronbach's alpha of 0.32.

Social participation. Neighbourhood social participation was assessed by asking respondents if they had held a volunteer or officer role in a neighbourhood association or group within the past five years. Asking respondents if they had held a volunteer or officer role in a non-neighbourhood association or group assessed outside-neighbourhood social participation within the past five years. Respondents replied with a "yes" or "no" for each

question.

Socio-demographic characteristics. Several demographic variables were measured and used as covariates in the multilevel analyses. Respondents stated whether they were male or female. Age was measured using six age categories: (1) 25-34 years old, (2) 35-44 years old, (3) 45-54 years old, (4) 55-64 years old, (5) 65-74 years old, and (6) 75 years and older. Marital status was grouped into four categories for these analyses: (1) married or in a common law relationship, (2) single, (3) separated or divorced, and (4) widowed. Education was divided into four categories: (1) no high school certificate or diploma, (2) high school diploma or trade certificate or diploma, (3) college certificate or diploma lower than a bachelor's degree, and (4) university degree or more. Employment status was measured by asking respondents whether they were currently employed or not. Income was divided into five categories: (1) less than \$28 000, (2) \$28 000 to \$49 000, (3) \$50 000 to \$74 000, (4) \$75 000 to \$100 000, and (5) over \$100 000. Income data were imputed for 20% of the observations using ordinal regression and information about their educational attainment, employment status, age, and 2006 Canada census data on the median household income of the person's census tract of residence. Foreign-born status was assessed by asking participants if they were born inside or outside Canada. Respondents stated whether the primary language spoken in the household was French, English, or other.

Statistical Analyses

A four-stage model building process was used to examine if general and neighbourhood psychosocial and network measures of social capital were associated with depressive symptoms. For the base model, socio-demographic variables were first entered to examine whether their association with depressive symptoms. In the second model, general

social capital measures were added to model one. These included: core social ties, general network capital, generalized trust, and social participation. The third model substituted neighbourhood-specific measures for the general social capital measures. These measures included: core tie diversity, neighbourhood network capital, trust in neighbours, neighbourhood social participation, and perceived neighbourhood cohesion. To examine the relative association of general and neighbourhood-specific social capital, the fourth model included only the social capital variables significant in models two and three. Multilevel logistic regression was used to account for the clustered sampling design in which respondents were nested within census tracts. No area-level variables were included in this study. Odds ratios and 95% confidence intervals are reported. Model fit was assessed using Wald Chi-Square tests.

The response rate of the MONNET-HA study was 38.7%. The response rate was calculated by dividing the number of completed interviews by the number of incomplete interviews, non-interviews, and estimated proportions of cases of unknown eligibility (Moore et al., 2011). The degree to which the sample is representative of those in the MMA was calculated by comparing the observed sample counts on certain demographic characteristics to expected counts based on the 2006 Canada census. Results showed that the sample over-represented older adults, those with incomes of less than \$50,000 per year, those with a residential duration over 5 years, women, and those with college and university levels of education (Moore et al., 2011).

Results

Sample

After excluding observations missing data on study variables, this study had a final

sample size of 2624 adults. Of the 2,624 participants, 17.34% were classified as having depressive symptoms. Approximately 65% of respondents were female; 54% of respondents were married, 38% had a university degree, 55% were employed, 78% lived in primarily French speaking households, and 82% were born in Canada. More information regarding socio-demographic variables can be seen in Table 2.

Table 2. Characteristics of Montreal Neighbourhood Networks and Healthy Aging study (MoNNET-HA), social capital and depressive symptoms sample, n=2624

| Variables | Percentage | |
|----------------------------|--------------------|------|
| Depressive symptoms | 17.3 | |
| Female | 64.6 | |
| Age | | |
| | 25-34 | 14.7 |
| | 35-44 | 17.8 |
| | 45-54 | 20.2 |
| | 55-64 | 16.2 |
| | 65-74 | 20.9 |
| | 75+ | 10.3 |
| Marital Status | | |
| | Married | 54.4 |
| | Single | 20.4 |
| | Divorced/Separated | 14.9 |
| | Widowed | 10.3 |
| Education | | |
| | No high school | 11.9 |
| | High School/Trade | 29.3 |
| | College | 20.6 |

| | | |
|------------------------------------|--|-------------------|
| | University degree or higher | 38.2 |
| Income | Under \$28,000 | 20.4 |
| | \$28,000-49,000 | 28.3 |
| | \$50,000-74,000 | 26.8 |
| | \$75,000-100,000 | 13 |
| | \$100,000 and over | 11.6 |
| | | |
| Employment status | Not employed | 45.2 |
| | Employed | 54.76 |
| Foreign born status | Born in Canada | 81.6 |
| | Born outside of Canada | 18.5 |
| Variables | | Percentage |
| Household language | French | 78.1 |
| | English | 13.7 |
| | Foreign language | 8.3 |
| Social Capital | | |
| <i>Network measures:</i> | | |
| Core social ties | No core tie | 13.4 |
| | One or more core tie | 86.6 |
| Core tie diversity | Neighbourhood ties only | 9.2 |
| | Non-neighbourhood ties only | 44.6 |
| | Neighbourhood and non-neighbourhood ties | 32.9 |
| | No core ties | 13.4 |
| <i>Psychosocial measures:</i> | | |
| Generalized trust | High trust | 42.8 |
| | Low trust | 57.2 |
| Social participation | | 36.3 |
| Neighbourhood participation | | 24 |

Model 1: Socio-demographic and -economic Factors

Results for models 1, 2, 3, and 4 can be seen in Table 3. Among the socio-demographic and economic factors, gender, age, marital status, and income were each associated with having depressive symptoms. Men were 34% less likely to have high depression scores compared to women (OR = 0.66, 95% CI = 0.52-0.84). Those aged 55-64 were 34% less likely (OR = 0.66, 95% CI = 0.44-0.99), those 65-74 were 50% less likely (OR = 0.50, 95% CI = 0.32-0.78), and those 75 and older were 59% less likely (OR = 0.41, 95% CI = 0.24-0.71) compared to those aged 25-34 to have depressive symptomatology.

Marital status was also associated with depressive symptoms. Single respondents were 80% more likely (OR = 1.80, 95% CI = 1.33-2.42), while divorced or separated (OR = 2.19, 95% CI = 1.58-3.04) or widowed respondents (OR = 2.30, 95% CI = 1.52-3.47) were over twice as likely to have depressive symptomatology compared to those who were married or in common-law relationships. There was a gradient in risk for depressive symptomatology with those in higher income categories less likely to have depressive symptoms than lower income categories. The Wald chi-square statistic of 108.65 was significant ($p < .001$) indicating that variables within the model provided a good fit to depressive symptoms.

Model 2: General Social Capital

Among the general measures of social capital, participants with low compared to high levels of generalized trust were more likely to report depressive symptoms (OR = 1.66, 95% CI = 1.30-2.12). Previously significant socio-demographic and economic variables continued to be significant in model two. The Wald chi-square statistic was significant (125.54, $p < .001$) and a likelihood ratio test determined that model two provided a better fit than model one (LR chi2 = 21.78, $p < .001$).

Model 3: Intra-neighbourhood Social Capital

Among the neighbourhood social capital measures, the psychosocial measures of trust in neighbours and perceived neighbourhood cohesion were associated with having depressive symptomatology. Those with high compared to low levels of trust in their neighbours were 17% less likely to have depressive symptomatology, (OR = 0.83, 95% CI = 0.76-0.91), while those who perceived their neighbourhoods as being more cohesive were 32% less likely to have depressive symptomatology (OR = 0.68, 95% CI = 0.58-0.81). A network measure of social capital, namely core tie diversity, was also associated with depressive symptoms. Those with both neighbourhood and non-neighbourhood ties were more likely to have depressive symptomatology compared to those with neighbourhood-only core ties (OR = 1.82, 95% CI = 1.18-2.82). The Wald chi-square value (157.64, $p < .001$) indicated that model three was significant, and likelihood ratio tests indicated that model 3 provided a better fit than model one (LR $\chi^2 = 39.95$, $p < .001$).

Model 4: General and Neighbourhood-specific Social Capital Variables

Social capital measures that were associated with depressive symptoms in models 2 and 3 were included in the final model. Psychosocial measures remained associated with depressive symptoms with those reporting low generalized trust (OR = 1.46, 95% CI = 1.14-1.88), low trust in neighbours (OR = 0.85, 95% CI = 0.77-0.92), and poorer perceptions of neighbourhood cohesion (OR = 0.71, 95% CI = 0.60-0.84) being more likely to experience depressive symptoms. The network measure assessing core tie diversity continued to be significant, with those having neighbourhood-only core ties being less likely to report depressive symptoms compared to those with both neighbourhood and non-neighbourhood ties (OR = 1.84, 95% CI = 1.19-2.84). The significant Wald chi-square statistic (160.17,

$p < .001$) and likelihood ratio tests indicate that model 4 provided a better fit than model one (LR $\chi^2 = 67.16$, $p < .001$).

Table 3. Adjusted odds ratio and 95% confidence intervals from multilevel logistic regression analyses, $n=2624$.

| Variable | Model 1 (n=2624) | Model 2 (n=2624) | Model 3 (n=2624) | Model 4 (n=2624) |
|-----------------------|------------------------|------------------------|------------------------|------------------------|
| | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) |
| Gender | | | | |
| Female | 1.00 | 1.00 | 1.00 | 1.00 |
| Male | 0.66 (0.52-0.84)** | 0.68 (0.54-0.87)** | 0.64 (0.50-0.82)*** | 0.65 (0.51-0.83)** |
| Age (in years) | | | | |
| 25-34 | 1.00 | 1.00 | 1.00 | 1.00 |
| 35-44 | 0.83 (0.57-1.21) | 0.79 (0.54-1.16) | 0.90 (0.61-1.32) | 0.89 (0.61-1.31) |
| 45-54 | 0.9 (0.64-1.34) | 0.87 (0.60-1.26) | 0.95 (0.65-1.39) | 0.93 (0.64-1.36) |
| 55-64 | 0.66 (0.44-0.99)* | 0.62 (0.41-0.95)* | 0.77 (0.50-1.17) | 0.75 (0.49-1.14) |
| 65-74 | 0.50 (0.32-0.78)** | 0.48 (0.31-0.75)** | 0.60 (0.38-0.94)* | 0.59 (0.38-0.93) |
| 75+ | 0.41 (0.24-0.71)** | 0.41 (0.23-0.71)** | 0.51 (0.29-0.88)* | 0.50 (0.29-0.87) |
| Marital Status | | | | |
| Married | 1.00 | 1.00 | 1.00 | 1.00 |
| Single | 1.80 (1.33-2.42)*** | 1.80 (1.34-2.43)*** | 1.81 (1.33-2.45)*** | 1.78 (1.32-2.41)*** |
| Divorced/Separated | 2.19 (1.58-3.04)*** | 2.22 (1.59-3.08)*** | 2.19 (1.57-3.05)*** | 2.22 (1.59-3.11)*** |
| Widowed | 2.30 (1.52-3.47)*** | 2.32 (1.53-3.52)*** | 2.47 (1.62-3.76)*** | 2.48 (1.63-3.78)*** |
| Education | | | | |
| University degree | 1.00 | 1.00 | 1.00 | 1.00 |
| College | 0.76 (0.55-1.04) | 0.73 (0.53-1.01) | 0.78(0.56- 1.07) | 0.73(0.52-1.01) |
| High School/Trade | 0.91 (0.68-1.22) | 0.87 (0.64-1.19) | 0.92(0.68- 1.24) | 0.83(0.61-1.13) |
| No degree | 1.01 (0.68-1.50) | 1.02 (0.68-1.54) | 1.08(0.72- 1.62) | 0.97(0.64-1.45) |

| Variable | Model 1 (n=2624) | Model 2 (n=2624) | Model 3 (n=2624) | Model 4 (n=2624) |
|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) |
| Income | | | | |
| Under \$28,000 | 1.00 | 1.00 | 1.00 | 1.00 |
| \$28,000-49,000 | 0.68 (0.50-0.92)* | 0.69 (0.51-0.94)* | 0.73 (0.54-1.00) | 0.76 (0.55-1.03) |
| \$50,000-74,000 | 0.57 (0.40-0.82)** | 0.59 (0.41-0.84)** | 0.63 (0.44-0.91)* | 0.66 (0.46-0.95)* |
| \$75,000-100,000 | 0.55 (0.34-0.88)* | 0.56 (0.35-0.90)* | 0.63 (0.39-1.01) | 0.66 (0.46-0.95) |
| \$100,000 and over | 0.46 (0.27-0.77)** | 0.47 (0.28-0.79)** | 0.53 (0.31-0.90)* | 0.65 (0.40-1.05)* |
| Foreign born status | | | | |
| Born in Canada | 1.00 | 1.00 | 1.00 | 1.00 |
| Born outside of Canada | 1.30 (0.94-1.81) | 1.32 (0.95-1.83) | 1.39 (1.00-1.94) | 1.38 (0.99-1.93) |
| Household language | | | | |
| French | 1.00 | 1.00 | 1.00 | 1.00 |
| English | 0.97 (0.69-1.35) | 0.96 (0.68-1.34) | 1.03 (0.73-1.44) | 1.06 (0.75-1.49) |
| Foreign language | 1.07 (0.68-1.68) | 1.00 (0.64-1.58) | 1.00 (0.64-1.58) | 0.96 (0.61-1.51) |
| Employment status | | | | |
| Employed | 1.00 | 1.00 | 1.00 | 1.00 |
| Not currently employed | 1.27 (0.95-1.70) | 1.25 (0.93-1.68) | 1.29 (0.96-1.74) | 1.27 (0.94-1.71) |
| Network measures: | | | | |
| Core ties | | | | |
| No core tie | -- | 1.00 | -- | -- |
| One or more core tie | -- | 1.21 (0.85-1.71) | -- | -- |
| Core tie diversity | | | | |
| Neighbourhood ties only | -- | -- | 1.00 | 1.00 |
| Non-neighbourhood ties only | -- | -- | 1.39 (0.90-2.14) | 1.30 (0.85-2.00) |
| Neighbourhood and non- | -- | -- | 1.82 (1.18-2.82)** | 1.84 (1.19-2.84)** |

| Variable | Model 1 (n=2624) | Model 2 (n=2624) | Model 3 (n=2624) | Model 4 (n=2624) |
|---|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| | OR (95% CI) | OR (95% CI) | OR (95% CI) | OR (95% CI) |
| neighbourhood ties | | | | |
| No core ties | -- | -- | 1.19 (0.72-1.98) | 1.09 (0.66-1.80) |
| General network capital | -- | 1.10 (0.97-1.24) | -- | -- |
| Inside-neighbourhood network capital | -- | -- | 1.09 (0.97-1.22) | -- |
| <i>Psychosocial measures:</i> | | | | |
| Generalized trust | | | | |
| High trust | -- | 1.00 | -- | 1.00 |
| Low trust | | 1.66 (1.30-2.12)*** | -- | 1.46 (1.14-1.88)** |
| Social participation | -- | 1.09 (0.92-1.29) | -- | -- |
| Trust in neighbours | -- | -- | 0.83 (0.76-0.91)*** | 0.85 (0.77-0.92)*** |
| Perceived neighbourhood cohesion | -- | -- | 0.68 (0.58-0.81)*** | 0.71 (0.60-0.84)*** |
| Neighbourhood participation | -- | -- | 1.16 (0.89-1.52) | -- |

* $p < 0.05$, ** $p < .01$, *** $p < .001$

Discussion

The current study examined whether social capital was associated with depressive symptoms in a sample of urban-dwelling Canadian adults. The study differentiated psychosocial from network measures of social capital to assess whether (1) psychosocial and network measures were each associated with depressive symptoms and (2) those associations differed depending on the geographical location (i.e., generally or within neighbourhood boundaries) of the social capital. Results indicated that both psychosocial and network measures of social capital were associated with depressive symptoms, and the inclusion of both provides a more comprehensive picture of how social capital is associated with depression. Furthermore, results indicated that neighbourhood and general social capital measures are associated with depressive symptoms and should be included in studies of depression.

Those with high levels of trust in other people, those who trust their neighbours, and those who perceive their neighbourhoods to have high levels of cohesion were least likely to have high levels of depressive symptoms. Our findings are consistent with previous work in finding strong inverse associations between depressive symptoms and intra- and extra-neighbourhood psychosocial measures of trust and social cohesion (De Silva et al., 2005; Echeverria et al., 2008; Kim & Ross, 2009; Mulvaney & Kendrick, 2005; Veenstra, 2005; Whitley et al., 2005). It has been proposed that stress is the potential mechanism linking trust and health, with trusting individuals less likely to experience stress and thus less likely to face negative health outcomes than those who do not trust as easily (Abbott & Freeth, 2008). Social participation measures were not associated with depression in this study, which was consistent with findings by Fujiwara & Kawachi (2008). Differences in associations between

social participation, trust, social cohesion, and network measures with depressive symptoms may be due to fundamental differences within these components of social capital. Abbott and Freeth (2008) suggest that trust and cohesion are measures of “attitudes”, whereas participation and social networks are measures of “behaviours”. Relationships between attitudes and behaviours are complex and while they are likely linked, Abbott and Freeth (2008) discuss the importance of examining components separately. Although we are hesitant to term network components of social capital as “behavioural” since network measures typically measure access to resources rather than behaviours, we would agree that psychosocial and network mechanisms seem to be fundamentally different in what they measure. These inherent differences within the components of social capital may explain why they are differentially linked with depressive symptoms.

Although network capital was not associated with depressive symptoms, aspects of people's core ties were associated with depressive symptoms. Specifically, having only neighbours as core ties was associated with decreased levels of depressive symptoms compared to individuals with both neighbourhood and non-neighbourhood core ties. It remains unclear as to why those having mixed core ties would be at greater odds of having depressive compared to those with neighbourhood ties only. Features of neighbourhood environments are increasingly considered as important in studies of depression, and knowing one's neighbours has been associated with decreased depression in previous studies (Caughy et al., 2003; Mair et al., 2008; Mulvaney & Kendrick, 2005). Previous research has shown complex relationships between neighbourhood ties and depressive symptoms. In some instances, neighbourhood core ties have been beneficial for mental health whereas in others (ie. In disadvantaged neighbourhoods), they have been detrimental (Caughy et al., 2003). If

similar trends were seen in our sample, this may partially explain why no differences in depressive symptoms were found between those with only neighbourhood core ties versus those with only non-neighbourhood core ties. Studies have yet to examine *why* neighbourhood core ties are protective compared to having core ties living in multiple locations. It may be that additional stress brought on by maintaining core ties in diverse locations is a key mechanism that increases depressive symptoms.

Other network measures, including general reporting of core ties and inside- as well as outside- network social capital, were not associated with depressive symptoms in the current study. Webber and colleagues (2010) also found that depression was unrelated to network capital in their study (Webber et al., 2010). The finding of no associations between those who reported core ties versus those reporting no core ties appears inconsistent with previous research linking depression to social isolation (Berkman, 1995; Bruce & Hoff, 1994; Walters et al., 2004; Webber et al., 2010). Yet, discrepancies in study results may be due to differences in measurement of social isolation. The current study considered individuals to be socially isolated if no core ties were reported; however other studies typically use measures of social isolation not seen in studies of social capital. For example, other studies may use a social isolation scale to assess feelings of isolation or degree of disconnectedness (Dean, 1961; McPherson et al., 2006).

Implications

This study has several implications for the design and implementation of prevention and treatment programs for depression. Findings of this study indicate that psychosocial measures as well as the possession of mixed ties are more strongly associated with depressive

symptoms, and so programs should instead be implemented to foster socially-supportive networks and neighbourhoods. For example, programs aimed at promoting positive attitudes through increasing trust between neighbours and neighbourhood cohesion may be beneficial for mental health from a population-based perspective. With depression being one of the main disease burdens in Canada and the world, and social capital being an influence on health in neighbourhoods worldwide, it is vitally important to understand how social capital may be positively or negatively related to depressive symptoms. Future studies should explore longitudinally the relationship among psychosocial and network mechanisms of social capital and clinical levels of depression.

Limitations

The current study has some unavoidable limitations. Due to the cross-sectional design, cause-effect relationships cannot be established. For example, it is unknown whether having low social capital results in depression, or whether having depression causes individuals to become disconnected within their networks and decrease their use of resources thus resulting in lower social capital. Previous research has shown complex reciprocal effects when it comes to the relationship between depression and social relationships (Chou & Chi, 2003; Patten et al., 2010; Ramos & Wilmoth, 2003). A second limitation to this study is that depressive symptoms are not clinician-rated. Although the CES-D is a valid and reliable screening tool for measuring depressive symptoms, it is not able to make clinical diagnoses of depression (Radloff, 1977). As a result, conclusions in this study are limited to depressive symptoms, but not major depressive disorder itself.

Conclusions

It is well known that depression is related to the social environment however there is a need to understand *how* these phenomenon are linked and which features of individual's social surroundings may be most influential. This study recommends that both psychosocial and network mechanisms, as well as measures of general and neighbourhood social capital be included when investigating social capital and depressive symptoms. In terms of depressive symptoms, core tie diversity as well as the psychosocial measures of generalized trust, trust in neighbours, and perceptions of neighbourhood cohesion, indicate that positive neighbourhood social environments and positive social relationships may be beneficial to those suffering from moderate to high levels of depressive symptoms.

Author's Contributions

SM and EB designed the research and contributed to the conceptualization of the study. EB conducted data analysis and drafted the initial version of the manuscript. SM was the nominated principal investigator on the Montreal Neighbourhood Networks and Healthy Aging Study, gave advice and input on the data analyses, and edited the manuscript for intellectual content and clarity. Both authors assume responsibility for the final content and approve the manuscript for submission. There are no conflicts of interest to report.

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Chapter 4

An Investigation of Neighbourhood Disadvantage, Social Capital and Depressive Symptoms in Montreal Men and Women

Abstract

Depression debilitates the lives of millions and is projected to be the second leading disease burden worldwide by 2020. At the population level, the causes of depression are found in the everyday social and physical environments in which people live. Research has shown that men and women often experience neighbourhood environments differently and that these variations are often reflected in health outcomes. The current study examines whether social and environmental correlates of depression are similar in men and women. Two questions guide the study: (1) does neighbourhood disadvantage have a stronger association with depression in women compared to men? and (2) do specific social capital factors mediate the association between neighbourhood disadvantage and depression? Data came from the Montreal Neighbourhood Networks and Healthy Aging Study conducted in 2008, and includes information on 2624 adults residing in 300 Montreal Metropolitan Area (MMA) census tracts. Depressive symptoms were measured with the Center for Epidemiologic Studies 10-item Depression Scale. Psychosocial components of social capital came from self-reported questions on trust and neighbourhood environment, and network components were measured by position and name generator instruments. Neighbourhood disadvantage was measured at the census tract level using data from the 2006 Canada Census. Multilevel logistic regression stratified by gender and a three-step mediation analysis procedure were used. Findings indicated that neighbourhood disadvantage was associated with depressive symptoms in women only and that women's perceptions of the neighbourhood environment mediated this association. Other social capital variables, specifically generalized trust and trust in neighbours were associated with depression in women but did not act as mediating variables. Findings suggest that neighbourhood

disadvantage is associated with women's depression through women's cognitive perceptions of the local environment. Health promotion initiatives meant to combat depression may wish to consider gender differences in the design and implementation of neighbourhood or peer-based programs.

An Investigation of Neighbourhood Disadvantage, Social Capital and Depressive Symptoms in Montreal Men and Women

Depression is a major health concern in countries around the world, and has a significant impact on the lives of millions of Canadians. Major depressive disorder, as it is classified in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), includes symptoms such as depressed mood, loss of pleasure, and loss of interest in nearly all daily activities (American Psychiatric Association, 2000). According to the Canadian Community Health Survey, 4.0% of Canada's population experienced a major depressive episode in 2002, and 10.8% of the population had experienced major depression in their lifetime (Patten, et al., 2006). Canadian prevalence rates of major depressive episodes in 2002 were 5% in women and 2.9% in men (Patten et al., 2006).

To gain a clearer picture of the specific factors that impacts population-level risk for depressive symptoms, researchers have examined demographic, social, psychological, and environmental factors. Recently, social epidemiological research on depression has focused on people's local social environments, and how certain groups may be differentially impacted by neighbourhood factors. These studies have examined both neighbourhood-level factors such as disadvantage and individual-level factors such as trust and participation. Research has rarely examined whether certain dimensions of social capital in fact mediate the association of neighbourhood disadvantage with depression. Moreover, given the higher prevalence of depression in women and research suggesting women's greater vulnerability to untoward neighbourhood environments, there is reason to anticipate that these associations are likely to differ between men and women. The current study examined whether

neighbourhood disadvantage has a stronger association with depression in women compared to men, and whether various dimensions of social capital mediate these associations.

Neighbourhood disadvantage measures the socioeconomic circumstances of a neighbourhood and typically includes indicators of neighbourhood income, resources, unemployment rates, residential stability, and services (Cutrona et al., 2005; Matheson et al., 2006; Menec et al., 2010; Ross, 2000; Silver et al., 2002; Walters et al., 2004). Research on disadvantage and depression has shown inconsistent results. Several studies have shown that neighbourhood disadvantage is associated with depressive symptoms (Cutrona et al., 2005; Echeverria et al., 2008; Matheson et al., 2006; Mulvaney et al., 2005; Rajaratnam et al., 2008; Silver et al., 2002; Veenstra, 2005). Other studies have found that neighbourhood disadvantage is not associated with depression after adjustment for other individual- or neighbourhood-level factors (Dupere & Perkins, 2007; Hybels et al., 2006; Ross, 2000). Such inconsistencies may reflect a number of factors, including different macro-political contexts, measures of disadvantage, and target groups.

Social capital can be defined as the material, informational and affective resources to which individuals and, potentially, groups have access through their social connections (Moore et al., 2009). Social capital is most often associated with concepts such as trust in others, social norms, power, relationships, and social networks and can be measured generally or within specific environments, such as within individual's neighbourhoods (Whitley & McKenzie, 2005). The examination of social capital within individuals' neighbourhoods allows for insight into broader social contexts and environments and is increasingly studied in the field public health. A number of social capital dimensions have

been found to be associated with depressive symptoms. For example, studies have found generalized trust as well as trust in neighbours to be inversely related to depressive symptoms (Aslund et al., 2010; De Silva et al., 2005; Fujiwara & Kawachi, 2008; Sund et al., 2007; Veenstra, 2005; Webber et al., 2010). Researchers examining social networks and depression have shown that individuals with no close ties report higher rates of depression than those who report more close ties (Berkman, 1995; Bruce & Hoff, 1994; Fujiwara & Kawachi, 2008; Walters et al., 2004; Webber et al., 2010). Another study has shown depressive symptoms to spread within social networks, and that those individuals who have close friends or family with depression are twice as likely to develop depressive symptoms themselves (Rosenquist et al., 2011). Social capital measures that have been included in studies of neighbourhood disadvantage and depression have also found that individual-level social support, neighbourhood-level social support, community trust, political trust, and social cohesion may all be associated with depressive symptoms to varying degrees (Echeverria et al., 2008; Mulvaney et al., 2005; Rajaratnam et al., 2008; Veenstra, 2005).

Research on depression and neighbourhood disadvantage has suggested that the relationship between disadvantage and depression may be more complex than those of a simple direct pathway. Such studies have shown that network measures of social capital may either moderate or mediate the association between neighbourhood characteristics and depressive symptoms (Caughy, O'Campo, & Muntaner, 2003; Rajaratnam, O'Campo, O'Brien Caughy, & Muntaner, 2008). For example, Caughy et al. (2003) found parental social connections to moderate the association between neighbourhood disadvantage and depression in children. In wealthy neighbourhoods, children whose parents knew many neighbours were less likely to have anxiety and depression than children whose parents knew

fewer neighbours. In poor neighbourhoods, on the other hand, children whose parents knew fewer neighbours were less likely to have anxiety and depression than children whose parents knew many neighbours (Caughy et al., 2003). Rajaratnam et al. (2008) found that in low-crime neighbourhoods, women who reported zero close ties had higher rates of depression than those reporting one or more close tie. No differences in rates of depression were found for women in high-crime neighbourhoods (Rajaratnam et al., 2008). Social connectivity may thus moderate the ways in which characteristics of the neighbourhood environment are associated with depressive symptoms. Social capital may also mediate associations between neighbourhood disadvantage and depression. For example, Haines et al. (2011) found that the range of someone's network capital mediated the association of the neighbourhood disadvantage on depressive symptoms. These findings demonstrate the importance of examining the indirect pathways by which neighbourhood disadvantage might have an impact on depressive symptoms.

Gender Differences

Research on gender and depression has consistently found that women's rates of depression typically occur at double the rate of men's (Nolen-Hoeksema, 2001). Gender differences are also seen in several of the social, psychological, and environmental determinants of depression (Ingram et al., 2007; Nolen-Hoeksema, 2001; Piccinelli & Uddin et al., 2006; Wilkinson, 2000). Surprisingly, there has been limited research on whether neighbourhood disadvantage may be more strongly associated with depression in women compared to men. Matheson et al. (2006) have suggested that women may be more prone than men to the negative effects of neighbourhood-level stressors due to their higher degree

of social integration within their neighbourhoods. There is therefore reason to anticipate that neighbourhood disadvantage will have a stronger association with depressive symptoms in women than men. More research is needed however to understand whether such gender differences in the association between disadvantage and depressive symptoms are in fact present.

There is also reason to anticipate that there are important differences in social capital between men and women. Kavanagh et al. (2006) showed that social trust was associated with positive self-rated health in men, whereas perceptions of neighbourhood safety were associated with self-rated health for women (Kavanagh et al., 2006). Chuang and Chuang (2008) found that the association of trust and neighbourhood closeness on health-related behaviours, specifically smoking and alcohol consumption, were much stronger in women than men. Little research has examined gender differences in the association between social capital and depressive symptoms. One such study investigated the effects of family social capital, which measured adolescent's perceptions of parent-child interaction and parental monitoring, on depressive symptoms in Chinese adolescents (Wu et al., 2010). In that study, female's higher rates of depressive symptoms were attributed to their lower levels of family social capital (Wu et al., 2010). In a sample of African American adolescents, interaction effects were found between gender and socially supportive components of capital, including measures of self-reported familial and school support (Fitzpatrick et al., 2005). It was suggested that although depressive symptoms were more common in girls, high levels of social capital may act as a buffer against depressive symptomatology (Fitzpatrick et al., 2005). Less is known about how these relationships may manifest in adult populations.

Furthermore, studies of gender differences and depressive symptoms should incorporate both psychosocial and network dimensions of social capital.

Study Objectives

This study examines whether neighbourhood disadvantage is associated with depressive symptoms in men and women to the same degree, and whether various dimensions of social capital moderate or mediate the association between disadvantage and depressive symptoms. Three research questions guide the study: (1) Is neighbourhood disadvantage associated with depressive symptoms in men and women separately and after adjusting for socio-demographic and socio-economic factors?; (2) are there different patterns in the association of social capital with depressive symptoms in men and women?; and (3) may specific dimensions of social capital moderate or mediate the association between disadvantage and depression? Previous literature demonstrates that components of social capital may moderate the association of neighbourhood disadvantage and depressive symptoms. For example, social network ties may be detrimental for mental health in neighbourhoods high in disadvantage, but beneficial in neighbourhoods low in disadvantage (Caughy et al., 2003). On the other hand, other components of social capital may mediate associations between neighbourhood disadvantage and depressive symptoms. For example, network capital has been shown to act as the pathway by which neighbourhood disadvantage is associated with depressive symptoms (Haines et al., 2011). Greater specification of the subpopulations potentially impacted by neighbourhood disadvantage and inclusion of both network and cognitive components of social capital make this study a unique contribution to research on the social epidemiology of depression. Findings may contribute to the design

and implementation of neighbourhood-based health promotion programs that better target the high prevalence of depression among women.

Methods

Ethics Statement

Prior to taking part in the study's telephone interview, participants were read the study's letter of information and consent form. If individuals gave verbal consent to participate, they were administered the questionnaire by trained interviewers. Verbal consent was recorded on the computer-administered telephone interviewing system. This interview protocol was documented in the study's ethics application. Ethics approval for the study was given by the Committee of Scientific Evaluation and Research Ethics of the Centre de Recherche at the Centre Hospitalier de l'Université de Montréal (CHUM) in October 2007 (N.D. 07.049).

Study Design

Data come from the Montreal Neighborhood Networks and Healthy Aging Study (MoNNET-HA). MoNNET-HA used a stratified random cluster sampling design to survey 2707 adults residing in 300 different Montreal Metropolitan Area (MMA) census tracts. Montreal census tracts (N=862) were stratified into tertiles of low, medium, and high SES areas based on median household income data from the 2006 Canada Census. One hundred census tracts were randomly selected from each tertile. Within each tract, household selection was stratified by the age category of the household respondent so that three adults were selected from the following categories: (1) 25-44 years old; (2) 45-64; and (3) 65 and older. Inclusion criteria for respondents specified that respondents were not currently

institutionalized, that they were able to complete questionnaires in French or English, and that they had lived in their current residence for at least one year. Further information about the sampling procedures can be found in Moore et al., 2011.

Measures

This study uses individual and neighbourhood-level data. MoNNET-HA study provides the individual level information on depressive symptoms, social capital, and the socio-demographic characteristics of study participants. Neighbourhood-level information is from the 2006 Canada Census.

Individual level measures

Depressive symptoms. The Center for Epidemiologic Studies 10-item Depression Scale (CES-D-10 Scale) was used to measure depressive symptoms in our sample. The CES-D-10 scale asked respondents whether or not they had experienced depressive symptoms in the past week with each item eliciting a “yes” or “no” response (Bradley, Bagnell, & Brannen, 2010). For example, items included statements such as “I felt sad” or “I enjoyed life” with respondents asked to report whether they had or had not experienced the particular symptom during the past two weeks. These items were randomly ordered on the scale except for the final question which was “I felt depressed.” Following validated diagnostic criteria, participants who responded affirmatively to four or more items were classified as having depressive symptoms (Irwin, Haydari Artin, & Oxman, 1999). The CES-D-10 scale has scored high on both reliability and validity and has been shown suitable for use in general adult populations (Irwin, et al., 1999). The scale has a Cronbach’s alpha score of 0.72.

Social capital.

Core tie diversity. A name generator asking respondents to list up to three alters with whom they had discussed important matters within the last 6 months was used to measure the size of a person's core network. Among those who reported one or more core ties, a name interpreter instrument was used to ask respondents if their core ties lived (1) in their households, (2) in their neighbourhoods, (3) within the MMA, or (4) outside the MMA. Responses were recoded for this analysis to compare the chances of depressive symptoms in those adults who had (1) no core ties, (2) neighbourhood ties only, (3) Non-neighbourhood ties only (ie. ties within the household or outside the neighbourhood), or (4) Neighbourhood and non-neighbourhood ties. These categorizations allowed for the comparison of individuals with neighbourhood core ties only to respondents in each of the other three categories. Because network measures are relatively recent in development, the reliability of such measures has gained recent attention. Similar network questions asking respondents to list core ties have been shown to have high reliability in other works (Hlebec & Ferligoj, 2002).

Generalized trust. Generalized trust in others was measured by asking respondents "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?" Possible response options included: (1) most people can be trusted, (2) can't be too careful, (3) depends, (4) most people cannot be trusted, and (5) don't know. Responses were coded dichotomously so those who answered "most people can be trusted" could be compared to those with lower levels of trust.

Trust in neighbours. To measure "trust in neighbours," participants were given the statement: "Most people in your neighbourhood can be trusted." Based on a five-point Likert scale, respondents replied from strongly disagree to strongly agree. These responses were centred on 0 as the neutral category and coded so that a higher score represented higher trust

in neighbours.

Perceived neighbourhood cohesion. Respondents reported the extent to which they agreed with the following four statements as an indicator of perceived neighbourhood cohesion: 1) you have trouble with your neighbours, 2) people in your neighbourhood are willing to help each other, 3) most people in your neighbourhood know you, and 4) your neighbourhood is clean. Responses were also provided on a five-point Likert scale from “strongly disagree” to “strongly agree.” The first item was reverse-coded and responses for each item were summed so that higher scores were indicative of higher perceived neighbourhood cohesion. Respondents who answered 3 or more of the items were included in analyses, and only 2 respondents failed to answer all four items. The perceived neighbourhood cohesion scale had a Chronbach’s alpha of 0.32.

Socio-demographic characteristics. Socio-demographic and -economic variables included measures of gender, age, marital status, foreign-born status, primary household language, education, income, and employment status. Gender was measured dichotomously, with respondents stating whether they are male or female. Age was measured with six age categories, including: (1) 25-34 years old, (2) 35-44 years old, (3) 45-54 years old, (4) 55-64 years old, (5) 65-74 years old, and (6) 75 years and older. Marital status categories were (1) currently married or in a common law relationship, (2) single, (3) separated, (4) divorced, and (5) widowed. Foreign-born status was measured by asking participants if they were born inside or outside Canada, and primary household language was measured by asking respondents if they most often spoke French, English, or other languages within their household. Education included four categories: (1) no high school certificate or diploma, (2) high school diploma or equivalent and trade certificate or diploma, (3) college certificate or

diploma lower than a bachelor's degree, (4) bachelor's degree and higher. Income was divided into five categories: (1) less than \$28 000, (2) \$28 000 to 49 000, (3) \$50 000 to \$74 000, (4) \$75 000 to \$100 000, (5) over \$100 000. To account for missing data on income for 20% of respondents, income data were imputed for these cases using an ordinal regression. Income was imputed based on respondent education, employment status, age, and the median household income of the census tract in which the respondent resided.

Neighbourhood-level Measures

Census-tract level measures of neighbourhood disadvantage were constructed using data from the 2006 Canada Census. The neighbourhood disadvantage score was composed of a standardized factor score of census-tract unemployment rates, percentage of immigrants, percentage of single mothers, and percentage of renters. Their respective proportional contributions within the factor score were 0.69, 0.18, 0.11, and 0.03. Neighbourhood population density was based on the 2006 Canada Census census-tract level estimates of population size per square kilometer. Given that the sample of MMA neighbourhoods covered more urban and suburban environments, population density was used to adjust for potential differences in the neighbourhood physical and social environment that may not be due to variations in disadvantage.

Statistical Analyses

Multilevel logistic regression was used to account for the clustering of participants within census tracts. Analyses were stratified by gender. A two-stage model-building process was used. The first models assessed whether neighbourhood disadvantage was associated with depressive symptoms after adjusting for neighbourhood density and the socio-

demographic and -economic compositional characteristics of the neighbourhoods. Social capital variables were added to the second models to examine which components of social capital were associated with depressive symptoms in men and women. Results from each model may be seen in Table 2. Model fit was assessed with Wald statistics retrieved from the output of each multilevel regression. Moderation tests were conducted to assess whether social capital variables moderated the association between disadvantage and depressive symptoms in men and women separately. Moderation tests included interaction terms of social capital variables with neighbourhood disadvantage. Each interaction term was added to Model 2 separately to investigate if separate social capital measures moderated the association of neighbourhood disadvantage and depressive symptoms.

If results from models one and two suggested potential mediation, a series of mediation tests were conducted to identify which social capital variables potentially mediated the association between neighbourhood disadvantage and depressive symptoms. The three-step mediation process used by Krull and MacKinnon (1999) was employed. These steps have been elaborated in other texts. These tests involve however a three-stage procedure. First, using multilevel linear regression, neighbourhood disadvantage was regressed on the separate social capital components while adjusting for socio-demographic and -economic characteristics. The coefficients for these associations were retrieved, and labelled “*a*”. Second, using multilevel logistic regression, having or not having depressive symptoms was regressed on the separate social capital components. These estimates were labelled “*b*.” Third, the product of these coefficients, *ab*, were calculated to provide an estimate of the mediated effects for each of social capital variables. The separate *ab* estimates and their

standard errors were used to calculate z-scores, Wald statistics, and 95% confidence intervals.

MoNNET-HA response rates were estimated at 38.7% using the second response rate definition from the American Association of Public Opinion Research. Using data from the 2006 Canada Census, chi-square analyses were conducted to assess the representativeness of the MoNNET-HA sample. Results showed that the MoNNETs-HA study over-represented women, older adults (by study design), and persons with incomes under \$50,000, those who had lived in their current place of residence for over 5 years, and those with college and university education (Moore et al., 2011). After excluding observations from participants who were missing information on any of the main study variables, the final sample size for this study was 2624 participants. Most participants who were excluded had missing information on educational attainment (n=21), self-reported generalized trust (n=20), and marital status (n=16).

Results

Sample

The overall prevalence of having depressive symptoms in the MoNNET-HA sample was 17.34%. Among women, the prevalence was 19.65% (n = 333); the prevalence was lower in men at 13.13% (n = 122). Further descriptive information on the sample is provided in Table 4.

Table 4. Characteristics of Montreal Neighbourhood Networks and Healthy Aging study (MoNNET-HA), social capital and depressive symptoms sample, n=2624

| Variables | Frequency (Percent) | |
|-----------------------------|---------------------|---------------------|
| | Men (N= 929) | Women (N = 1695) |
| Depressive symptoms | 122(13.1) | 333(19.6) |
| Age | | |
| 25-34 | 123 (13.2) | 262 (15.5) |
| 35-44 | 180 (19.4) | 286 (16.9) |
| 45-54 | 199 (21.4) | 332 (19.6) |
| 55-64 | 150 (16.2) | 274 (16.2) |
| 65-74 | 192 (20.7) | 357 (21.1) |
| 75+ | 85 (9.2) | 184 (10.9) |
| Marital Status | | |
| Married | 533 (57.4) | 895 (52.8) |
| Single | 222 (23.9) | 313 (18.5) |
| Divorced/Separated | 116 (12.5) | 274 (16.2) |
| Widowed | 58 (6.2) | 213 (12.6) |
| Education | | |
| No high school | 80 (8.6) | 233 (13.8) |
| High School/Trade | 260 (28) | 508 (30) |
| College | 183 (19.7) | 357 (21.1) |
| University degree or higher | 406 (43.7) | 597 (35.2) |
| Income | | |
| Under \$28,000 | 146 (15.7) | 388 (22.9) |
| \$28,000-49,000 | 263 (28.3) | 480 (28.3) |
| \$50,000-74,000 | 250 (26.9) | 452 (26.7) |
| \$75,000-100,000 | 134 (14.4) | 207 (12.2) |
| \$100,000 and over | 136 (14.6) | 168 (9.9) |
| Foreign born status | | |
| Born in Canada | 735 (79.1) | 1405 (82.9) |
| Born outside of Canada | 194 (20.9) | 290 (17.1) |
| Household language | | |
| French | 713 (76.8) | 1335 (78.8) |
| English | 133 (14.3) | 226 (13.3) |
| Foreign language | 83 (8.9) | 134 (7.9) |

| Variables | Frequency (Percent) | |
|---|---------------------|---------------------|
| | Men (N= 929) | Women (N = 1695) |
| Employment status | | |
| Not currently employed | 366 (39.4) | 821 (48.4) |
| Employed | 563 (60.6) | 874 (51.6) |
| Social Capital | | |
| <i>Network measures:</i> | | |
| Core tie diversity Neighbourhood ties only | 88(9) | 153(9) |
| Non-neighbourhood ties only | 420(45.2) | 750(44.2) |
| Neighbourhood and non-neighbourhood ties | 290(31.2) | 572(33.7) |
| No core ties | 131(14) | 220(13) |
| <i>Psychosocial measures:</i> | | |
| Generalized trust High trust | 452(48.7) | 671(39.6) |
| Low trust | 477(51.3) | 1024(60.4) |

Model 1a: Neighbourhood Disadvantage, Socio-demographic and Socioeconomic

Factors in Men

Neighbourhood disadvantage did not increase or decrease the likelihood of having or not having depressive symptoms in men. Certain individual socio-demographic and - economic characteristics did. For example, men over 75 were 79% less likely ($OR = 0.21$, $95\% CI = 0.07-0.66$) to have depressive symptoms than men aged 25-34 years old. Men who were single ($OR = 2.91$, $95\% CI = 1.65-5.11$), divorced or separated ($OR = 2.09$, $95\% CI = 1.03-4.25$), or widowed ($OR = 7.36$, $95\% CI = 3.12-17.40$) were more likely to report depressive symptoms than men who were married or in a common-law relationship.

Model 1b: Neighbourhood Disadvantage, Socio-demographic and Socioeconomic Factors in Women

Model 1a examined neighbourhood disadvantage, census tract density, socio-demographic and socioeconomic characteristics as correlates of depressive symptoms in women. Neighbourhood disadvantage was positively associated with the odds of having depressive symptoms in women ($OR = 1.26$, $95\% CI = 1.02-1.55$). Women aged 65-74 were 46% less likely ($OR = 0.54$, $95\% CI = 0.32-0.92$) to have depressive symptoms than those aged 25-34 years old. Marital status was associated with the likelihood of having depressive symptoms in women. Women who were divorced or separated were more likely to report depressive symptoms than women who were married or in a common-law relationship ($OR = 2.15$, $95\% CI = 1.47-3.14$). Those who were widowed were also more likely to report depressive symptoms ($OR = 1.64$, $95\% CI = 1.01-2.67$). In general, higher income decreased women's odds of being depressed with those making over \$28,000 less likely to have depressive symptoms compared to those making under \$28,000.

Model 2a: Social Capital and Depressive Symptoms in Men

Men with more positive perceptions of neighbourhood cohesion were less likely to report depressive symptoms than men who viewed their neighbourhoods less favourably ($OR = 0.65$, $95\% CI = 0.47-0.92$). In addition, men with higher trust in neighbours were less likely to report depressive symptoms than those with lower trust ($OR = 0.79$, $95\% CI = 0.67-0.94$). The Wald statistic value of 44.68 in Model one reached significance, and increased to 61.45 in Model 2. A likelihood ratio test indicated that Model two included variables more strongly predictive of depressive symptoms than those seen in Model 1 (LR $\chi^2 = 27.75$,

$p < .001$). Findings suggest that social capital variables provide additional value as predictors of depressive symptoms over and above neighbourhood, socio-demographic, and socio-economic variables alone.

Model 2b: Social Capital and Depressive Symptoms in Women

Model two included the different social capital dimensions. Having positive perceptions of neighbourhood cohesion decreased the likelihood of having depressive symptoms in women ($OR = 0.72$, $95\% CI = 0.59-0.87$). Women who had higher trust in neighbours were less likely to report depressive symptoms than women with low trust in neighbours ($OR = 0.88$, $95\% CI = 0.79-0.98$), and women with low generalized trust ($OR = 1.53$, $95\% CI = 1.14-2.07$) were more likely to report depressive symptoms than those with high generalized trust. Women with both neighbourhood and non-neighbourhood ties were more likely ($OR = 2.10$, $95\% CI = 1.23-3.58$) to have depressive symptoms compared to those with ties only inside the neighbourhood. The Wald statistic for Model one was significant in women, with a value of 71.16. This value increased to 103.60 in Model two, and likelihood ratio tests indicated that variables in this model provided a good fit of depressive symptoms in women (LR $\chi^2 = 42.05$, $p < .001$). Moderation tests showed that social capital variables did not moderate the association between disadvantage and depressive symptoms in women nor men. Model 1 and Model 2 results can be seen in Table 5.

Table 5. Adjusted odds ratio and 95% confidence intervals from multilevel logistic regression analyses, n=2624.

| Variables | Model 1 (N=2624) | | Model 2 (N=2624) | |
|-----------------------|-------------------------|------------------------|-------------------------|------------------------|
| | OR (95% CI) | | OR (95% CI) | |
| | Men (N = 929) | Women (N = 1695) | Men (N = 929) | Women (N = 1695) |
| Age (years) | | | | |
| 25-34 | 1.00 | 1.00 | 1.00 | 1.00 |
| 35-44 | 0.99 (0.48-2.06) | 0.81 (0.51-1.28) | 1.07 (0.52-2.22) | 0.86 (0.54-1.38) |
| 45-54 | 0.93 (0.45-1.91) | 0.99 (0.64-1.54) | 0.98 (0.47-2.03) | 0.97 (0.62-1.53) |
| 55-64 | 0.44 (0.19-1.03) | 0.83 (0.51-1.34) | 0.47 (0.20-1.12) | 0.94 (0.57-1.54) |
| 65-74 | 0.55 (0.23-1.27) | 0.54 (0.32-0.92)* | 0.63 (0.27-1.47) | 0.63 (0.37-1.08) |
| 75+ | 0.21 (0.07-0.66)** | 0.56 (0.30-1.06) | 0.28 (0.09-0.90)* | 0.66 (0.35-1.27) |
| Marital status | | | | |
| Married | 1.00 | 1.00 | 1.00 | 1.00 |
| Single | 2.91 (1.65-5.11)*** | 1.40 (0.97-2.03) | 2.92 (1.65-5.15)*** | 1.37 (0.94-2.01) |
| Divorced/Separated | 2.09 (1.03-4.25)* | 2.15 (1.47-3.14)*** | 1.99 (0.96-4.09) | 2.22 (1.50-3.28)*** |
| Widowed | 7.36 (3.12-17.40)*** | 1.64 (1.01-2.67) | 8.17 (3.37-19.81)*** | 1.72 (1.05-2.81)* |
| Education | | | | |
| University degree | 1.00 | 1.00 | 1.00 | 1.00 |
| College | 0.77 (0.42-1.42) | 0.76 (0.52-1.11) | 0.76 (0.41-1.43) | 0.71 (0.48-1.05) |
| High School/Trade | 0.82 (0.47-1.44) | 0.93 (0.65-1.34) | 0.77 (0.43-1.38) | 0.84 (0.58-1.22) |
| No degree | 0.75 (0.32-1.77) | 1.06 (0.67-1.68) | 0.72 (0.29-1.75) | 1.02 (0.63-1.64) |
| Income | | | | |
| Under \$28,000 | 1.00 | 1.00 | 1.00 | 1.00 |
| \$28,000-49,000 | 0.83 (0.44-1.53) | 0.64 (0.45-0.92)* | 0.84 (0.45-1.58) | 0.70 (0.49-1.02) |
| \$50,000-74,000 | 0.65 (0.32-1.33) | 0.57 (0.37-0.87)* | 0.65 (0.31-1.36) | 0.63 (0.41-0.99) |
| \$75,000-100,000 | 0.58 (0.23-1.46) | 0.58 (0.32-1.03) | 0.59 (0.23-1.53) | 0.65 (0.36-1.18) |
| \$100,000 and over | 0.50 (0.19-1.33) | 0.49 (0.26-0.93)* | 0.55 (0.20-1.53) | 0.57 (0.29-1.10) |

| Variables | Model 1 (N=2624) | | Model 2 (N=2624) | |
|--|---------------------|----------------------|---------------------|-----------------------|
| | OR (95% CI) | | OR (95% CI) | |
| | Men (N = 929) | Women (N = 1695) | Men (N = 929) | Women (N = 1695) |
| Foreign born status | | | | |
| Born in Canada | 1.00 | 1.00 | 1.00 | 1.00 |
| Born outside of Canada | 1.33 (0.73-2.41) | 1.28 (0.85-1.91) | 1.34 (0.73-2.46) | 1.39 (0.92-2.10) |
| Household language | | | | |
| French | 1.00 | 1.00 | 1.00 | 1.00 |
| English | 1.67 (0.90-3.07) | 0.82 (0.55-1.24) | 1.85 (0.99-3.46) | 0.89 (0.59-1.35) |
| Foreign language | 1.13 (0.49-2.61) | 1.06 (0.67-1.68) | 1.08 (0.47-2.48) | 0.89 (0.51-1.57) |
| Employment status | | | | |
| Employed | 1.00 | 1.00 | 1.00 | 1.00 |
| Not currently employed | 1.65 (0.92-2.95) | 1.10 (0.78-1.56) | 1.64 (0.91-2.95) | 1.10 (0.77-1.56) |
| <i>Neighbourhood-level Measures:</i> | | | | |
| Neighbourhood disadvantage | 0.96 (0.68-1.36) | 1.26 (1.02-1.55)* | 0.84 (0.59-1.20) | 1.20 (0.96-1.48) |
| Census tract density | 1.01 (0.95-1.07) | 0.99 (0.95-1.02) | 1.01 (0.95-1.07) | 0.98 (0.95-1.02) |
| <i>Social Capital Measures:</i> | | | | |
| Core tie diversity | | | | |
| Neighbourhood ties only | -- | -- | 1.00 | 1.00 |
| No core ties | -- | -- | 0.76 (0.35-1.65) | 1.68 (0.99-2.84) |
| Neighbourhood and non-neighbourhood ties | -- | -- | 1.38 (0.64-3.02) | 2.10 (1.22-3.58)** |
| No neighbours as core ties | -- | -- | 0.72 (0.29-1.76) | 1.31 (0.71-2.40) |
| Generalized trust | | | | |
| Most people can be trusted | -- | -- | 1.00 | 1.00 |
| Low trust | -- | -- | 1.42 (0.87-2.30) | 1.53 (1.14-2.07)** |

| Variables | Model 1 (N=2624) | | Model 2 (N=2624) | |
|---|------------------|---------------------|-----------------------|-----------------------|
| | OR (95% CI) | | OR (95% CI) | |
| | Men (N = 929) | Women (N = 1695) | Men (N = 929) | Women (N = 1695) |
| Trust in neighbours | -- | -- | 0.79 (0.67-0.94)** | 0.88 (0.79-0.98)* |
| Perceived neighbourhood cohesion | -- | -- | 0.65 (0.47-0.92)* | 0.72 (0.59-0.87)** |

* $p < 0.05$, ** $p < .01$, *** $p < .001$

Moderation Analyses

Moderation tests indicated that social capital variables did not moderate the association of neighbourhood disadvantage with depressive symptoms.

Mediation Analyses

Given that neighbourhood disadvantage was not shown associated with depressive symptoms in men, no mediation tests were conducted with the men's data. Among the women, perceived neighbourhood cohesion was the only social capital dimension among the four shown to mediate the association between neighbourhood disadvantage and depressive symptoms in women ($ab = 0.003$, $95\% CI = 0.00-0.01$, $p < 0.01$). Results from the mediation analyses may be seen in Table 6.

Table 6. Mediation analyses: social capital variables as mediators of neighbourhood disadvantage and depressive symptoms in women, n = 1624.

| Social Capital Components | a | b | aSE | bSE | ab | SE (ab) | z | Wald statistic | p | lower 95% CI | upper 95% CI |
|---|----------|----------|------------|------------|-----------|----------------|----------|-----------------------|-------------|---------------------|---------------------|
| Generalized Trust | 0.06 | 0.43 | 0.08 | 0.15 | 0.03 | 0.04 | 0.73 | 0.53 | 0.47 | -0.04 | 0.10 |
| Trust in Neighbours | 0.01 | -0.13 | 0.03 | 0.05 | -0.00 | 0.00 | -0.33 | 0.11 | 0.74 | -0.01 | 0.01 |
| Core Tie Diversity (vs. neighbourhood ties) | | | | | | | | | | | |
| No neighbourhood ties | 0.05 | 0.52 | 0.08 | 0.27 | 0.03 | 0.04 | 0.59 | 0.35 | 0.55 | -0.06 | 0.11 |
| Ties inside and outside the neighbourhood | -0.01 | 0.74 | 0.09 | 0.27 | -0.01 | 0.07 | -0.11 | 0.01 | 0.91 | -0.14 | 0.12 |
| No core ties | -0.11 | 0.27 | 0.12 | 0.31 | -0.03 | 0.05 | -0.63 | 0.40 | 0.53 | -0.12 | 0.06 |
| Perceived neighbourhood cohesion | -0.01 | -0.34 | 0 | 0.1 | 0.00 | 0.00 | 3.40 | 11.56 | 0.00 *** | 0.00 | 0.01 |

Discussion

The current study investigated if neighbourhood disadvantage was associated with depressive symptoms in urban-dwelling adults, and whether these associations differed by gender. Furthermore, the study assessed whether specific dimensions of social capital mediated the association between neighbourhood disadvantage and having depressive symptoms. Findings showed that higher levels of neighbourhood disadvantage increased the odds of women reporting depressive symptoms, and that this association was mediated by women's perceptions of neighbourhood cohesion. Although disadvantage was not associated with depressive symptoms in men, associations were found between men's individual-level perceptions of neighbourhood cohesion and depressive symptoms.

Our findings suggest, first of all, that there may be important differences in the way that neighbourhood disadvantage is associated with having depressive symptoms in men and women. In our sample, women appear to be more exposed to the potential influence of disadvantage on their mental health. Although to our knowledge no previous research has directly investigated gender differences in neighbourhood disadvantage and depressive symptoms, our findings would align with social epidemiological studies that have examined outcomes, such as aggression and self-rated health (Karriker-Jaffe et al., 2009; Stafford et al., 2005). For example, neighbourhood socioeconomic disadvantage was predictive of aggression in adolescent girls (Karriker-Jaffe et al., 2009). When examining self-rated health, Stafford and colleagues (2005) reported that although neighbourhood characteristics were associated with poorer self-rated health in men and women, the magnitude was larger for

women. Our results are thus consistent with other studies demonstrating that women may be more vulnerable to neighbourhood disadvantage than men (Matheson et al., 2006).

In assessing whether social capital potentially mediated the association between disadvantage and having depressive symptoms, it was shown that only perceived neighbourhood cohesion mediated the association. Findings thus suggest that objective neighbourhood disadvantage may operate indirectly to influence the risk of depression via cognitive, psychosocial pathways in women. Haines et al. (2011) found network components of social capital, including structural and resource-related elements of social networks, mediated the association between neighbourhood disadvantage and depressive symptoms in a sample of men and women. Although their finding suggests a network/resource accessibility pathway, cognitive measures of trust or cohesion were not included in their study. Future research might assess the types of neighbourhood environmental characteristics that might alter the relative influence of specific pathways linking neighbourhood disadvantage to depressive symptoms.

Despite differences between men and women in the importance of neighbourhood disadvantage, men and women did exhibit a number of similarities in the individual-level social capital correlates of depressive symptoms. As shown in other studies, lower trust in neighbours and poorer perceptions of neighbourhoods increased the odds of depressive symptoms in both men and women (Curry et al., 2008; Fujiwara & Kawachi, 2008; Ross, 2000; Webber et al., 2010). Yet, low generalized trust increased the odds of depressive symptoms in women only. This finding differs from studies reporting that generalized trust is

predictive of depressive symptoms in both men and women, however such studies did not report results stratified by gender (Aslund et al., 2010; De Silva et al., 2005; Fujiwara & Kawachi, 2008; Sund et al., 2007; Veenstra, 2005; Webber et al., 2010). Finally, diversity in the geographical source of one's core ties was shown to be important only in women: women with both neighbourhood and non-neighbourhood core ties were more likely to report depressive symptoms compared to women whose core ties were only in the neighbourhood. To our knowledge, no other studies have investigated gender differences within this component of social capital. However, recent literature supports the mental health benefits of having positive relationships within the neighbourhood (Caughy et al., 2003; Rajaratnam et al., 2008). Although research is beginning to explore the potential health-related benefits of spatial diversity in network ties, it remains unclear as to why women who have more spatially diverse ties are more likely to have depressive symptoms.

Limitations

The current study had some unavoidable limitations. First, depressive symptoms were not clinician-rated. Although symptoms were measured with a validated scale, findings may not be directly applicable to those with major depressive disorder. Second, there may be a discrepancy between the study's objective definition of neighbourhoods as census tracts and participant's subjective perceptions of their neighbourhood boundaries and those who belong. Third, the perceived neighbourhood cohesion scale had low reliability. Ancillary analyses were thus conducted using an alternative perceived neighbourhood cohesion variable generated from a factor analysis of the four items. The alternative perceived neighbourhood

factor score was substituted for the original scale and analyses reconducted. Results, including the mediation analyses, were similar as to those found in the original analyses. Lastly, due to the study's cross-sectional design, causality cannot be inferred. Although individual depression is not likely to influence actual levels of neighbourhood disadvantage, depression may have an influence on a person's perception of neighbourhood cohesion.

Conclusion

To our knowledge, this is the first study to investigate gender differences in the association of neighbourhood disadvantage and depression, and whether components of social capital might mediate those associations. Neighbourhood disadvantage was associated with depressive symptoms in women only, and these associations were fully mediated by neighbourhood perceptions. Limited differences in the association of individual social capital and depressive symptoms were found between men and women. Findings of this study would suggest that prevention and treatment programs for depression may wish to consider differences between men and women. For example, it may be that neighbourhood-level interventions that alter the levels of actual disadvantage in a neighbourhood may have greater effectiveness in reducing depressive symptoms in women than men. Longitudinal studies might lead to better understandings of the causal pathways linking neighbourhood disadvantage, social capital, and depressive symptoms.

Author's Contributions

SM and EB designed the research and contributed to the conceptualization of the study. EB conducted data analysis and drafted the initial version of the manuscript. SM was the nominated principal investigator on the Montreal Neighbourhood Networks and Healthy Aging Study, gave advice and input on the data analyses, and edited the manuscript for intellectual content and clarity. Both authors assume responsibility for the final content and approve the manuscript for submission. There are no conflicts of interest to report.

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Chapter 5

General Discussion

Previous research has indicated that social influences play a powerful role in mental health at individual and group levels, yet the specific links between social capital and depression have remained largely unknown. It has also been suggested that social influences are associated with depressive symptoms differentially between men and women, but research has not examined whether the association between social capital and depression varies by sex. Social capital is a relatively new concept in public health research, and with any new concept there is often debate, as theorists and researchers develop concrete definitions and measures. The current work suggests that a convergence of both network and psychosocial measures may be the most effective means to gain a fuller depiction of how social capital relates to depressive symptoms.

A second common debate is whether social capital is most appropriately measured generally or within contextual boundaries, such as within neighbourhoods. General social capital typically provides insight into overall resources accessed by individuals however neighbourhood-specific measures of social capital provides more specific information as to where resources are accessed. Understanding how contextual factors of social capital are linked with depression has important public health implications, especially when deciding which components of social capital to target in treatment or prevention programs. Yet, studies of general- and neighbourhood-specific social capital and depression remain limited. This thesis work demonstrated that neighbourhood-level variables were important to include in studies of depression, and may be especially so for women's symptomatology.

This thesis undertook an extensive investigation of the associations between social capital and depressive symptoms in Montreal adults. First, network and psychosocial measures were explored as predictors of depressive symptoms and differences between general and neighbourhood-specific measures of social capital were investigated. Second, sex differences in significant psychosocial and network measures of social capital, including core tie diversity, perceived neighbourhood cohesion, generalized- and neighbourhood-specific trust, and neighbourhood disadvantage, were explored as predictors of depressive symptoms. This discussion will include a summary of key findings, a critique of the strengths and limitations of the thesis work, a consideration of implications of study findings and suggestions for future research.

Summary of Key Findings

Findings from manuscripts one and two stress the importance of including psychosocial, network, general, and neighbourhood-specific measures in studies of social capital and depressive symptoms. Specifically, study results suggested that the network-based measure ‘core tie diversity’ was associated with increased depressive symptoms among women. Women with only core neighbourhood ties tended to report lower levels of depressive symptoms compared to those with both neighbourhood and non-neighbourhood ties. To our knowledge, no other studies have investigated associations between the actual network component of social capital and depressive symptoms. Neighbourhood health is a growing area of research, and in many instances, positive relationships with neighbours may improve health outcomes (Curry et al., 2008; Fujiwara & Kawachi, 2008; Ross, 2000;

Webber et al., 2010). Psychosocial components of social capital were also associated with depressive symptoms, demonstrating that inclusion of both network and psychosocial components is necessary to gain a complete picture of how social capital is associated with depressive symptoms. Those with higher generalized trust in others, higher trust in their neighbours, and more positive perceptions of neighbourhood cohesion reported the lowest rates of depressive symptoms. Findings are consistent with previous research exploring psychosocial components of social capital as predictors of depressive symptoms (Aslund et al., 2010; Curry et al., 2008; De Silva et al., 2005; Fujiwara & Kawachi, 2008; Ross, 2000; Sund et al., 2007; Veenstra, 2005; Webber et al., 2010). To summarize, when examining the adult population as a whole both network and psychosocial components of social capital were associated with depressive symptoms. When results were stratified by gender, network and psychosocial components were relevant for women, with only psychosocial measures as predictors of depressive symptoms in men.

Neighborhood-level disadvantage provides further insight into the ways in which social and physical environments impact depressive symptoms. Although findings of previous studies have been somewhat inconsistent, disadvantaged neighbourhood characteristics have been shown to be associated with negative behavioural and health-related outcomes in women (Karriker-Jaffe et al., 2009; Matheson et al., 2008; Stafford et al., 2005). It has been posited that women are more prone to the negative effects of neighbourhood-level stressors than men due to their tendencies to be more socially embedded within their neighbourhoods (Matheson et al., 2006). In the current study, neighbourhood disadvantage

was associated with depressive symptoms in women only, and these associations were fully mediated by perceptions of neighbourhood cohesion. Perceived neighbourhood cohesion was especially important when considering the complex pathways by which neighbourhood disadvantage is associated with depressive symptoms in women. The current work reinforces the importance of considering gender differences when attempting to gain a comprehensive understanding of important health outcomes, such as elevated depressive symptoms.

Strengths of Thesis Work

Strengths of the current thesis work can be seen in two of its overarching goals: (1) to develop current understandings of social capital as a correlate of depressive symptoms, and (2) to aid in the clarification of definition and measurement debates that exist within the social capital literature by including measures of its network, psychosocial, general, and neighbourhood components. Thus, it is my aim that this work informs researchers and those in health-based settings working towards improving the mental well-being of populations, but also to theorists and researchers interested in developing a cohesive understanding of social capital.

This thesis work took a necessary next step in understanding the link between social capital and depressive symptoms. It is widely accepted that multiple psychological, social, and environmental determinants likely contribute to depressive symptoms (Berkman, 1995; Bruce & Hoff, 1994; Cutrona et al., 2005; Echeverria et al., 2008; Haines et al., 2011; Ingram et al., 2007; Street et al., 2001). This was considered through the inclusion of demographic

characteristics, multiple components of social capital, and neighbourhood-level measures.

Differences between men and women were also investigated to gain an understanding of how these determinants may vary by gender. To our knowledge, this is the first study of its kind to consider network, psychosocial, general, and neighbourhood-specific measures of social capital when examining depressive symptoms. The addition of neighbourhood-level variables and the consideration of gender differences contribute to the uniqueness of this work.

Finally, the MoNNET-HA study was a useful resource to better understand the multifaceted nature of social capital. The sampling design, which included an equal number of individuals from low to high socioeconomic areas in 300 census tracts, ensured that the sample was representative of the various groups that resided within the Montreal metropolitan area. The breadth and richness of this data source was a strength in itself since it not only allowed us to understand the links between social capital and depressive symptoms, but acted as an ideal source to tackle some of the current debates within the social capital field. Specifically, an approach to social capital that is all-inclusive (i.e., one that includes network, psychosocial, general, and neighbourhood measures) is likely most appropriate when understanding depressive symptoms. These findings have important implications not only for those who attempt to understand depression to a higher degree, but also to theorists who typically use narrow approaches to social capital.

Limitations of Thesis Work

The current study has some unavoidable limitations. Due to the cross-sectional design, cause and effect relationships cannot be established with ultimate certainty. Specifically, it is unknown whether having low social capital results in depression, or

whether having depression results in decreased levels of social capital. However, having critically examined the current literature, it is probable that increased social capital may sequentially improve mental health. This is further supported when observing public health initiatives to improve the mental well-being of individuals and populations. For example, individual counseling and community initiatives often aim towards strengthening social relationships and social involvement with expectations that subsequent improvements in mental health will be observed (Public Health Agency of Canada, 1986). Such initiatives imply causality, yet longitudinal studies would strengthen the current evidence. A second limitation to this study is that depressive symptoms are not clinician-rated. Although the CES-D-10 is a valid and reliable screening tool for measuring depressive symptoms, it is not able to make clinical diagnoses of depression (Radloff, 1977). As a result, conclusions in this study are limited to depressive symptoms, but not major depressive disorder itself. A third discrepancy may lie within the individual- and ecological- level measures of neighbourhoods. Whereas neighbourhood-level disadvantage was measured from census tract data, the individual-level measure of neighbourhood perception was based on respondent's own mental frames of where their neighbourhood boundaries lie. It may be that respondent's perceptions differed from the strictly defined census tract boundaries.

Future Research Directions

While cross-sectional studies have many advantages in terms of brevity and reduced resource load and are helpful when gaining an initial understanding of associations, longitudinal studies within the current area of research is a logical next step. Longitudinal

investigations of the relationships between social capital and depression may help identify specific causal directions, but will allow for the development of more tailored community programs. If, for example, reduced social capital causes subsequent increases in depressive symptoms, then increasing the levels of social capital should be the primary focus of community programs.

Future studies of social capital and depressive symptoms should build upon findings by conducting similar analyses in other populations and locations. Specifically, associations between social capital and depressive symptoms should be assessed in individuals with clinician diagnosed major depressive disorder since current study conclusions are only applicable to those experiencing elevated depressive symptoms. Depression is often comorbid with various physical and mental illnesses and interesting findings may develop from studies that measure associations between social capital, depression, and other health outcomes.

Future studies should assess the multi-dimensional components of social capital in conjunction with depressive symptoms in other locations. For example, social capital is found to vary between high- and low-density areas. Small towns and rural settings are typically known for having close-knit social networks, and thus social capital may be more indicative of health outcomes, such as depression, in these areas (Greiner et al., 2004; Walters et al., 2004; Webber et al., 2010).

Public Health Implications

The improvement of social capital (and its cognitive, network, and resource components), has recently been outlined as an important health promotion initiative in countries including Canada, Australia, and the United Kingdom. The Victorian Government suggest that social capital can be fostered by emphasizing community development, which can be improved by defining community-level goals, mobilizing resources, and developing plans to address collective problems (State Government of Victoria, Australia, Department of Health, 2011). European initiatives to improve the mental health of population include action goals such as promoting mental health in schools and the workplace, supporting mentally healthy aging and reducing disadvantage (Jane-Llopis & Anderson, 2005). Goals such as these can be accomplished by promoting social inclusion, implementing community development programs, and encouraging social, cultural, economic and political contribution of individuals in society (Jane-Llopis & Anderson, 2005). Through the development of social capital within communities, inequality issues in health and well-being and the ways in which groups come together to promote health can be directly addressed (State Government of Victoria, Australia, Department of Health, 2011).

Canadian initiatives do not yet typically include the term ‘social capital’ within their mental health initiatives, as does the U.K.; however health promoting goals have included several of its key concepts for decades. For example, in 1986, efforts to improve mental well-being in its population, the Ottawa charter for mental health promotion strived to (1) build health public policy, (2) create supportive environments, (3) strengthen community action, (4) develop personal skills, and (5) reorient health services (Public Health Agency of Canada,

1986). Each goal incorporates fundamental concepts of social capital by emphasizing the importance of building connections within social networks, developing health promoting resources and behaviours within communities, and fostering cohesion between individuals and groups.

This thesis work aims to contribute to the fields of research and public health in domains of mental health and social capital. Implications may be particularly relevant for prevention and treatment programs of depression, and for the general promotion of positive mental well-being in populations. From a community-based programming perspective for example, programs may be beneficial for the mental well-being of communities if they work towards improving the socioeconomic and social conditions of neighbourhoods. Such population-based approaches are beneficial in that they target multiple groups at once, allowing for more wide-spread outcomes than typical mental health treatments aimed at the individual level. Furthermore, prevention and treatment programs of depression may wish to consider differences between men and women for design and implementation purposes. For example, it may be that neighbourhood-level interventions that target neighbourhood disadvantage may be more beneficial for women.

Summary of M.Sc. Experience

Throughout my M.Sc. research experience, I believe that I have gained the foundational skills and knowledge necessary to move forward in the Ph.D. program and guide me throughout my career. My thesis work and research assistantship have provided me with an appreciation for the dedication and hard work that goes into the entire research

process. For example, with my thesis I have experienced the benefits and challenges of working with data that was collected prior to my time in the department. Working with such a comprehensive database has been an excellent experience overall, however there is an element of challenge experienced when attempting to learn details of research conducted at a different time and in another city. As well as working with the database used in my thesis, I had the opportunity to assist with the design and implementation of a pilot research study conducted in our research lab. Through this study, I was able to provide input in the initial planning stages, assisted with ethics submission, recruited participants within the local community, conducted interviews with participants, analyzed actigraph data, and compiled sleep reports for participants. These experiences have provided me with the skills, tools, and confidence necessary to carry out future research endeavours.

Through practical experiences and coursework, I have also developed a solid understanding of what is needed to promote positive health and well-being at individual and community levels. In particular, I have learned the importance of examining various factors at the individual, group, and community levels when attempting to better understand health outcomes. Coming from psychology – a field which often focuses on the individual – this was a valuable lesson to learn and helped to broaden my perspective of health research. Perhaps most importantly, I understand the value of working in a field that is interesting, challenging, and rewarding, and I look forward to continuing on in such environments throughout my graduate studies and future professional opportunities.

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Appendices

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Appendix 1

MoNNET-HA Ethics Approval



CENTRE DE RECHERCHE
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Le 05 octobre 2007

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Objet : NDo7.049 - Approbation accélérée initiale et finale CÉR

Le capital social, les réseaux sociaux et le vieillissement en santé

Docteur,

J'ai pris connaissance des documents reçus en date du 21 septembre 2007 en vue de l'approbation accélérée du projet mentionné ci-dessus :

- Formulaire de présentation - Formulaire A - Annexe 2.1
- Formulaire de renseignements supplémentaires - Annexe 2.2
- Résumé d'un protocole de recherche
- Protocole de recherche
- Routing Slip of Registration/Application
- Formulaire d'information et de consentement - Version française - 13 septembre 2007
- Information and consent form - Version September 13, 2007
- Projet de questionnaire des ménages
- Draft household questionnaire

En vertu des pouvoirs qui me sont délégués par le Comité d'éthique de la recherche du CHUM pour procéder à une évaluation accélérée, il me fait plaisir de vous informer que j'approuve votre projet puisqu'il s'agit d'un projet se situant sous le seuil de risque minimal.

Toutefois, auriez-vous l'obligeance de nous faire parvenir le questionnaire dans sa version finale, lorsque complété.

La présente constitue l'approbation finale du comité suite à une procédure d'évaluation accélérée. Elle est **valide pour un an à compter du 05 octobre 2007**, date de l'approbation initiale. Je vous rappelle que toute modification au protocole et/ou au formulaire de consentement en cours d'étude, doit être soumise pour approbation du comité d'éthique.

CENTRE HOSPITALIER DE L'UNIVERSITÉ DE MONTRÉAL

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Le comité suit les règles de constitution et de fonctionnement de l'Énoncé de Politique des trois Conseils et des Bonnes pratiques cliniques de la CIH.

Vous souhaitant la meilleure des chances dans la poursuite de vos travaux, je vous prie d'accepter, Docteur, mes salutations distinguées.

A handwritten signature in cursive script, appearing to read "B. St-Pierre".

*Brigitte St-Pierre, conseillère en éthique
Adjointe à la présidente
Comité d'éthique de la recherche du CHUM*

BSTP/go

Appendix 2

MoNNET-HA Participant Questionnaire

22:

DEBU1

single
min = 1 max = 1 l = 2
Coder tel quel

Hi, My name is _____. I work for DEBU1) BIP, the Office of Professional Interviewers. We are working for a team of researchers from the University of Montreal, McGill University and the Centre Hospitalier de Université de Montréal (CHUM) with whom we are conducting a study on neighbourhood social relationships and healthy aging among Montreal residents. We would like your collaboration to answer a few questions. Do you have some time available right now? First, because this study focuses on healthy aging, can you tell me how many people aged 25 years and older live in this household on a regular basis?

\$E

*DKN/DNA 99

23:

DEBU2

single
min = 0 max = 1 l = 30

In order to choose one person randomly, can I speak to the adult aged 25 years and older who has the nearest upcoming birthday? Can I have his/her first name? Can I have his/her first name?

24:

DEBU3

single
min = 1 max = 1 l = 1

Hi (person's name). My name is _____, I am working for a team of researchers from the University of Montreal, McGill University and the Centre Hospitalier de Université de Montréal (CHUM). You are being asked to answer a household questionnaire that asks you about the your neighbourhood, your health, and your general interactions with your neighbours. Your participation is completely voluntary. You are free to respond or not to any of the questions that are addressed to you. In addition, you may stop completing the questionnaire at any time. Rest assured that all information you provide will be kept strictly confidential. Please know that the project has received the approval of the Centre Hospitalier de Université de Montréal (CHUM). Can I count on your collaboration for the next 20

minutes? Before we begin the interview, I have a few questions to verify that you are eligible to participate in this study.

We continue 1 D

25: **S1**

single
min = 1 max = 1 l = 1

S1) Have you lived at your current residence for at least 12 months?

Yes 1 => +2

No..... 2

26: **MES1**

single
min = 1 max = 1 l = 1

I'm sorry, according to the study's guidelines you are not eligible to participate in this study. Thank you for your time.

Not eligible - code 60..... 1 D

27: **S1A**

single
min = 1 max = 1 l = 2

Coder tel quel

S1a) Can you tell me, in years, how long have you lived at your current residence?

\$E 1 90

*DKN 99

28: **S2**

single
min = 1 max = 1 l = 2

LIRE

S2) Please stop me when I reach your age category. Are you between:

25 to 34 years 01

35 to 44 years 02

45 to 54 years 03

55 to 64 years 04

65 to 74 years 05

or 75 years and more 06

*DKN - no eligible..... 99 => /INT

29:

S3

single
min = 1 max = 1 l = 1

S3) Code the sexe <debu2>

- Male 1
- Female..... 2

30:

MES2

single
min = 1 max = 1 l = 1

The following questions ask about your social relationships..

We continue 1 D

31:

Q1

single
min = 1 max = 1 l = 1

Q1. Generally speaking, would you say that most people can be trusted, or that you can't be too careful in dealing with people?

- *Most people can be trusted 1
- *Can't be too careful 2
- *Depends..... 3
- *Most people CANNOT be trusted 4
- *I Don't Know..... 9

32:

Q2

single
min = 1 max = 1 l = 1

Q2. During the past five years, have you been active in a neighbourhood group or association as a volunteer or an officer?

- Yes 1
- No..... 2
- *DKN 8
- *DNA 9

33:

Q2A

single
min = 1 max = 1 l = 1

Q2a) During the past five years, have you been active in any other voluntary associations as a volunteer or an officer?

- Yes 1
- No..... 2
- *DKN 8
- *DNA 9

34:

Q3

single
min = 1 max = 1 l = 1

Now we would like to ask you about the people you know on a first name basis and the type of work they do.

We continue 1 D

35:

Q3A

single
min = 1 max = 1 l = 1

invalid [3] -> Q3J2

Q3a) Do you know someone who is a high school teacher?

- Yes 1
- No..... 2

36:

Q3A1

single
min = 1 max = 1 l = 1
 READ

Q3a1) Is this person a ...

=> +2
 if Q3A=2

- Relative 1
- Friend 2
- Acquaintance..... 3
- *DKN 8
- *DNA 9

37:

Q3A2

single
min = 1 max = 1 l = 1
 READ

- Q3a2) Does this person live in your ...
- Household 1
 - Neighbourhood 2
 - In the Montreal Metropolitan Area 3
 - None of the above 4
 - *DKN 8
 - *DNA 9

38:

Q3B

single
min = 1 max = 1 l = 1

- Q3b) Do you know someone who is a carpenter?
- Yes 1
 - No..... 2

39:

Q3B1

single
min = 1 max = 1 l = 1
 READ

Q3b1) Is this person a ...

| |
|----------|
| => +2 |
| if Q3B=2 |

- Relative 1
- Friend 2
- Acquaintance..... 3
- *DKN 8
- *DNA 9

40:

Q3B2

single
min = 1 max = 1 l = 1
 READ

- Q3b2) Does this person live in your ...
- Household 1
 - Neighbourhood 2
 - In the Montreal Metropolitan Area 3
 - None of the above 4
 - *DKN 8
 - *DNA 9

41:

Q3C

single
min = 1 max = 1 l = 1

- Q3c) Do you know someone who is a Musician/artist?
- Yes 1
 - No..... 2

42:

Q3C1

single
min = 1 max = 1 l = 1
 READ

Q3c1) Is this person a ...

| |
|----------|
| => +2 |
| if Q3C=2 |

- Relative 1
- Friend 2
- Acquaintance..... 3
- *DKN 8
- *DNA 9

43:

Q3C2

single
min = 1 max = 1 l = 1
 READ

Q3c2) Does this person live in your ...

- Household 1
- Neighbourhood 2
- In the Montreal Metropolitan Area 3
- None of the above 4
- *DKN 8
- *DNA 9

44:

Q3D

single
min = 1 max = 1 l = 1

Q3d) Do you know someone who is a Taxi driver?

- Yes 1
- No..... 2

45:

Q3D1

single
min = 1 max = 1 l = 1
 READ

Q3d1) Is this person a ...

| |
|----------|
| => +2 |
| if Q3D=2 |

- Relative 1
- Friend 2
- Acquaintance..... 3
- *DKN 8
- *DNA 9

46:

Q3D2

single
min = 1 max = 1 l = 1
 READ

Q3d2) Does this person live in your ...

- Household 1
- Neighbourhood 2
- In the Montreal Metropolitan Area 3
- None of the above 4
- *DKN 8
- *DNA 9

47:

Q3E

single
min = 1 max = 1 l = 1

Q3e) Do you know someone who is a Physician?

- Yes 1
- No..... 2

48:

Q3E1

single
min = 1 max = 1 l = 1
 READ

Q3e1) Is this person a ...

=> +2
 if Q3E=2

- Relative 1
- Friend 2
- Acquaintance..... 3
- *DKN 8
- *DNA 9

49:

Q3E2

| | | |
|----------------|----------------|--------------|
| | <i>single</i> | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 1</i> |
| <i>READ</i> | | |

Q3e2) Does this person live in your ...

- Household 1
- Neighbourhood 2
- In the Montreal Metropolitan Area 3
- None of the above 4
- *DKN 8
- *DNA 9

50:

Q3F

| | | |
|----------------|----------------|--------------|
| | <i>single</i> | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 1</i> |

Q3f) Do you know someone who is a Janitor?

- Yes 1
- No..... 2

51:

Q3F1

| | | |
|----------------|----------------|--------------|
| | <i>single</i> | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 1</i> |
| <i>READ</i> | | |

Q3f1) Is this person a ...

| |
|----------|
| => +2 |
| if Q3F=2 |

- Relative 1
- Friend 2
- Acquaintance..... 3
- *DKN 8
- *DNA 9

52:

Q3F2

single
min = 1 max = 1 l = 1
READ

- Q3f2) Does this person live in your ...
- Household 1
 - Neighbourhood 2
 - In the Montreal Metropolitan Area 3
 - None of the above 4
 - *DKN 8
 - *DNA 9

53:

Q3G

single
min = 1 max = 1 l = 1

- Q3g) Do you know someone who is a Registered nurse?
- Yes 1
 - No..... 2

54:

Q3G1

single
min = 1 max = 1 l = 1
READ

Q3g1) Is this person a ...

| |
|----------|
| => +2 |
| if Q3G=2 |

- Relative 1
- Friend 2
- Acquaintance..... 3
- *DKN 8
- *DNA 9

55:

Q3G2

| | | |
|----------------|----------------|--------------|
| <i>single</i> | | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 1</i> |
| <i>READ</i> | | |

Q3g2) Does this person live in your ...

| | |
|---|---|
| Household | 1 |
| Neighbourhood | 2 |
| In the Montreal Metropolitan Area | 3 |
| None of the above | 4 |
| *DKN | 8 |
| *DNA | 9 |

56:

Q3H

| | | |
|----------------|----------------|--------------|
| <i>single</i> | | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 1</i> |

Q3h) Do you know someone who is a Welder?

| | |
|-----------|---|
| Yes | 1 |
| No..... | 2 |

57:

Q3H1

| | | |
|----------------|----------------|--------------|
| <i>single</i> | | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 1</i> |
| <i>READ</i> | | |

Q3h1) Is this person a ...

| |
|----------|
| => +2 |
| if Q3H=2 |

| | |
|-------------------|---|
| Relative | 1 |
| Friend | 2 |
| Acquaintance..... | 3 |
| *DKN | 8 |
| *DNA | 9 |

58:

Q3H2

single
min = 1 max = 1 l = 1
READ

- Q3h2) Does this person live in your ...
- Household 1
 - Neighbourhood 2
 - In the Montreal Metropolitan Area 3
 - None of the above 4
 - *DKN 8
 - *DNA 9

59:

Q3I

single
min = 1 max = 1 l = 1

- Q3i) Do you know someone who is a Accountant?
- Yes 1
 - No..... 2

60:

Q3I1

single
min = 1 max = 1 l = 1
READ

Q3i1) Do you know someone who is a Accountant?

- => +2
if Q3I=2
- Relative 1
 - Friend 2
 - Acquaintance..... 3
 - *DNK 8
 - *DNA 9

61:

Q3I2

single
min = 1 max = 1 l = 1
 READ

- Q3i2) Does this person live in your ...
- Household 1
 - Neighbourhood 2
 - In the Montreal Metropolitan Area 3
 - None of the above 4
 - *DKN 8
 - *DNA 9

62:

Q3J

single
min = 1 max = 1 l = 1

- Q3j) Do you know someone who is a Receptionist?
- Yes 1
 - No..... 2

63:

Q3J1

single
min = 1 max = 1 l = 1
 READ

Q3j1) Is this person a ...

| |
|----------|
| => +2 |
| if Q3J=2 |

- Relative 1
- Friend 2
- Acquaintance..... 3
- *DKN 8
- *DNA 9

64:

Q3J2

single
min = 1 max = 1 l = 1
READ

Q3j2) Does this person live in your ...

- Household 1
- Neighbourhood 2
- In the Montreal Metropolitan Area 3
- None of the above 4
- *DKN 8
- *DNA 9

65:

MES3

single
min = 1 max = 1 l = 1

The following questions ask about people with whom you discuss important personal matters such as health, family, work, and money issues. These people may live in your household, may be relatives, friends, work colleagues, neighbours or other persons living outside your household. You can give a fake name rather than the real name if you prefer.

We continue 1 D

66:

Q4

single
min = 1 max = 1 l = 1

Q4. Can you tell me up to three people with whom you have discussed important matters in the last six months?

- Yes - Person 3 1
- Yes - Person 2 2
- Yes - Person 1 3
- No - No one 4
- *Don't want to name anyone (probe) 9

67:

Q4A

single
 $min = 0$ $max = 1$ $l = 80$

Q4a) The name of the first person ? ***At the need: if you prefer, you can give a fictitious name rather than the truth.

=> +3
 if Q4=4 9

68:

Q4B

single
 $min = 0$ $max = 1$ $l = 80$

Q4b) The name of the second person ? ***At the need: if you prefer, you can give a fictitious name rather than the truth.

=> +2
 if Q4=3

69:

Q4C

single
 $min = 0$ $max = 1$ $l = 80$

Q4c) The name of the third person ? ***At the need: if you prefer, you can give a fictitious name rather than the truth.

=> +1
 if Q4=2

70:

Q5

single
 $min = 1$ $max = 1$ $l = 1$

Q5. The next set of questions asks you about the people whom you have discussed important matters within the last six months:

=> Q9
 if Q4=4 9

We continue 1 D

71:

Q5A

single
min = 1 max = 1 l = 1

Q5a) ***Code the sexe of <q4a> At the need: Tell me if <q4a> is :

Male 1
 or Female 2

72:

Q5B

single
min = 1 max = 1 l = 3

Coder tel quel

Q5b) How old is <q4a> , roughly?

\$E 12 110

*DKN/DNA 999

73:

Q5C

single
min = 1 max = 1 l = 1

Q5c) How much formal education has <q4a>had (roughly)? ...

Less than high school..... 1
 High school 2
 More than high school but no university degree..... 3
 University degree or more 4
 *Don't know 8
 *Refuses to answer 9

74:

Q5D

single
min = 1 max = 1 l = 1

Q5d) Is he/she ...

Relative 1
 Friend 2
 Acquaintance..... 3
 *DKN 8
 *DNA 9

75:

Q5E

| | |
|----------------|---------------------------|
| | <i>single, open</i> |
| <i>min = 1</i> | <i>max = 1 l = 2</i> |

Q5e) Does <q4a> live...(Roughly)?

In your household 01

In your neighbourhood..... 02

Outside of Montreal Metropolitan area..... 03

*Other: Which area of Montreal Metropolitan area (e.g. Plateau, St. Laurent)*specify: 97

..... 0

*DKN/DNA 99

76:

Q5H

| | |
|----------------|---------------------------|
| | <i>single</i> |
| <i>min = 1</i> | <i>max = 1 l = 1</i> |

Q5h) Would you say that <q4a> ethnic or cultural background is the same or different than yours?

Same..... 1

Different..... 2

*DNK..... 8

*DNA..... 9

77:

Q5F

| | |
|----------------|---------------------------|
| | <i>single</i> |
| <i>min = 1</i> | <i>max = 1 l = 1</i> |

Q5f) Does <q4a> exercise regularly?

Yes 1

No..... 2

*DKN/DNA 9

78:

Q5I

| | |
|----------------|---------------------------|
| | <i>single</i> |
| <i>min = 1</i> | <i>max = 1 l = 1</i> |

Q5i) Does <q4a> smoke?

Yes 1

No..... 2

*DNK..... 9

79:

Q5G

| | | |
|----------------|---------------------|--------------|
| | <i>single, open</i> | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 2</i> |

Q5g) What occupation does <q4a>have?

*Write the answer here 97 O

*DKN/DNA 99

80:

Q6A

| | | |
|----------------|----------------|--------------|
| | <i>single</i> | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 1</i> |

Q6a) ***Code the sexe of <q4b> At the need: Tell me if <q4b> is :

=> Q8
if Q4=3

Male 1

or Female 2

81:

Q6B

| | | |
|----------------|----------------|--------------|
| | <i>single</i> | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 3</i> |

Coder tel quel

Q6b) How old is <q4b> , roughly?

\$E 12 110

*DKN/DNA 999

82:

Q6C

| | | |
|----------------|----------------|--------------|
| | <i>single</i> | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 1</i> |

Q6c) How much formal education has <q4b> had (roughly)? ...

Less than high school 1

High school 2

More than high school but no university degree 3

University degree or more 4

*Don't know 8

*Refuses to answer 9

83:

Q6D

single
min = 1 max = 1 l = 1

Q6d) Is he/she a ...

- Relative 1
- Friend 2
- Acquaintance..... 3
- *DKN 8
- *DNA 9

84:

Q6E

single, open
min = 1 max = 1 l = 2

Q6e) Does <q4b> live...(Roughly)

- In your household 01
- In your neighbourhood..... 02
- Outside of Montreal Metropolitan area..... 03
- *Other: Which area of Montreal Metropolitan area (e.g. Plateau, St. Laurent)*specify: 97
..... 0
- *DKN/DNA 99

85:

Q6H

single
min = 1 max = 1 l = 1

Q6h) Would you say that <q4b> ethnic or cultural background is the same or different than yours?

- Same..... 1
- Different..... 2
- *DNK 8
- *DNA 9

86:

Q6F

single
min = 1 max = 1 l = 1

Q6f) Does <q4b> exercise regularly?

- Yes 1
- No..... 2
- *DKN/DNA 9

87:

Q6I

single
min = 1 max = 1 l = 1

Q6i) Does <q4b> smoke?

Yes 1

No..... 2

*DNK..... 9

88:

Q6G

single, open
min = 1 max = 1 l = 2

Q6g) What occupation does <q4b> have?

*Write the answer here: 97 O

*DKN/DNA 99

89:

Q7A

single
min = 1 max = 1 l = 1

Q7a) ***Code the sexe of <q4c> At the need: Tell me if <q4c> is :

=> Q8

if Q4=2

Male 1

or Female 2

90:

Q7B

single
min = 1 max = 1 l = 3

Coder tel quel

Q7b) How old is <q4c> , roughly?

\$E 12 110

*DKN/DNA 999

91:

Q7C

| | | |
|----------------|----------------|--------------|
| | <i>single</i> | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 1</i> |

Q7c) How much formal education has <q4c> had (roughly)? ...

- Less than high school..... 1
- High school 2
- More than high school but no university degree..... 3
- University degree or more 4
- *Don't know 8
- *Refuses to answer 9

92:

Q7D

| | | |
|----------------|----------------|--------------|
| | <i>single</i> | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 1</i> |

Q7d) Is he/she a ...

- Relative 1
- Friend 2
- Acquaintance..... 3
- *DKN 8
- *DNA 9

93:

Q7E

| | | |
|----------------|---------------------|--------------|
| | <i>single, open</i> | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 2</i> |

Q7e) Does <q4c>? live...(Roughly)

- In your household 01
- In your neighbourhood..... 02
- Outside of Montreal Metropolitan area..... 03
- *Other: Which area of Montreal Metropolitan area (e.g. Plateau, St. Laurent)*specify: 97
- 0
- *DKN/DNA 99

94:

Q7H

single
min = 1 max = 1 l = 1

Q7h) Would you say that <q4c> ethnic or cultural background is the same or different than yours?

Same..... 1
Different..... 2
*DNK..... 8
*DNA..... 9

95:

Q7F

single
min = 1 max = 1 l = 1

Q7f) Does <q4c> exercise regularly?

Yes 1
No..... 2
*DKN/DNA 9

96:

Q7I

single
min = 1 max = 1 l = 1

Q7i) Does <q4c> smoke?

Yes 1
No..... 2
*DNK..... 9

97:

Q7G

single, open
min = 1 max = 1 l = 2

Q7g) What occupation does <q4c> have?

*Write the answer here 97 O
*NSP/NRP 99

98:

Q8

| | | |
|----------------|----------------|--------------|
| | <i>single</i> | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 1</i> |

Q8. These next questions ask if the people who live in your neighbourhood know one another (as far as you are know).

| |
|---|
| => Q9 if NON((Q5E=02 ET Q6E=02) OU (Q5E=02 ET Q7E=02) OU (Q6E=02 ET Q7E=02)) |
|---|

We continue 1 D

99:

Q8A

| | | |
|----------------|----------------|--------------|
| | <i>single</i> | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 1</i> |

Q8a) Do <Q4a> and <Q4b> know each other?

| |
|-----------------------------------|
| => +1 if NON(Q5E=02 ET Q6E=02) |
|-----------------------------------|

| | |
|-----------|---|
| Yes | 1 |
| No..... | 2 |
| *DKN..... | 8 |
| *DNA..... | 9 |

100:

Q8B

| | | |
|----------------|----------------|--------------|
| | <i>single</i> | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 1</i> |

Q8b) Do <Q4a> and <Q4c> know each other?

| |
|-----------------------------------|
| => +1 if NON(Q5E=02 ET Q7E=02) |
|-----------------------------------|

| | |
|-----------|---|
| Yes | 1 |
| No..... | 2 |
| *DKN..... | 8 |
| *DNA..... | 9 |

101:

Q8C

single
min = 1 max = 1 l = 1

Q8c) Do <Q4b> and <Q4c> know each other?

=> +1

if NON(Q6E=02 ET Q7E=02)

Yes 1
 No..... 2
 *DKN 8
 *DNA 9

102:

Q9

single
min = 1 max = 1 l = 1

Q9. The following are questions about different aspects of your neighbourhood and your relationships with neighbours. Would you say:

=> /+1

if 1

We continue 1 D

103:

Q9A

single
min = 1 max = 1 l = 1

screen [template 2] -> Q9K

invalid -> Q9K

Q9a) your neighbourhood is noisy?

Question drop

=> +1

if 1

Strongly agree 1
 Agree..... 2
 Disagree 3
 Strongly Disagree..... 4
 *Don't Know 8
 *Refuses to answer 9

104:

Q9B

single
min = 1 max = 1 l = 1

Q9b) your neighbourhood is clean?

- Strongly agree 1
- Agree 2
- Disagree 3
- Strongly Disagree..... 4
- *Don't Know 8
- *Refuses to answer 9

105:

Q9C

single
min = 1 max = 1 l = 1

Q9c) there are too many people hanging around on the streets near your home.

Question drop

=> +1

if 1

- Strongly agree 1
- Agree 2
- Disagree 3
- Strongly Disagree..... 4
- *Don't Know 8
- *Refuses to answer 9

106:

Q9D

single
min = 1 max = 1 l = 1

Q9d) you have trouble with your neighbours

- Strongly agree 1
- Agree 2
- Disagree 3
- Strongly Disagree..... 4
- *Don't Know 8
- *Refuses to answer 9

107:

Q9E

single
min = 1 max = 1 l = 1

Q9e) people in your neighbourhood are willing to help each other

- Strongly agree 1
- Agree 2
- Disagree 3
- Strongly Disagree..... 4
- *Don't Know 8
- *Refuses to answer 9

108:

Q9F

single
min = 1 max = 1 l = 1

Q9f) people in your neighbourhood can be trusted

- Strongly agree 1
- Agree 2
- Disagree 3
- Strongly Disagree..... 4
- *Don't Know 8
- *Refuses to answer 9

109:

Q9G

single
min = 1 max = 1 l = 1

Q9g) if there is a problem in your neighbourhood, people in your neighbourhood can get it solved.

- Strongly agree 1
 - Agree 2
 - Disagree 3
 - Strongly Disagree..... 4
 - *Don't Know 8
 - *Refuses to answer 9
-
-

110:

Q9H

| |
|--|
| <i>single</i> |
| <i>min = 1 max = 1 l = 1</i> |

Q9h) you feel at home in your neighbourhood.

Question drop

=> +1

if 1

- Strongly agree 1
- Agree 2
- Disagree 3
- Strongly Disagree..... 4
- *Don't Know 8
- *Refuses to answer 9

111:

Q9I

| |
|--|
| <i>single</i> |
| <i>min = 1 max = 1 l = 1</i> |

Q9i) you have someone in your neighbourhood who you can really talk to.

- Strongly agree 1
- Agree 2
- Disagree 3
- Strongly Disagree..... 4
- *Don't Know 8
- *Refuses to answer 9

112:

Q9J

| |
|--|
| <i>single</i> |
| <i>min = 1 max = 1 l = 1</i> |

Q9j) you have someone in your neighbourhood who could help you out with things, like give you a ride, watch the house or kids, or fix something.

- Strongly agree 1
- Agree 2
- Disagree 3
- Strongly Disagree..... 4
- *Don't Know 8
- *Refuses to answer 9

113:

Q9K

single
min = 1 max = 1 l = 1

Q9k) most people in your neighbourhood know you.

- Strongly agree 1
- Agree 2
- Disagree 3
- Strongly Disagree..... 4
- *Don't Know 8
- *Refuses to answer 9

114:

MES4

single
min = 1 max = 1 l = 1

QUESTIONS CONCERNING HEALTH AND WELL-BEING QUESTIONS: This section of the survey asks for your views about your health.

We continue 1 D

115:

Q10

single
min = 1 max = 1 l = 1

READ

Q10. In general, would you say your health is...

- Excellent 1
- Very good..... 2
- Good..... 3
- Fair 4
- Poor 5
- *DKN 9

116:

Q11

single
min = 1 max = 1 l = 1
READ

Q11. During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with friends, relatives, etc.)?

- All of the time 1
- Most of the time 2
- Some of the time 3
- A little of the time 4
- None of the time 5
- *DKN 9

117:

Q12

single
min = 1 max = 1 l = 1
READ

Q12. How well are you able to get around?

- Very Good..... 1
- Good..... 2
- Neither good nor poor 3
- Poor 4
- Very poor 5
- *DKN 9

118:

Q13

single
min = 1 max = 1 l = 1
READ

Q13. How would you rate your memory?

- Very Good..... 1
- Good..... 2
- Neither good nor poor 3
- Poor 4
- Very Poor 5
- *DKN 9

119:

Q14

single
min = 1 max = 1 l = 1

Q14. Has a doctor ever told you whether or not you suffer from any of the following symptoms or conditions?

=> /+1
if 1

We continue 1 D

120:

Q14A

single
min = 1 max = 1 l = 1

screen [template 2] -> Q14F

invalid -> Q14F

14a) Diabetes

Yes 1

No..... 2

121:

Q14B

single
min = 1 max = 1 l = 1

Q14b) Hypertension (high blood pressure)

Yes 1

No..... 2

122:

Q14C

single
min = 1 max = 1 l = 1

Q14c) High cholesterol

Yes 1

No..... 2

123:

Q14D

single
min = 1 max = 1 l = 1

Q14d) Cardiac problems (angina, heart attack/myocardial infarction, by-pass)?

Yes 1

No..... 2

124:

Q14E

| | | |
|----------------|----------------|--------------|
| | <i>single</i> | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 1</i> |

Q14e) Osteoporosis?

Yes 1
 No..... 2

125:

Q14F

| | | |
|----------------|----------------|--------------|
| | <i>single</i> | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 1</i> |

Q14f) Arthritis/or rheumatism?

Yes 1
 No..... 2

126:

Q15

| | | |
|----------------|----------------|--------------|
| | <i>single</i> | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 1</i> |

Q15) Can you tell me, roughly speaking, what your current weight is in pounds or in kilos?

*Answer in Pounds 1
 *Answer in kilos 2
 *DKN 9

127:

Q15A

| | | |
|----------------|----------------|--------------|
| | <i>single</i> | |
| <i>min = 1</i> | <i>max = 1</i> | <i>l = 3</i> |

Coder tel quel

Q15a) Can you tell me on average which is your current weight in pounds?

\$E 80 500

| |
|---------------------|
| => +1 if Q15=2 9 |
|---------------------|

*DKN 999

128:

Q15B

single
min = 1 max = 1 l = 3
Coder tel quel

Q15b) Can you tell me on average which is your current weight in kilos?
 \$E 40 200

=> +1
 if Q15=1 9

*DKN 999

129:

Q16

single
min = 1 max = 1 l = 1

Q16) Can you tell me, roughly speaking, how tall you are?

*Answer in feet 1
 *Answer in metres 2
 *DKN 9

130:

Q16A

single
min = 1 max = 1 l = 4
Coder tel quel

Q16a) Can you tell me on average how much you measure in feet ?
 \$R.2 3.60 8.00

=> +1
 if Q16=2 9

*DKN 9999

131:

Q16B

single
min = 1 max = 1 l = 4
Coder tel quel

Q16b) Can you tell me on average how much you measure in metres
 \$R.2 0.5 2.40

=> +1
 if Q16=1 9

*NRP 9999

132:

Q17E

single
min = 1 max = 1 l = 1

Q17e) In the past 30 days, have you smoked?"

- Yes 9
- No..... 2
- *DNK..... 3
- *DNA 4

133:

Q17

single
min = 1 max = 1 l = 1

Q17) Alcohol consumption A drink of alcohol is 1 can or bottle of beer, 1 glass of wine, 1 bottle of wine cooler, 1 cocktail, or 1 shot of liquor. During the past 30 days, how many days per week or per month did you have at least 1 drink of any alcoholic beverage?

- *Days per week..... 1
- *Days in past 30 (month)..... 2
- *No drinks in past 30 days..... 0 => Q18
- *Don't know/not sure 8
- *Refused 9 => Q18

134:

Q17A

single
min = 1 max = 1 l = 1

Coder tel quel

During the past 30 days, how many days per week did you have at least 1 drink of any alcoholic beverage?

\$E 1 7

=> +1
if Q17=2 8

- *DNK/DNA 9

135:

Q17B

single
min = 1 max = 1 l = 2
Coder tel quel

Q17b) During the past 30 days, how many days per month did you have at least 1 drink of any alcoholic beverage?

\$E 1 31

=> +1
if Q17=1 8

*DKN/DNA 99

136:

Q17C

single
min = 1 max = 1 l = 2
Coder tel quel

Q17c) On the days when you drank, about how many drinks did you drink on average?

\$E 1 30

*Don't know/not sure 98

*Refused 99

137:

Q17D

single
min = 1 max = 1 l = 2
Coder tel quel

Q17d) Considering all types of alcoholic beverages, how many times during the past 30 days did you have 5 or more drinks on an occasion?

\$E 0 30

=> Q18
if Q17C=99

*None 00

*Don't know/not sure 98

*Refused 99

138:

Q18

single
min = 1 max = 1 l = 1

Adapted IPAQ (International Physical Activity Questionnaire):

Q18) Now, I am going to ask you about the time you spent being physically active in the last 7 days. Please answer each question even if you do not consider yourself to be an active

person. Think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport. Only include the activities that you did for at least 10 minutes at a time.

We continue 1 D

139: **Q18A**

single
min = 1 max = 1 l = 1
Coder tel quel

Q18a) Think about all the vigorous activities that you did... (These are activities that take hard physical effort, such as heavy lifting, digging, aerobics, or fast bicycling). During the last 7 days, on how many days did you do this type of activity?

\$E 0 7

- *Don't know 8
- *Refused to answer 9

140: **Q18B**

single
min = 1 max = 1 l = 1

Q18b) How much time did you spend doing this activity on one of those days?

- *Hours per day 1
- *Minutes per day..... 2
- *Don't know 8
- *Refused to answer 9

141: **Q18BA**

single
min = 1 max = 1 l = 2
Coder tel quel

Q18ba) How much time in hours did you spend doing this activity on one of those days?

\$E 1 16

=> +1
 if Q18B=2 8 9

- *DNK/DNA 99

142:

Q18BB

single
min = 1 max = 1 l = 2
Coder tel quel

Q18bb)Q18b) How much time in minutes did you spend doing this activity on one of those days?

\$E 1 59

| |
|------------------------|
| => +1 if Q18B=1 8 9 |
|------------------------|

*DKN/DNA 99

143:

Q18E

single
min = 1 max = 1 l = 1
Coder tel quel

Q18e)Think about all the moderate activities that you did... (These are activities that make you breathe somewhat harder than normal, such as carrying light loads, bicycling at a regular pace, or doubles at tennis). *Do not include walking. During the last 7 days, on how many days did you do this type of activity?

\$E 1 7

*Don't know 8

*Refused to answer 9

144:

Q18F

single
min = 1 max = 1 l = 1

Q18f) How much time did you spend doing this activity on one of those days?

*Hours per day 1

*Minutes per day..... 2

*Don't know 8

*Refused to answer 9

145:

Q18FA

single
min = 1 max = 1 l = 2
Coder tel quel

Q18fa) How much time in hours did you spend doing this activity on one of those days?
 \$E 1 16

=> +1
 if Q18F=2 8 9

*DNK/DNA 99

146:

Q18FB

single
min = 1 max = 1 l = 2
Coder tel quel

Q18fb)Q18b) How much time in minutes did you spend doing this activity on one of those days?
 \$E 1 59

=> +1
 if Q18F=1 8 9

*DKN/DNA 99

147:

Q18C

single
min = 1 max = 1 l = 1
Coder tel quel

Q18c) Think about the time you spent walking...(This includes at work and at home, walking to travel from place to place, and any other walking you might do solely for recreation, sport, exercise or leisure). During the last 7 days, on how many days did you do this type of activity?

\$E 1 7

*Don't know 8

*Refused to answer 9

148:

Q18D

single
min = 1 max = 1 l = 1

Q18d) How much time did you spend doing this activity on one of those days?

- *Hours per day 1
- *Minutes per day..... 2
- *Don't know 8
- *Refused to answer 9

149:

Q18DA

single
min = 1 max = 1 l = 2

Coder tel quel

Q18da) How much time in hours did you spend doing this activity on one of those days?

\$E 1 16

=> +1

if Q18D=2 8 9

*DKN/DNA 99

150:

Q18DB

single
min = 1 max = 1 l = 2

Coder tel quel

Q18db) How much time in minutes did you spend doing this activity on one of those days?

\$E 1 59

=> +1

if Q18D=1 8 9

*DKN/DNA 99

151:

Q19

single
min = 1 max = 1 l = 1

I will now read a list of some of the ways you may have or may not have felt over the past week. Please answer by yes or no to the following statements

=> /+1

if 1

We continue 1 D

152:

Q19B

single
min = 1 max = 1 l = 1

screen [template 2] -> Q19A

invalid -> Q19J

Q19b) I felt that everything I did was an effort

Yes 1
No..... 0

153:

Q19C

single
min = 1 max = 1 l = 1

Q19c) My sleep was restless

Yes 1
No..... 0

154:

Q19D

single
min = 1 max = 1 l = 1

Q19d) I was happy

Yes 1
No..... 0

155:

Q19E

single
min = 1 max = 1 l = 1

Q19e) I felt lonely

Yes 1
No..... 0

156:

Q19F

single
min = 1 max = 1 l = 1

Q19f) People were unfriendly

Yes 1
No..... 0

157:

Q19G

single
min = 1 max = 1 l = 1

Q19g) I enjoyed life

Yes 1
No..... 0

158:

Q19H

single
min = 1 max = 1 l = 1

Q19h) I felt sad

Yes 1
No..... 0

159:

Q19I

single
min = 1 max = 1 l = 1

Q19i) I felt that people disliked me

Yes 1
No..... 0

160:

Q19J

single
min = 1 max = 1 l = 1

Q19j) I could not get going

Yes 1
No..... 0

161:

Q19A

single
min = 1 max = 1 l = 1

Q19a) I felt depressed

Yes 1
No..... 0

162:

MES5

single
min = 1 max = 1 l = 1

***ATTENTION : If a participant scores, offer them Mental Health resources by saying:
"We are offering all participants a phone number for support services. Would you like me to provide you with this number?" 514-738-4873

=> +1
if SOM([Q19A-Q19J])<4

We continue 1 D

163:

Q20

single
min = 1 max = 1 l = 1

Q20) Can you tell me how strongly you feel about the following statements?:

=> /+1
if 1

We continue 1 D

164:

Q20A

single
min = 1 max = 1 l = 1

screen [template 2] -> Q20E

invalid -> Q20E

Q20a) I am responsible for my own successes.

- Strongly agree 1
- Agree 2
- Disagree 3
- Strongly Disagree..... 4
- *Don't Know 8
- *Refuses to answer 9

165:

Q20B

single
min = 1 max = 1 l = 1

Q20b) The really good things that happen to me are mostly luck.

- Strongly agree 1
- Agree 2
- Disagree 3
- Strongly Disagree..... 4
- *Don't Know 8
- *Refuses to answer 9

166:

Q20C

single
min = 1 max = 1 l = 1

Q20c) I can do just about anything I set my mind to.

- Strongly agree 1
- Agree 2
- Disagree 3
- Strongly Disagree..... 4
- *Don't Know 8
- *Refuses to answer 9

167:

Q20D

single
min = 1 max = 1 l = 1

Q20d) There's no sense planning a lot - if something good is going to happen it will

- Strongly agree 1
- Agree 2
- Disagree 3
- Strongly Disagree..... 4
- *Don't Know 8
- *Refuses to answer 9

168:

Q20E

single
min = 1 max = 1 l = 1

Q20e) It is difficult for me to make new friends

- Strongly agree 1
- Agree..... 2
- Disagree 3
- Strongly Disagree..... 4
- *Don't Know 8
- *Refuses to answer 9

169:

MES6

single
min = 1 max = 1 l = 1

These last questions ask a little about you. Your answers will be used for general comparison purposes only and your responses will remain strictly confidential.

We continue 1 D

170:

Q21

single
min = 1 max = 1 l = 1

READ

Q21) Which situation best describes your marital status ?

- Married/Common law relationship 1
- Single, never married 2
- Separated..... 3
- Divorced..... 4
- Widowed 5
- *DKN/DNA 9

171:

Q22

single
min = 1 max = 1 l = 1

Q22) Do you have any children?

- Yes 1
- No..... 2

172:

Q22A

single
min = 1 max = 1 l = 2

Q22a) How many ?

\$E 1 10

=> +1

if Q22=2

*DKN 99

173:

Q22B

single
min = 1 max = 1 l = 2

Coder tel quel

Q22b) Including yourself, how many people live in your household?

\$E 1 10

*DKN 99

174:

Q23

single, open
min = 1 max = 1 l = 2

Q23) In what country were you born?

*Canada..... 01

*Other specify:..... 97 O

*DKN 99

175:

Q24

single, open
min = 1 max = 1 l = 2

Q24) To which ethnic or cultural group do you identify?

*Write the answer here: 97 O

*DKN 99

176:

Q25

single, open
min = 1 max = 1 l = 2

Q25) What is the primary language spoken in your household?

French 01
English 02
*Other, specify 97 O
*DKN 99

177:

Q26

single
min = 1 max = 1 l = 2

Q26) What is the highest level of education you have completed ?

No degree, certificate, or diploma..... 01
Secondary (high) school diploma or equivalent 02
Trades Certificate or Diploma 03
College certificate or diploma below Bachelor's degree level04
.....
University certificate or diploma at bachelor level..... 05
Master's degree..... 06
Earned Doctorate Degree 07
No Response 99

178:

Q27

single
min = 1 max = 1 l = 1

Q27) Are you currently employed?

Yes 1
No..... 2
*No response..... 9

179:

Q27A

single, open
min = 1 max = 1 l = 2

Q27a) What is your present occupation?

=> +1
if Q27=2

*Write the answer here : 97 O
*DKN 99

180:

Q28

single
min = 0 max = 1 l = 7

Q28. Is your postal code

181:

Q29

single
min = 1 max = 1 l = 1
READ

Q29) Please stop me when I reach the category that includes your total household income in [the past year]; that is, the income for all members of the household during the past year.

Less than \$28,000 1
\$ 28,000 - \$49,000 2
\$ 50,000 - \$74,000 3
\$ 75,000- \$100,000 4
+ \$100,000 9
*DKN 6

182:

S4

single
min = 1 max = 1 l = 1

S4) This study comprises of two parts. The questionnaire you are completing today is the first part of the study. Would it be okay for us to contact you again in about 1 year, if necessary, for the second half of this study?

Yes 1
No..... 2