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**Understanding the Role of Social Support on Psychological Distress Among Older Canadians: An
Investigation of the National Population Health Survey**

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Understanding the role of social support on psychological distress among older Canadians: An
investigation of the National Population Health Survey

Annie Robitaille

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Faculty of Graduate and Postdoctoral Studies
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Abstract

The purpose of this thesis was to examine the reciprocal association between various dimensions of social support and psychological distress and whether social support acted as a buffer against chronic stressors for a population of older Canadians. This thesis was composed of three studies, all of which used data from the National Population Health Survey. The first study reported on the psychometric properties, factorial structure, and measurement invariance of the Medical Outcomes Study social support scale for a sample of French and English-speaking older Canadians. Results indicated good internal consistency. The confirmatory factor analysis revealed acceptable fit indices for the 4-factor structure and that the scale functions uniformly across both groups. The second study investigated the longitudinal bidirectional relationship between the different dimensions of social support and psychological distress using an autoregressive cross-lagged model for five waves of data. Some support for the reciprocal relationship between affectionate support and distress was found with higher distress predicting higher affectionate support and higher support predicting higher distress. Higher distress also predicted subsequently higher levels of positive social interaction and emotional/informational support. Little support was found for a reciprocal relationship between structural support and tangible support and psychological distress. The objective of the third study was to look at the cross-sectional and longitudinal interactions between chronic stressors and functional social support on psychological distress in a sample of older Canadians. From the cross-sectional analyses, significant interactions were found for tangible and emotional/informational support. The findings provided no evidence of buffering effects of positive social interaction and affectionate support on the association between chronic stressors and psychological distress. For the longitudinal analysis, the stress-buffering hypothesis was only supported for one wave of data with social support acting as a buffer against the relationship between chronic stressors in

2002/2003 and subsequent psychological distress two years later (2004/2005). Implications of the studies included in this thesis and future research needs are discussed.

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Introduction

Scope and Structure of Thesis

Older adults, with their vast life experiences, knowledge, and wisdom add greatly to the lives of other seniors and younger generations. Their dedication to volunteerism and to charities and the unpaid help they provide to their family and friends make them a vital part of all communities (Statistics Canada, 2007). Today, older Canadians have longer life expectancies, are better off financially, and fare very well in terms of general health (Chen & Shields, 1999; Shields & Martel, 2005; Turcotte & Schellenberg, 2007). It is projected that the number of older adults in Canada will more than double between 2005 and 2036 (Turcotte & Schellenberg, 2007). The fact that the Canadian population is aging at a faster rate than before has led to an increased focus on healthy aging initiatives. One of these initiatives has been on improving the mental and emotional health of older adults and on better understanding the determinants of mental health. For example, the Public Health Agency of Canada's (PHAC) five-year priorities for action plan includes addressing the health of Canadians including the mental health of seniors and gaining a better understanding of the key determinants of healthy aging (Public Health Agency of Canada, 2007). Similarly, the establishment of the Canadian Coalition for Seniors' Mental Health (CCSMH) in 2002 and the strategic goals of that coalition further demonstrate the importance set forth in promoting older adults' mental health. The role of social support has also surfaced as being an important aspect of healthy aging (Healthy Aging and Wellness Working Group, 2009).

The importance of social relationships has been noted for over a century. For example, Durkheim (1897) found that suicide rates were higher amongst people with weaker connections to others (Durkheim, 1897). Since then, numerous studies have highlighted the importance of social relationships for successful aging (Depp & Jeste, 2006), physical health (Bosworth &

Schaie, 1997; Shields & Martel, 2005), mortality (Blazer, 1982; Ceria et al., 2001; Dalgard & Lund Håheim, 1998; Hanson, Isacsson, Janzon, & Lindell, 1989; Hirdes & Forbes, 1992; House, Robbins, & Metzner, 1982; Kaplan et al., 1994; Kawachi et al., 1996; Lennartsson & Silverstein, 2001; Orth-Gomér & Johnson, 1987; Seeman, 1996; Seeman, Kaplan, Knudsen, Cohen, & Guralnik, 1987; Steinbach, 1992), and mental health outcomes (Blazer & Hybels, 2005; Krause, 1997; Krause, Liang, & Yatom, 1989; Lépine & Bouchez, 1998; Oxman, Berkman, Kasl, Freeman, & Barrett, 1992; Ramos & Wilmoth, 2003; Russell & Cutrona, 1991; Shields & Martel, 2005). Concerning mental health specifically, findings have shown how lower social support is related to increased depression (Blazer & Hybels, 2005) and psychological distress (Couture, Larivière, & Lefrançois, 2005; Cruza-Guet, Spokane, Caskie, Brown, & Szapocznik, 2008; Ferraro & Su, 1999; Matt & Dean, 1993; Shields, 2004).

Older age is characterized by changes in social relationships that result from reduced mobility, widowhood, and the aging of friends (Powell, 2004; Shaw, Krause, Liang, & Bennett, 2007). Therefore, it is important to gain more knowledge about how changes in social relationships with aging affect people's mental health. Two popular models that provide a theoretical explanation for the process by which social support interacts with physical and mental health are the main-effect and the stress-buffering models. Evidence has been found supporting both of these models suggesting that social support can act both as a buffer in the presence of stressors and have a direct impact on health independently of the presence of stressors (Cohen & Wills, 1985; Russell & Cutrona, 1991; Schwarzer, Knoll, & Rieckmann, 2004). Still, some questions remain to be answered. For one, few studies compare different types of social support even though research studies suggest that social support has an effect on health and interacts with stressors differently depending on the type of support investigated (Cohen & Wills, 1985). Understanding the relationship between different types of social relationships and mental health

outcomes can help improve the quality of life of older adults and lead to an improved understanding of how social interventions can be implemented over the life span (Cohen, Gottlieb, & Underwood, 2001).

The role of psychological distress as an antecedent of social support is another area of interest that has received less attention (Blazer, 1983; Matt & Dean, 1993; Murphy, 1985). Some studies appear to suggest a possible association between mental health and later social support (Blazer, 1983; Matt & Dean, 1993; Murphy, 1985). Still, the direction of that relationship is unclear. Long-term longitudinal research studies would help to further untangle the relationship between social support and distress. That is, it would help to explain the role of social support on distress after controlling for previous levels of distress and the role of distress on subsequent levels of social support.

The purpose of this thesis was to examine the reciprocal relationship between various dimensions of social support and psychological distress and investigate the role of social support as a buffer against chronic stressors. The National Population Health Survey (NPHS), which is a national survey of 17,276 Canadians who are followed every two years, beginning in 1994/95, was used. The following thesis is composed of three related studies. Before presenting these studies, a general introduction about the concepts of social support, chronic stressors, and psychological distress are discussed and research and theoretical models of the relationship between social support, chronic stressors, and psychological distress are reviewed. The first article examined the psychometric properties and factorial structure of the French and English language versions of the Medical Outcomes Study (MOS) social support scale as well as the invariance between English and French-speaking Canadians in order to examine whether the scales could be uniformly used in both languages. In addition to being important for the current thesis, the first study also provides valuable information to others wishing to use the MOS social

support scale. Both the English and French questionnaires have been used even though no information has been available to support that both function equally well across both groups. The second study examined how social support and psychological distress reciprocally related to each other over time. The objective of the third study was to look at the cross-sectional and longitudinal interactions between chronic stressors and functional social support on psychological distress in a sample of older Canadians. These three studies are followed by a general discussion of the thesis.

Defining Social Support

Social support is a popular construct that has been included in numerous studies by researchers in diverse disciplines such as medicine, epidemiology, public health, sociology, and psychology. Various measures of social support have been included in several questionnaire packages and have been a component of many national surveys. The definition as well as the diversity of facets of social support have evolved greatly since the 1970s and have varied from one author to the next. Still today, social support is conceptualized and measured differently by different researchers. Very broadly, social support can be defined as the help provided by one's social network such as by providing information, financial help, or emotional support (Cohen, 2004). However, this is merely a broad definition of a concept that is far more complex. Furthermore, although the term social support has often been used to encompass all types of social relationships (Winemiller, Mitchell, Sutliff, & Cline, 1993), social support should be distinguished from other terms such as social network and social integration. In order to truly understand the multidimensionality of the concept it is important to define the various components of social support. A number of different classification schemes have been used to define social support.

Social network is the structure of social relationships. Network size is the number of friends, family members, and neighbours in an individual's surroundings who provide the help (Brissette, Cohen, & Seeman, 2000). Network density examines the extent to which individuals know their network members. For example, high density networks are characterized as networks where individuals are highly acquainted with each other (Brissette et al., 2000).

Social integration has been defined as the participation of individuals in a broad range of social activities in the community (Brissette et al., 2000; Laireiter & Baumann, 1992). It has also been referred to as social network participation (Cohen, Gottlieb, & Underwood, 2000).

Membership in various organizations, religious activities, and church attendance are but some of the activities that fall under the social integration category (Laireiter & Baumann, 1992).

Furthermore, it has also been conceptualized by some as the diversity of relationships one is involved in including being a family member, a close friend, a spouse, a neighbor, and so forth (Cohen et al., 2000). In some cases, social integration has also been referred to as the subjective perception of belongingness (Brissette et al., 2000). Therefore, it can be conceptualized as a multidimensional concept including a behavioural (level of engagement in the activities) and cognitive (sense of being part of the community) component (Brissette et al., 2000). Measures that assess the different dimensions of social integration have been categorized as *role-based integration measures* which measure the number of social relationships the person is engaged in, *participation-based measures* which measure the frequency with which individuals participate in various social activities, *perceived integration measures* which measure individuals' perception of being socially integrated in social structures, and *complex indicators* which are a combination of the previous measures into one index (Brissette et al., 2000).

Unlike social network which focuses on the structural aspect of social relationships, functional support examines the function and quality of these relations (Schwarzer et al., 2004).

As mentioned, this concept of social support can be further divided into a number of other categories including emotional support, informational support, tangible/instrumental support, positive social interaction, and affectionate support. Emotional support refers to the extent to which relationships supply positive affect and reassurance and provide people with an opportunity to express their feelings (Cohen, 2004; Schwarzer et al., 2004; Sherbourne & Stewart, 1991), for example, 'someone you can tell your worries to'. Informational support involves the provision of guidance, advice, and information to help the individual cope with current stressors or difficulties (Cohen, 2004; Schwarzer et al., 2004; Sherbourne & Stewart, 1991), for example, 'someone you can turn to for suggestions'. Tangible support refers to the provision of help with solving current problems or help with daily activities (Cohen, 2004; Schwarzer et al., 2004; Sherbourne & Stewart, 1991). Examples include 'someone to take you to the doctor' or 'to help with chores around the house'. Affectionate support refers to the provision of love and affection (Cohen, 2004; Schwarzer et al., 2004; Sherbourne & Stewart, 1991), for example, 'someone who hugs and loves you'. Positive social interaction involves having friends and family members to have a great time and engage in activities with (Sherbourne & Stewart, 1991). Other types of support that have also been included by some are appraisal support (affirmation support for acts and statements made) (Langford, Bowsher, Maloney, & Lillis, 1997), esteem support and reassurance of worth (information that makes the person feel a sense of personal worth and self-esteem; Cobb, 1976; Cutrona & Russell, 1987), and opportunity for nurturance (the feeling of providing support to others; Cutrona & Russell, 1987).

It is important to mention that the components of social support just described can be worded in a way to measure either perceived or received social support depending on the purpose of the study. Perceived social support is an individual's perception of having either a person or persons (e.g. family member, friend, neighbours, etc.) available to help and support

him/her. It is the anticipation of having support available to them in time of need (Barrera, 1986; Schwarzer et al., 2004). For example, the question could ask “People sometimes look to others for companionship, assistance, or other types of support. How often is each of the following kinds of support available to you if you need it?” (Sherbourne & Stewart, 1991). On the other hand, received social support is the amount of support actually received when help is needed within a certain time period (Schwarzer et al., 2004). An example of this is, “In the last month, how often has someone listened to you talk about your private feelings?” (Cruza-Guet et al., 2008; Krause & Markides, 1990). In addition to the distinction between perceived and received support, some researchers have also differentiated between peoples’ satisfaction with their perceived or received level of support. For example, the question might ask, “In the last month, how satisfied have you been with the support you have received during difficult situations...” (Cruza-Guet et al., 2008; Krause & Markides, 1990).

Numerous questionnaires [e.g. Multidimensional Scale of Perceived Social Support (Zimet, Dahlem, Zimet, & Farley, 1988), Louisville Social Support Scale (Norris & Murrell, 1987), Social Support Appraisals Scale (Vaux et al., 1986), Social Support Questionnaire (Sarason, Levine, Basham, & Sarason, 1983), Duke Social Support Index (Koenig et al., 1993), Interpersonal Support Evaluation List (Cohen & Hoberman, 1983) Social Provisions Scale (Cutrona & Russell, 1987) and MOS social support scale (Sherbourne & Stewart, 1991)]; and interview methods [e.g. Social Stress and Support Interview (Jenkins, Mann, & Belsey, 1981), Interview Schedule for Social Interaction (Henderson, Duncan-Jones, Byrne, & Scott, 1980)] are available to measure social support constructs (for a review of the numerous measures of social support see the chapter written by Wills and Shinar (Wills & Shinar, 2000)). Given that this thesis was based on secondary data analysis and that the researcher has had no control over the content of the survey, questionnaire data were used. It would have been unfeasible for developers of the

NPHS to use the aforementioned interview questionnaires due to the length of time and costs involved in doing so. Large scale population surveys like the NPHS have been successful in retaining large sample sizes over the years and in collecting information about a wide variety of domains because a great deal of thought was put in selecting valid questionnaires that were not excessively demanding on the participants. This has allowed researchers to have access to a large database that is representative of the Canadian population.

The majority of studies that have looked at the relationship between social support and health have focused on only one facet of social relationships and have failed to examine the different components of social support. In order to get a better understanding of the role of social relationships on psychological distress, it is important to consider as many dimensions of social support as possible (Caron & Guay, 2005; Cohen et al., 2000; Cohen et al., 2001). For the purpose of this thesis, a categorization that is widely accepted and used by many authors was used (Hutchison, 1999; Langford et al., 1997): social network/structural support and functional support (emotional/informational, tangible/instrumental support, positive social interaction, and affectionate support). More specifically, the MOS social support scale was used. This scale was especially appropriate for this research study for numerous reasons. For one, this scale allowed us to look at four different types of functional social support and structural social support. Many of the previously used scales of social support only included one type of social support. Given that the purpose of this thesis was to further understand what types of social support were most important in improving mental health, the MOS social support scale was especially suitable. Secondly, the MOS social support scale has been found to have good psychometric properties and the four-factor model of functional support has been found to have an acceptable fit to the data (Anderson, Bilodeau, Deshaies, Gilbert, & Jobin, 2005; Badoux, 2000; Gjesfjeld, Greeno, & Kim, 2008; Sherbourne & Stewart, 1991). Some previous studies have used scales with unknown

psychometric properties. Thirdly, the short nature of the scale made it suitable for a population of older adults, especially for the older old included in the sample. Still, there are limitations to using the MOS social support scale which are discussed in the discussion sections of the studies included in this thesis.

Defining Psychological Distress

Psychological distress is a non-specific negative psychological state (Kessler, Barker, Colpe, Epstein, & et al., 2003). While some researchers have measured psychological distress by examining the symptoms of a specific mental disorder (most frequently depression) it has also frequently been measured by counting the number of symptoms reported related to feelings of depression and anxiety combined (Dohrenwend, Shrout, Egri, & Mendelsohn, 1980; Krause, 1999; Mirowsky & Ross, 2003). The focus of the latter is more on undifferentiated symptoms of distress. Although psychological distress includes both physiological and psychological indicators, the more recent surveys have tended to focus more on the mood-related symptom such as feeling sad rather than on physical symptoms such as loss of appetite (Mirowsky & Ross, 1986; Mirowsky & Ross, 2003). This shift was instigated by the realization that people were more willing to report their emotional feelings than was initially believed (Mirowsky & Ross, 1986; Mirowsky & Ross, 2003). Furthermore, untangling the relationship between physical health and psychological distress was problematic given that the physical symptoms of distress likely made the association between both variables stronger than it really was (Mirowsky & Ross, 2003). Using measures of distress that include the somatic symptoms may also lead to a slight overestimate in the rate of distress among older adults given that it may indicate physical health declines rather than distress (Préville, Potvin, Boyer, & Boulerice, 2000).

Mirowsky and Ross (2003) describe psychological distress as on a continuum ranging from well-being to distress and emphasize the importance in not equating psychological distress

to mental illness (Mirowsky & Ross, 2003). Only the most severe cases could be considered as a mental disorder. However, this does not change the fact that psychological distress merits to be further studied. This area of research warrants to be studied for a number of reasons.

For one, although psychological distress is less severe and may not affect individuals to the same degree as depression does, it nevertheless has been associated with important feelings of worthlessness, sadness, and irritability; and in some cases has led to depression or anxiety (Mirowsky & Ross, 2003). In more severe cases, it has led to increased use of psychotropic drugs, more suicidal thoughts, and suicide attempts (Préville, Potvin, & Boyer, 1995). Higher psychological distress has been linked to numerous other negative outcomes such as lower perceived health and life satisfaction; and mortality (Camirand & Nanhou, 2008; Wilkins, 2006). Similarly, lower distress has been linked to thriving in old adulthood (Kaplan et al., 2008). In addition, psychological distress also results in increased social costs such as being less productive at work as well as increased costs and burden on the health care system (Mirowsky & Ross, 2003).

Secondly, a larger percentage of the population has been affected by psychological distress than by clinical depression (Mirowsky & Ross, 2003). Given the larger number of people living with psychological distress when compared to depression, understanding the relationship between social relationships and psychological distress may ultimately lead to larger scale improvement in the lives of Canadians (Rose, 1985). Studying psychological distress can help paint a picture of the mental health of the general population of Canadians.

Thirdly, severe psychological distress in seniors can be challenging for general practitioners to treat (Préville, Hébert, Bravo, & Boyer, 2001). Préville (2001) reported that 77.9 percent of older adults reporting severe psychological distress were still severely distressed 12 months later. Understanding the role of social support on distress specifically can help in the

implementation of interventions designed to prevent and decrease psychological distress in older adults.

Another reason why it is important to study psychological distress is because of the high co-morbidity between anxiety and depression found in older adults (Doraiswamy, 2001; Mineka, Watson, & Clark, 1998). By using a measure of psychological distress rather than depression, we are taking into account the fact that anxiety and depression frequently occur together in older adults (Voyer, Verreault, Cappeliez, Holmes, & Mengue, 2005).

Unlike clinical trial studies, large scale population-based studies allow us to understand psychological distress among the general population rather than only those who are already seeing a psychiatrist or psychologist (Mirowsky & Ross, 2003). This is important given the considerable delays in initial treatment that have been reported as well as the possibility that those that have the time and means of receiving treatment are different from those that do not (Wang et al., 2005).

Numerous different methods have been used to measure psychological distress. Some have used the structured clinical interview for Diagnostic and Statistical Manual of Mental Disorders (fourth edition; DSM-IV; American Psychiatric Association, 2000), while others have used questionnaires such as the General Health Questionnaire (Goldberg, 1978; Jackson, 2007), Psychological Distress Index (Ilfeld, 1976), Symptom Checklist-90-Revised-Depression and Anxiety Scales (Derogatis, 1992; Derogatis, Lipman, & Covi, 1973), Brief Symptom Inventory (Derogatis & Melisaratos, 1983), SF-36 (McCallum, 1995; McHorney, Ware, & Raczek, 1993), Centre for Epidemiological Studies' Depression Scale (CES-D) (McHorney et al., 1993), Geriatric Depression Scale (GSD) (Sheikh et al., 1991; Sheikh & Yesavage, 1986; Yesavage et al., 1983) sometimes in combination with the Spielberger State Trait Anxiety Inventory (STAI) (Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983), and the Kessler Psychological Distress

Scale (K6) (Kessler et al., 2003). Given the longitudinal national population-based nature of the data on a broad range of health determinants and outcomes, it would have been excessively time consuming and costly to use the structured clinical interview for DSM-IV disorders. Therefore, a questionnaire, the K6 measure of psychological distress, was used.

The K6 is a validated measure used to assess individuals' non-specific psychological distress in population surveys (Kessler et al., 2003). It was initially developed for use in the US National Health Interview Survey (NHIS) in order to discriminate between community cases and non-cases of non-specific distress based on severity rather than diagnosis. Both a 10-item (K10) and a 6-item (K6) version of the survey were developed. The K6 measure is an appropriate measure to use because of the following reasons. For one, it has been reported to have strong psychometric properties and to accurately discriminate between DSM-IV cases and non-cases (Furukawa, Kessler, Slade, & Andrews, 2003; Kessler et al., 2002; Kessler et al., 2003). It has also been found to correlate strongly with mood and anxiety disorders diagnosed with the structured clinical interview for the DSM-IV (Kessler et al., 2003). Furthermore, the Kessler's psychological distress measure has been found to function favorably when compared to the General Health Questionnaire (GHQ-12) and the SF-12 (Andrews & Slade, 2001; Furukawa et al., 2003). Secondly, it is a measure that has been developed, and that is therefore appropriate, for population based studies and for measuring the mental health of the general population (Camirand & Nanhou, 2008) and more specifically the Canadian population (Cairney, Veldhuizen, Wade, Kurdyak, & Streiner, 2007). The French translation of the instrument has also been reported as a good instrument to use with French-speaking Canadians (Camirand & Nanhou, 2008). Lastly, the brevity of the survey makes it especially appropriate for a sample of older adults.

Defining Stress and Stressors

An important impetus to the study of the role of social support on mental and physical health was research about stress. The numerous studies on the role of stress on mental and physical health and the realization that the relationship between both was weaker than expected led to the search for moderators between both variables (Hobfoll & Vaux, 1993; Sarason, Pierce, & Sarason, 1994). This, among other factors, led to the development of extensive research on the role of social support as a moderator. In order to further understand the role of the different types of social support on psychological distress, it is important to examine the role of social support as a moderating variable between stressors and distress. Thus, it is important that the stress concept and the various different ways of measuring stressors be discussed in this thesis.

The “stress” concept has been around for decades and most would agree that it has gained popularity following the Second World War (Newton, 1995). Hans Selye is internationally renowned as being an important figure on the topic of stress. Selye identified stress as the non-specific response of the body to demands made on it (Selye, 1993). Many different demands and stressors lead to the response of the body which is why he referred to stress as a non-specific response. He suggested that the body had a general way of responding to stressors and labeled the response of the body as the general adaptation syndrome (GAS) which includes changes in the nervous and endocrine system. This adaptation process was divided in three stages: the alarm reaction, the stage of resistance, and the stage of exhaustion. Although Selye has been criticized for his oversimplified concept of stress, he has nevertheless been a very influential figure in the development of the concept of stress over the decades and is still one of the most frequently cited researchers on the topic of stress.

Lazarus and Folkman (1984) have also been influential in the development of the stress concept. Unlike Selye’s work, Lazarus and Folkman’s (1984) definition of stress is more

complex and takes into account the processes involved. Lazarus and Folkman's (1984) definition of stress is "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984). An important aspect of the transactional theory proposed by Lazarus and Folkman's (1984) is that whether a feature of the environment is considered a stressor or not is dependent on how that potential stressor is appraised. According to this model, whether a potential stressor is appraised as stressful is dependent on a two step process of primary and secondary appraisal. During primary appraisal the individual assesses whether the stimulus is irrelevant and not threatening or relevant and stressful. For events assessed as stressful during the primary appraisal process, secondary appraisal occurs and the individual assesses whether coping resources appear to be adequate or inadequate to deal with the potential stressor. Those stimuli where coping appears to be inadequate will be appraised as stressors.

Similarly to the social support concept, the term "stress" is very complex with many different types of stress that can be studied and many different ways each of these types of stress can be measured (Cohen, Kessler, & Underwood, 1995). While some have referred to stress as problems people face (stressors, stimulus), others refer to stress as a response to the problem (e.g. distress). The emerging consensus is that stress is the transaction between the stimulus, also called the stressor, and the response of the organism in reaction to the threat, also referred to as the state of stress. For the purpose of the current thesis, stressors will be measured.

An overall definition of stressors provided by Wheaton (1996, 1997) is "threats, demands, or structural constraints that, by the very fact of their occurrence or existence, call into question the operating integrity of the organism" (Wheaton, 1996; Wheaton, 1997). Wheaton also elaborated on that definition by saying that stressors pose a threat to the integrity of the person, must be resolved at some point if not will continue to be damaging (it cannot be a

problem if it does not need to be resolved), and get their strength from posing a threat to the organism. In addition to the three important elements included in the general definition of a stressor, threats (e.g. fear of potential harm because your husband is violent towards you or threat to your identity as a good soccer player) demands (e.g. too many demands from work and family), and structural constraints (e.g. limited as a result of social environment they live in such as rules put in place and discrimination), Wheaton (1996, 1997) also discusses other instances where situations can become stressors: complexity (e.g. excessively complex situations that cannot be controlled, that are unpredictable and that the person is unable to resolve), uncertainty (e.g. an uncertain situation that is long-lasting and cannot be resolved), conflict (e.g. prolonged issues with partner or work), restriction of choice (e.g. when a person has no way out of a situation), under reward (e.g. relative inequality between input and rewards), and resource deprivation (e.g. not enough resources to achieve valued goals, Wheaton, 1997).

In addition to the general definition of stressors provided above, various different types of stressors are also available: life events, chronic stressors, daily hassles, macro events, non-events, and traumas. For the purpose of this thesis, only chronic stressors were included in our model. We have chosen to use chronic stressors because of our interest in the long-term association between stressors on distress and the role of social support in buffering that association. It was, therefore, more appropriate to use a chronic measure rather than a more short-term type of stressor such as life-events (Jones & Kinman, 2001). Given that only chronic stressors were included in this thesis, only a brief sentence about each of the excluded stressors will be provided in order to help in the understanding of stressors in general and in being able to make the distinction between them. A more in depth discussion about chronic stressors is presented.

Life events are distinct circumstances that have a discernible beginning and end, are normally more short-term than long-term, and the offset of these events is often sudden rather than gradual (Wheaton, 1996; Wheaton, 1997). Examples of life events include the death of a significant other, divorce, or a terrible car accident, to name a few. Daily hassles are defined as “the irritating, frustrating, distressing demands that to some degree characterize everyday transactions with the environment” (Kanner, Coyne, Schaefer, & Lazarus, 1981, p.3). They are events that occur on a regular basis and that are annoying to the person such as daily traffic, high taxes to pay, and quarrels with co-workers. Macro stressors are larger scale stressors that occur at the system level such as the great depression and disasters (Wheaton, 1996). Non-events can be stressors when they are in fact desirable events. They are events that are expected by the person to occur and that are desirable but that fail to happen (Wheaton, 1996). For example, being unable to get pregnant after years of trying can be an important stressor for a couple who has always envisioned themselves with a big family. Traumas are usually sudden events that are traumatic and that become major stressors for those having lived these events. For example, traumas would include witnessing the sudden death of a parent and living through a terrible accident.

Chronic stressors are more continuous in nature. They surface more slowly and last for a longer duration of time (Wheaton, 1996; Wheaton, 1997). Examples of chronic stressors include enduring problems such as having to work many jobs in order to be able to make monthly payments and having a child that is very ill. The difference between chronic stressors and life events is not straight forward and one event can appear to be both a life event and a chronic stressor but a distinction can nevertheless be made between both (Wheaton, 1997). For example, the death of a spouse is a life event but the stress of having one income and taking care of the children alone is a chronic stressor. Unlike research studies that have examined daily hassles and

life events, studies with chronic stressors have captured stressors that would go unnoticed by these latter scales given that they are not necessarily marked by specific events.

Many different methods have been made available to measure chronic stressors with advantages and disadvantages attached to each of these (Herbert & Cohen, 1996). One method of measuring chronic stressors has been to use interviews (Herbert & Cohen, 1996). This method permits the researcher to gain more detailed information about the stressor and the context surrounding the stressor. However, the observers may be prone to bias and it is difficult to use with longitudinal population based studies given that it is time-consuming and an expensive method. Naturalistic and information-based observation is another method used to measure chronic stressors. This method is not affected by the self-report bias found in self-report surveys but similarly to interviews, this method is unfeasible with large-scale population-based studies (Herbert & Cohen, 1996). Rather, we have decided to use self-report questionnaire data on a representative sample of the Canadian population of older adults living in households. One disadvantage of this method is that it may be biased by a number of factors including the mood of the person on that specific day (Cohen et al., 1995). Even though results are influenced by self-report bias, this method is well-suited for longitudinal population based studies given that it is less time consuming and less expensive to implement. More specifically, the measure of chronic stressors used for the current study was developed based on the work by Wheaton (1994). The chronic stressors scale measures a number of different dimensions of chronic stressors: personal problems, financial problems, relationship problems (for those in a relationship), difficulties finding a relationship (for those who are single), child-related problems (for respondents with children), environmental problems, and family health problems. This measure was used because it measures many sources of chronic stressors and is therefore more suitable for a sample of older adults than the majority of other specific measures of chronic

stressors such as those that measure work-related stressors (Herbert & Cohen, 1996).

Furthermore, we opted to examine a wide range of chronic stressors because it may possibly be the accumulation of stressors that results in distress rather than one specific stressor (Cohen & Wills, 1985).

Social Support, Stressors, and Psychological Distress

Numerous studies have highlighted the importance of social relationships for successful aging (Depp & Jeste, 2006), physical health (Bosworth & Schaie, 1997; Shields & Martel, 2005), mortality (Blazer, 1982; Ceria et al., 2001; Dalgard & Lund Håheim, 1998; Hanson et al., 1989; Hirdes & Forbes, 1992; House et al., 1982; Kaplan et al., 1994; Kawachi et al., 1996; Lennartsson & Silverstein, 2001; Orth-Gomér & Johnson, 1987; Seeman, 1996; Seeman et al., 1987; Steinbach, 1992), and mental health outcomes (Blazer & Hybels, 2005; Krause, 1997; Krause et al., 1989; Lépine & Bouchez, 1998; Oxman et al., 1992; Ramos & Wilmoth, 2003; Russell & Cutrona, 1991; Shields & Martel, 2005). Concerning mental health specifically, findings have shown how lower social support is related to increased depression (Blazer & Hybels, 2005) and psychological distress (Camirand & Nanhou, 2008; Couture et al., 2005; Cruza-Guet et al., 2008; Ferraro & Su, 1999; Matt & Dean, 1993; Myer, Stein, Grimsrud, Seedat, & Williams, 2008; Shields, 2004). When investigating the role of social support on mental health it is important to consider the different processes that are possible to help explain the relationship between both social support and well-being. Two popular models that have helped explain the process by which social support interacts with physical and mental health are the main-effect and the stress-buffering model.

According to the main-effect model, social support has a direct effect on physical and mental health. On the other hand, the stress-buffering model suggests that social support moderates the relationship between stress and health (Cassel, 1976; Cobb, 1976; Cohen & Wills,

1985). Evidence has been found supporting both of these models suggesting that social support can act both as a buffer in the presence of stressors and have a direct impact on health independently of the presence of stressors (Cohen & Wills, 1985; Russell & Cutrona, 1991; Schwarzer et al., 2004). They suggest that the relationship between social support and health is dependent on the type of support being studied (Cohen & Wills, 1985). More recently, a number of studies have examined the relationship between social support and psychological distress, some of which have used the main-effect and stress-buffering model to help explain their findings.

Given that this thesis is about the role of social support on psychological distress, the following section reviews the literature with psychological distress as the outcome specifically. As mentioned, to date, less research has looked at psychological distress in the general population and has rather focused on depression and clinical samples. Still, a better understanding of the determinants of psychological distress can have large scale implications for older adults in the general population. By investigating the role of social support on psychological distress in the general population of older adults with distress levels ranging from almost no distress to severe distress, results are applicable at a much larger scale. It could have implications for the development of interventions for the general population of older adults and not just for those with severe psychological distress or clinical depression.

Social Support as a Main-effect

Proponents of the main-effect model have suggested that having a large social network and being socially integrated in ones' community may increase the likelihood of experiencing positive feelings and fewer negative ones, provide a greater sense of community and stability, and make the person feel good about him or herself which may result in increased well-being irrespective of whether or not stressors are present (Cassel, 1976; Cohen & Wills, 1985). Being a

member of social relationships or social groups can also influence people to engage in health promoting behaviors and in turn result in improved physical and mental health (Cohen et al., 2000). Finally, being socially integrated makes a person more likely to have access to information that will help them make healthy choices and prevent disease (Cohen et al., 2000).

Cross-sectional studies that have looked at the relationship between social support and psychological distress in older adults have reported mixed results. Many studies have provided support for the positive role of social relationships on psychological distress (Camirand & Nanhou, 2008; Couture et al., 2005; Myer et al., 2008). Still, others have found no association between both variables (Cruza-Guet et al., 2008) with some even reporting that higher support was linked with higher distress (Cruza-Guet et al., 2008; Krause & Rook, 2003; Liang et al., 2001). These inconsistencies suggest that the relationship between social support and distress is far more complex than was initially believed and that results depend on the type of social support being studied. Recently, a few studies examined the role of social network (Ryan & Willits, 2007), social integration (Ferraro & Su, 1999), overall perceived and received social support (Cairney & Krause, 2005; Couture et al., 2005; Gadalla, 2009; Matt & Dean, 1993; Prévile et al., 2001; Ryan & Willits, 2007), and perceived and received informational, emotional, and tangible support separately (Camirand & Nanhou, 2008; Cruza-Guet et al., 2008; Krause, Liang, & Keith, 1990; Kubzansky, Berkman, & Seeman, 2000).

In general, cross-sectional studies using measures of received social support have failed to find a relationship between social support and distress. Rather, those with perceived measures were more likely to find a significant positive role of social support on psychological distress. Krause and colleagues (1990) examined the relationship between perceived and received social support and psychological distress with a sample of older adults in the United Kingdom and found that higher perceived support was related with lower psychological distress. However,

received emotional support failed to play a positive role on mental health (Krause et al., 1990). Similarly, Ryan and Willits (2007) examined the relationship between the quality and quantity of family ties and psychological well-being among older adults (Ryan & Willits, 2007). They found that healthier quality of family relationships (satisfaction with marital situation and quality of relationship with children and with extended family members) was significantly related with better psychological well-being but that the quantity of social ties failed to relate with mental health. Prévile and colleagues (2001) examined the role of social support as a predictor of psychological distress with a sample of 664 older adults living in Quebec with functional limitations and found that higher psychological distress was associated with lower perceived social support (Prévile et al., 2001). Likewise, Couture and her colleagues (2005) examined the cross-sectional relationship between psychological distress and social support using secondary data from the Quebec Longitudinal Study on Aging (QUELSA) database with a sample of older adults with low functional independence. They found that lower perceived social support predicted higher psychological distress in older adults (Couture et al., 2005).

More recently, Cruza-Guet and colleagues (2008), based on a sample of Hispanic elders aged 70 to 100 years of age provided some support for the main-effect model and found that the perceived quality and quantity of social support was related to decreases in psychological distress (Cruza-Guet et al., 2008). On the other hand, higher levels of received social support were related to increases in psychological distress. More specifically, out of the three types of received social support they studied (tangible, informational, and emotional), it was informational support that was significantly related to increased psychological distress. One possible explanation for this unexpected finding is that the Hispanic elders may not like receiving advice and informational support, and feel that some people were critical of them as a result of it (Cruza-Guet et al., 2008). Hence, receiving informational support may have led to

negative psychological reactions. Another possible explanation is that the elders who have higher levels of psychological distress may also be the ones that require and hence receive the most informational support (Blazer, 1983; Matt & Dean, 1993; Murphy, 1985). However, this study was cross-sectional. Therefore, no causal relationship can be extracted from the findings.

Another recent study of a general population of people living in the province of Quebec used the K10 measure of psychological distress and found a significant relationship between psychological distress and perceived social support (emotional and informational support) with higher social support being related to lower psychological distress (Camirand & Nanhou, 2008). Gadalla (2009) has also examined the determinants of psychological distress using the NPHS (Gadalla, 2009). They found that for men but not for women higher perceived social support was directly related to lower psychological distress. However, these analyses were not conducted with older adults.

The aforementioned cross-sectional studies have provided valuable information about the role of social support on distress levels in older adults. Overall, these findings align with other studies that have found that it is perceived support rather than actual support that play a more important role on mental health. Still, comparing the aforementioned studies is complicated given the differences in settings, measures, and analyses used. While these studies suggested differences between received and perceived support, less information was provided about the role of different types of perceived social support such as tangible, emotional, and affectionate support, to name a few. Studies where various different types of social support are all included and analyzed in one paper would help to further untangle the complex role of the different dimensions of social support (Cohen et al., 2001; Krause et al., 1990). Practically, this would have important implications for the design of interventions for older adults. It would provide researchers and decision makers with more specific information about what types of social

support are most important for the general population of older adults. Interventions aimed at improving the mental well-being of older adults and preventing psychological distress could then be implemented and evaluated to more fully establish the role of the different types of support.

As mentioned, the studies just reviewed were all cross-sectional in nature. Cross-sectional observational studies make it impossible to make inferences about the sequence of the events (Cruza-Guet et al., 2008). While it is likely that social support causes changes in psychological distress, another explanation is also possible, that psychological distress levels cause changes in social support (Blazer, 1983; Matt & Dean, 1993; Murphy, 1985). Individuals who are depressed or who have higher levels of psychological distress may view the world in a more negative light and be more dissatisfied with their social support, they may be more likely to isolate themselves from the rest of the world, and may be more likely to receive less support as a result of changes in their mood (Blazer, 1983; Murphy, 1985). For example, the revised fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) mentions social withdrawal as a possible sign of major depression (American Psychiatric Association, 2000). Therefore, it is possible that they are at risk of decreased social support. However, to date inconsistent results have been found. While some studies suggest that depression leads to lower social support (Lakey & Dickinson, 1994; Matt & Dean, 1993), others suggest that it leads to higher support (Blazer, 1983). Still, others have failed to find that effect (Krause et al., 1989; Lakey, 1989).

One study that has examined the longitudinal relationship between received social support from friends and psychological distress (compared a young old and old-old group) using a structural modeling approach found different findings between both groups suggesting an age-by-support and age-by-distress interaction effect (Matt & Dean, 1993). For the old-old group, lower social support from friends at time one predicted higher psychological distress at time two

and higher psychological distress at time one predicted lower social support at time two. For the young-old group, this cross-lagged relationship was not found. Social support at time one did not predict psychological distress at time two and vice versa (Matt & Dean, 1993). However, this study only had two time points and was for a 22-month period. Furthermore, they only included support from friends and only controlled for age and gender. A longer longitudinal study controlling for more variables and examining different aspects of social support would be warranted.

More long-term studies of the bi-directional relationship between both variables and with multiple time points are needed. Despite the practical importance of understanding the relationship between social support and psychological distress over time, there are only a few longitudinal studies on this topic. Few of these have been for a national population of Canadians and for an extended period of time. Studies more than five or even 10 years in time are important because they can reveal more about psychological distress across the adult's life-span and are less likely to be affected by the test-retest artifact (Jorm, Duncan-Jones, & Scott, 1989). Furthermore, few longitudinal studies examining the positive impact of social ties on psychological distress have treated social relationships as a process that can change as people age (Shaw et al., 2007). Yet, older age is characterized by changes in social relationships that result from reduced mobility, widowhood, and the aging of friends and research studies have shown how social relations change in late life (Powell, 2004; Shaw et al., 2007). Furthermore, some studies have highlighted how the association between social relationships and mental health can be different depending on whether a cross-sectional or longitudinal design is used (Taylor & Lynch, 2004). Although cross-sectional studies have highlighted the relationship between social support and psychological distress, an autoregressive cross-lagged design would be more suitable to examine the reciprocal relation between both variables. This issue, as well as the need for

more studies including many dimensions of social support in one paper, was addressed by the second study of this thesis. That is, the second study investigated the longitudinal bidirectional relationship between the different dimensions of social support and psychological distress using an autoregressive cross-lagged model for five waves of data.

Stressors were not included in the second study because it would have made for an extremely long paper given that numerous different models were already included. Another important reason was that an autoregressive cross-lagged model with an interaction effect would have been very complex making it unlikely that the model would converge. Therefore, in the first study, we were unable to state whether there was a pure main ‘effect’ (a ‘main-effect’ with no interaction effect; the use of the term ‘effect’ in the current thesis does not imply causation). The third study is where the role of social support as a buffer against chronic stressors is addressed. In the following section, the literature on the role of social support as a buffer is reviewed.

Social Support and the Stress-Buffering Hypothesis

The stress-buffering model was initially proposed by Cassel and Cobb in 1976 (Cassel, 1976; Cobb, 1976). According to Cassel (1976), stressful events can be mitigated by a positive social environment characterized by feedback and assistance while those in negative social environments are at increased risk of negative outcomes as a result of the stressors (Cassel, 1976). Similarly, Cobb (1976) proposed that people that feel loved and affection and that feel that they belong are more capable of coping through stressful events (Cobb, 1976). Overall, the stress-buffering model suggests that the impact of stressors on mental well-being can be alleviated with social support. That is, social support will be beneficial for individuals in times of stress by reducing the stressful demands and providing individuals with a bolstered ability to cope with stressful events (Cohen & Wills, 1985).

There are various possible ways social support provides protection against stressful events. For one, the mere perception that support will be available if needed can make a potentially stressful situation non stressful. That is, social support may halt the stressful reaction from even occurring by preventing the event from being appraised as stressful (Thoits, 1986). Secondly, the perceived availability of support may also reduce the physiological and affective reaction in response to a stressor (Cohen & Pressman, 2003). The support may suppress the neuroendocrine system leading people to feel less distress when faced with stressful situations (Cohen & Wills, 1985). Finally, social support can make a person feel more capable and prepared to deal with the source of stress or even provide a solution to the stressor (Cohen & Wills, 1985). For example, someone with high instrumental support may not perceive financial problems as a stressor given that they know they have the financial support needed. Therefore, this model also suggests that different stressors may be alleviated differently by different types of social support (Cohen & Pressman, 2003; Cohen & Wills, 1985).

The importance of the different functions of social support on stressors has been referred by some as the stress-support matching hypothesis (Cutrona & Russell, 1990). According to an extensive review conducted by Cohen and Wills (1985), in general, studies that measured the perceived availability of the different functions of support found support for the stress-buffering hypothesis (Cohen & Wills, 1985). However, those that used measures of social network or that measured the amount of functional support actually received in the past have failed to find support for the stress-buffering model. According to the stress-buffering model, it would make sense that certain types of social support that address stressors (e.g. tangible support) would be more likely to act as buffers than types of social support that do not attend to the stressors being experienced (e.g. affectionate support). This might be one reason why mixed results have been found.

Studies that have looked at the stress-buffering role of social support on psychological distress with older adults have reported mixed results. Ferraro and Su (1999) examined the interaction effect between financial strain and different indicators of social integration (member of a group for seniors, member of a social group, and degree of participation in the social group) on psychological distress among older adults from four different nations and found that different interaction effects were found depending on the nation studied (Ferraro & Su, 1999). Ulbrich and Warheit (1989) using items that measure help from friends and family (tangible support) found support for the moderating role of social support on the relationship between stress and psychological distress (Ulbrich & Warheit, 1989). Bienenfeld and colleagues (1997) tested an exploratory model of psychosocial determinants of mental health in a sample of women aged between 65 and 92 years of age and found that perceived availability of emotional and instrumental support was inversely related with psychological distress (Bienenfeld, Koenig, Larson, & Sherrill, 1997). More specifically, they found that social support moderated the relationship between the stressor (physical disability) and psychological distress. On the other hand, Cruza-Guet and colleagues (2008) failed to find support for the stress-buffering hypothesis with received and perceived social support failing to act as moderating variables for the relationship between stressors (financial strain) and psychological distress (Cruza-Guet et al., 2008). However, this might be due to the single-item measure of financial strain that was used by the authors. More studies using measures of stressors that include a wider range of stressors would need to be examined before more definitive results can be made. Furthermore, some studies that have used composite measures of perceived social support have also failed to find a moderating role of support (Cairney & Krause, 2005; Gadalla, 2009) suggesting that only certain types of social support may moderate the relationship between stress and distress and that combining all of them in one measure may blur those relationships.

The Canadian National Population Health Survey was also recently used to examine the relationship between social support and psychological distress (Shields, 2004). For the cross-sectional analyses, it was found that perceived emotional support acted as a buffer against the negative role of stressors (recent negative life events, chronic stressors, and childhood traumas all combined in one total score of stress) on psychological distress. However, for the longitudinal analysis, the buffering effect of social support was no longer significant. However, these analyses were not with older adults specifically, only two time points were used, and only overall perceived social support was examined (Shields, 2004).

Although these studies and other related studies have started to paint a picture of the role of social relationships on the link between stress and psychological distress, a number of areas still warrant to be addressed. For one, similarly to studies looking at the main-effect model, stress-buffering studies should attempt to address the complexity of social support by investigating different dimensions of functional social support in one paper (Cohen et al., 2001). Theoretically, it would be expected that types of social support that help to reduce chronic stressors would moderate the relationship between stressors and distress while other types of support that are unrelated to the stressors but that nevertheless make the person have a good time and feel loved would be more likely to be associated with distress directly. The research studies mentioned above also suggest that that may be the case. Secondly, despite the practical importance of understanding the relationship between the interaction of social support on the relationship between stress and psychological distress over time, most studies to date have been cross-sectional in nature or have used only two waves of data. More information is needed about the long-term process of the stress-buffering hypothesis. Not only would this help untangle the sequence of the events but it would also provide some valuable information about the moderating role of social support over time and whether support can maintain an impact on distress over a

two year period. This is what the third paper of the current thesis attempted to address. That is, the objective of the third study was to look at the cross-sectional and longitudinal interaction effect of chronic stressors and functional social support on psychological distress in a large sample of older Canadians.

Determinants of Social Support and Psychological Distress

Although not discussed in the previous section, determinants of psychological distress and social support were included in many of the previously discussed studies. These are important to take into account and can further help to shed some light on the relationship between social support and psychological distress.

Following a number of statements suggesting that aging was ultimately associated with an increased risk of experiencing psychological distress, Feinson and Thoits (1986) set out to examine these perceptions and clarify the link between distress and aging (Feinson & Thoits, 1986). Overall, they concluded that older adults living in the community were not at an increased risk of psychological distress and that they reported similar or even lower rates than younger adults. Since then a number of studies have examined the relationship between psychological distress and age in older adults to attempt to further clarify the relationship between aging and mental health. While some studies suggest a gradual decrease in depression and psychological distress as people age (Camirand & Nanhou, 2008; Jorm et al., 2005; Melzer, Buxton, & Villamil, 2004), inconsistent results have also been found (Jorm, 2000; Matt & Dean, 1993; Prévile et al., 2001).

A review paper by Jorm (2000) concluded that age group differences in the prevalence and scores of distress varied significantly from one study to the next (Jorm, 2000). However, in general, they concluded that distress increased across the age groups followed by a decrease in later age groups (Jorm, 2000). However, out of all the studies included in the review only one

looked at psychological distress specifically. According to that included study, after controlling for other risk factors (sex, marital status, education, physical health, stressors, and personality) distress symptoms decreased in men but remained stable for women (Mroczek & Kolarz, 1998). In a more recent study, Camirand and Nanhou (2008) also found that psychological distress decreased with age and that it was the lowest for those 65 years of age or older (Camirand & Nanhou, 2008). Moreover, a study using the NPHS found that people over the age of 55 were significantly less likely to experience single and multiple episodes of psychological distress compared to those less than 55 years of age (Orpana, 2008). Overall, studies have suggested a gradual decrease in psychological distress over time. Still, some studies have reported results that are more complex and some that are inconsistent with the aforementioned studies.

Cairney and Krause (2005) reported that the young old were less distressed than the old-old (Cairney & Krause, 2005) and Prévile and colleagues (1995) suggest a nonlinear relationship between psychological distress and age with younger and older people reporting higher psychological distress than middle-aged people (Prévile et al., 1995). On the other hand, Prévile and colleagues (2001) failed to find age as a predictor of psychological distress for older adults (Prévile et al., 2001). Similarly, Matt and Dean (1993) found that psychological distress was fairly stable among the elderly and that age did not have a main effect on psychological distress (Matt & Dean, 1993).

Age as a determinant of changes in social support has also been examined. According to Jorm and colleagues (2005), negative support (e.g. criticism, pressure, and disputes) from family was higher among the 40 to 44 year olds when compared to the 60 to 64 year olds and positive support from friends and family was lower in the 40 to 44 year olds than the 60 to 64 year olds (Jorm et al., 2005). A recent longitudinal study that examined different types of social relations over a 10 year period found that received emotional support was stable through late life, received

tangible and informational support increased with age, and contact with friends, support satisfaction, and anticipated support decreased with age (Shaw et al., 2007).

A number of additional variables other than age have also been found to play an important role on social support and psychological distress. For one, gender has been found to predict psychological distress by most researchers with women reporting higher rates of distress than men (Cairney & Krause, 2005; Camirand & Nanhou, 2008; Cruza-Guet et al., 2008; Matt & Dean, 1993; Mirowsky & Ross, 1986; Orpana, Lemyre, & Gravel, 2009; Orpana, 2008; Pratt, Dey, & Cohen, 2007; Prévillle et al., 1995). However, other studies have failed to find gender as an important determinant of mental well-being (Couture et al., 2005; Prévillle et al., 2001; Ryan & Willits, 2007). In terms of predicting social support, Matt and Dean (1999) found that men had lower levels of support from friends than women (Matt & Dean, 1993).

In general, higher socioeconomic status has been associated with lower psychological distress (Camirand & Nanhou, 2008; Mirowsky & Ross, 1986; Myer et al., 2008). Still inconsistencies have been reported (Cairney & Krause, 2005; Couture et al., 2005; Prévillle et al., 2001). Inconsistent results have also been reported for education. While some studies suggest that lower education levels are related with increased distress (Pratt et al., 2007; Prévillle et al., 1995), others have found no significant relationship between both variables (Cairney & Krause, 2005; Couture et al., 2005; Prévillle et al., 2001). Individuals with lower household income or who perceive themselves as poor are also at increased risk of psychological distress (Camirand & Nanhou, 2008; Orpana et al., 2009; Orpana, 2008; Pratt et al., 2007; Prévillle et al., 1995). However, again inconsistent results have been found (Prévillle et al., 2001).

The role of socioeconomic status on social support has also been addressed by some and, in general, studies suggest that lower socioeconomic status is associated with lower social support (Krause, 2001). Still, as mentioned earlier, the various different operational definitions of

social support makes it difficult to draw general conclusions given that findings appear to vary depending on the type of social support used. Krause and Borawski-Clark (1995) looked at the relationship between income and education and various different types of social support: satisfaction with support received, contact with friends, contact with family, and contact received from other people, support provided to others, and negative interactions (Krause & Borawski-Clark, 1995). Older adults with higher income levels had more contacts with friends and family, were more highly satisfied with the support they received, and provided more support. Similar results were found when education was examined except for contact with family members which was no longer significant. Krause and colleagues (1990) also examined the relationship between education and different types of social support (contact with family, contact with friends, received emotional support, and anticipated support) but found no significant association between education and the social support process (Krause et al., 1990).

According to Statistics Canada and the Canadian Institute for Health Information (2006), the rates of emotional and informational support are the lowest in the province of Quebec when compared to other provinces in Canada (Statistics Canada and Canadian Institute for Health Information, 2006). French-speaking Canadians living in the province of Quebec also report higher distress than English-speaking Canadians (Cairney & Krause, 2005; Orpana, 2008).

Subjective health has also been studied. In a study about the reciprocal relationship between objective and subjective health and psychological distress both measures of health were found to predict psychological distress with older adults (Cappeliez, Sèvre-Rousseau, Landreville, Prévillle, & Scientific Committee of ESA Study, 2004). Also, in a recent Canadian study using the National Population Health Survey (NPHS), poorer self-reported health was found to relate to increased distress (Orpana et al., 2009). Furthermore, level of physical

disability and functional status were also found as important in predicting psychological distress in older adults (Bienenfeld et al , 1997; Couture et al , 2005, Prévile et al , 2001)

Overall, these studies highlight numerous determinants of social support and psychological distress and further paint a picture of the complexity of the relationship between both these variables. In order to get a true picture of the relationship between social support and psychological distress across time it is important to control for as many of these variables as possible. For the purpose of this thesis, four covariates, age, language, gender, and education, were controlled for. Given that we were interested in the long-term relationship between social support and psychological distress only time-invariant covariates were included. Including time-variant covariates would have increased the complexity of the model and increase the likelihood of it not converging.

Implications

The increased interest and popularity of social relationships has resulted in the development of numerous social intervention programs to provide the elderly with supportive social ties (Berkman, Heinik, Rosenthal, & Burke, 1999). However, inconsistent results have been reported with some interventions failing to succeed (Cohen, 2004, Cohen et al , 2001). One possible reason for these inconsistencies is that many of these interventions were not developed on the totality of the prior research in the area (Cohen, 2004). Furthermore, valuable information about the role of the different types of social support in reducing psychological distress is still lacking (Gottlieb, 1992). Most interventions, to date, have been exterior from people's natural social networks and few researchers have examined interventions tailored to specific components of social support (Cohen, 2004). Therefore, a better understanding of the relationship between the different dimensions of social support and psychological distress could result in interventions that are better tailored to the needs of older adults. Many different types of social support have

been identified, all of which have been found to help in very different ways. As mentioned, theoretically, it would make sense that these different types of support would have an effect on distress and moderate the effect of stressors in different ways. If specific types of social relationships were found to be important for the well-being of older adults, policy makers could encourage a variety of social activities and social embeddedness that aligned with our results. This could have a wide impact given today's aging population. We hope that this study will help policy makers to better understand the types of social interventions that are most beneficial in later life and, at the same time, understand why certain interventions have failed while others have succeeded.

The MOS Measure of Social Support

Before beginning the second and third study of the current thesis and being able to consider the process through which social support was related with psychological distress, it was important to gain more information about the social support measure used, the MOS social support scale in the NPHS.

Since 1991, when the instrument was first developed, the MOS social support scale has been included in numerous research studies. Yet, to our knowledge, few studies have examined the psychometric properties and factorial structure of the English version of the MOS social support scale. More research is needed to test the factor structure and psychometric properties of the survey with different populations (Gjesfjeld et al., 2008). This was especially important for the current thesis given that a population of older adults was used. It was important to discover if a four-factor model was replicated with a sample of older adults and whether acceptable psychometric properties were found. Furthermore, this thesis included both French and English-speaking Canadians. No information was provided about the MOS social support survey in the NPHS for a population of French-speaking Canadians. Two studies that have translated the MOS

social support scale from English to French and that examined its psychometric properties found that it had good internal consistency, reliability, and convergent validity (Anderson et al , 2005, Badoux, 2000) Furthermore, one study conducted a principal components analysis and found support for a four-factor scale (Badoux, 2000) However, the French-language translation developed by Statistics Canada was designed independently from the other versions mentioned above and, therefore, it was unlikely that the psychometric results would be the same

In addition, information about the invariance between French and English-speaking Canadians for the MOS social support scale was still lacking A multi-group analysis would provide researchers with information about whether the social support scale functions equally across the French and English-speaking older Canadians and whether it could uniformly be used with both samples This is especially important in the Canadian population, where comparisons between these groups are often made

According to Statistics Canada and the Canadian Institute for Health Information (2006), the rates of emotional and informational support were the lowest in the province of Quebec when compared to other provinces in Canada (Statistics Canada and Canadian Institute for Health Information, 2006) However, more information is needed to be able to affirm with more confidence whether these potential differences represent true differences or whether they were a result of bias in the translated measure being used Before studies about social support can combine findings from both French and English-speaking populations, it was important that measurement invariance be established Therefore, in addition to being important for the current thesis, gaining information about the English and French MOS social support scale used in the NPHS was especially valuable given that these data are frequently being used by researchers across the country

Objectives and Hypotheses

The goals of this thesis were:

Study 1

Objectives

1. To examine the internal consistency of the English and French version of the MOS social support scale for a sample of older adults.
2. To conduct a confirmatory factor analysis (CFA) to assess the factor structure of the English and French version of the MOS social support scale with a sample of older adults.
3. To determine whether the items comprising the social support scale operate equivalently across French and English-speaking older adults.

Study 2

Objective

1. To examine the longitudinal relationship between the different types of social support and psychological distress in order to determine whether social support had a relationship with subsequent psychological distress levels or if psychological distress levels had a relationship with subsequent social support levels, or both.

Hypotheses

1. For positive social interaction, the hypothesis was that there would be a significant negative relationship between support and subsequent distress levels and between distress and subsequent support.
2. For the perceived availability of tangible support, the hypothesis was that there would be no relationship between support and subsequent distress levels and between distress and subsequent support.

3. For structural support, the hypothesis was that there would be no relationship between support and subsequent distress levels and between distress and subsequent support.
4. For affectionate support, the hypothesis was that there would be a unidirectional or reciprocal link between both variables with higher affectionate support being related with lower subsequent levels of distress and higher distress being associated with lower affectionate support.
5. For the perceived availability of emotional/informational support, the hypothesis was that higher support would be related with subsequently lower distress and that higher distress would be associated with subsequently lower support.

Study 3

Objectives

1. To examine the cross-sectional interaction effect of chronic stressors and functional social support on psychological distress in a sample of older Canadians.
2. To examine the longitudinal role of chronic stressors on psychological distress and how, if at all, the effect of stressors depended on functional social support.

Hypotheses

1. For emotional/informational support, the hypothesis was that support would moderate the relationship between chronic stressors and psychological distress given that this type of support provides the information necessary to increase one's control over the situation.
2. For tangible support, the hypothesis was also that support would moderate the relationship between chronic stressors and psychological distress.
3. For positive social interaction, the hypothesis was that support would fail to moderate the relationship between chronic stressors and psychological distress.
4. For affectionate support, the hypothesis was that support would fail to moderate the relationship between chronic stressors and psychological distress.

Study 1

Robitaille, A., Orpana, H., McIntosh, C.N. Psychometric properties, factorial structure, and measurement invariance of the English and French versions of the Medical Outcomes Study social support scale. *Health Reports*. Accepted for publication.

Running Head: MEDICAL OUTCOMES STUDY SOCIAL SUPPORT SCALE

Psychometric properties, factorial structure, and measurement invariance of the English and French versions of the Medical Outcomes Study social support scale

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Abstract

Background: The Medical Outcomes Study (MOS) social support scale is a 19-item survey that measures four dimensions of functional support. The current study reports on the psychometric properties, factorial structure, and measurement invariance of the MOS social support scale for a sample of French and English-speaking older Canadians. **Data and Methods:** The internal consistency and composite reliability for congeneric measures model of the dimensions of functional social support were examined. A confirmatory factor analysis and test of invariance across language (English = 2642; French = 489) were also performed. **Results:** Across both French and English, results indicated good internal consistency (Cronbach's alphas ranged from .90 to .97) and composite reliability (composite reliability estimated ranged from .93 to .97) for all dimensions of functional social support. The confirmatory factor analysis revealed acceptable fit indices for the 4-factor structure similar to the original one. The scale appears to function uniformly across both groups. **Interpretation:** The MOS social support scale appears to be a psychometrically sound instrument for use in research on social support with samples of French and English-speaking older adults.

Key Words: OLDER ADULTS, SOCIAL SUPPORT, PSYCHOMETRIC PROPOERTIES, CONFIRMATORY FACTOR ANALYSIS, MULTI-GROUP ANALYSIS, LANGUAGE

Introduction

Social support is a popular construct that is included in numerous studies by researchers in several fields. Social support has been found to play an important role in successful aging (Depp & Jeste, 2006), physical health (Bosworth & Schaie, 1997; Shields & Martel, 2005), mortality (Blazer, 1982; Ceria et al., 2001; Dalgard & Lund Håheim, 1998; Hanson et al., 1989; Hirdes & Forbes, 1992; House et al., 1982; Kaplan et al., 1994; Kawachi et al., 1996; Lennartsson & Silverstein, 2001; Orth-Gomér & Johnson, 1987; Seeman, 1996; Seeman et al., 1987; Steinbach, 1992), and mental health (Blazer & Hybels, 2005; Krause, 1997; Krause et al., 1989; Lépine & Bouchez, 1998; Oxman et al., 1992; Ramos & Wilmoth, 2003; Russell & Cutrona, 1991; Shields & Martel, 2005) outcomes. Very broadly, social support can be defined as the help provided by one's social network such as by providing information, financial help, or emotional support (Cohen, 2004). However, social support can be divided in a number of different categories. In order to get a better understanding of the role of specific types of social support on mental and physical health outcomes, it is now recommended that researchers use measures of support that include as many dimensions of social support as possible and focus on types of support that have been found to relate to positive health outcomes (Caron & Guay, 2005; Cohen et al., 2000; Cohen et al., 2001).

One measure of social support that measures the different dimensions of social support is the Medical Outcomes Study (MOS) social support scale developed by Sherbourne and Stewart (1991) (Sherbourne & Stewart, 1991). The measure is composed of 19 items of the functional aspects of social support with one item designed to measure structural social support. Sherbourne and Stewart's original (1991) study was conducted with a sample of 2987 patients with chronic health conditions ranging in age from 18 to 98 with a mean of 55 years of age (Sherbourne & Stewart, 1991). The authors conducted a confirmatory factor analysis (CFA) on the 19 items

designed to measure functional support and reported that the four-factor model was a good fit to the data. The functional dimensions of social support include tangible support (e.g. material aid and assistance), affectionate support (e.g. love and affection), positive social interaction (e.g. engaging in fun activities with others), and emotional/informational support (e.g. feedback, guidance, and information). Standardized factor loadings were high for items in each dimension of functional support (Sherbourne & Stewart, 1991).

The factorial validity of the MOS social support scale was later examined with a sample of 330 mothers whose children were receiving mental health treatment. In this study, Gjesfjeld and colleagues (2008) conducted a confirmatory factor analysis on an 18-item MOS social support scale as well as a 12-item and 4-item abbreviated version (Gjesfjeld et al., 2008). The authors found a better fitting model for the 12-item and 4-item versions (Gjesfjeld et al., 2008). This study suggests that there remains some uncertainty regarding the fit of the original version of the MOS social support scale and that a better fitting model may be attained with certain items removed.

Since 1991, when the instrument was first developed, the MOS social support scale has been included in numerous research studies. Yet, to our knowledge, no other studies have examined the psychometric properties and factorial structure of the English version of the MOS social support scale. More research is needed to test the factor structure and psychometric properties of the survey with different populations (Gjesfjeld et al., 2008). Given that the MOS social support scale is brief in length, easy to understand, and was developed in order to minimize respondent burden, it is especially suited for a population of older adults. Older age is characterized by changes in social relationships that result from reduced mobility, widowhood, and the aging of friends (Powell, 2004; Shaw et al., 2007). Understanding the relationship between different types of social relationships and physical and mental health outcomes may

help improve the quality of life of older adults. Still, studies have failed to examine the psychometric soundness and factor structure of the instrument with a national sample of older adults.

Statistics Canada's National Population Health Survey (NPHS) is a national survey that uses the Medical Outcomes Study (MOS) social support scale. The questionnaires used in the NPHS have all been translated from English to French in order to be able to provide information about French and English-speaking Canadians. Still, no information is provided about the MOS social support survey for a population of French-speaking Canadians. Two studies that have translated the MOS social support scale from English to French and that examined its psychometric properties found that it had good internal consistency, reliability, and convergent validity (Anderson et al., 2005; Badoux, 2000). Furthermore, one study conducted a principal components analysis and found support for a four-factor scale (Badoux, 2000). However, the French-language translation developed by Statistics Canada was designed independently from the other versions mentioned above and, therefore, it is unlikely that the psychometric results would be the same. Information about the version developed for the NPHS is especially valuable given that these data are frequently being used by researchers across the country.

In addition, information about the invariance between French and English-speaking Canadians for the MOS social support scale is still lacking. A multi-group analysis would provide researchers with information about whether the social support scale functions equally across the French and English-speaking older Canadians and whether it can uniformly be used with both samples. This is especially important in the Canadian population, where comparisons between these groups are often made.

According to Statistics Canada and the Canadian Institute for Health Information (2006), the rates of emotional and informational support are the lowest in the province of Quebec when

compared to other provinces in Canada (Statistics Canada and Canadian Institute for Health Information, 2006). However, more information is needed to be able to affirm with more confidence whether these potential differences represent true differences or whether they are a result of bias in the translated measure being used. Before studies about social support can combine findings from both French and English-speaking populations, it is important that measurement invariance be established.

The primary purpose of this study is to examine the internal consistency of the English and French version of the MOS social support scale for a population of older adults. The second objective of this study is to conduct a CFA to assess the factor structure of the English and French version of the MOS social support scale with a sample of older adults. A third purpose of this study is to determine whether the items comprising the social support scale operate equivalently across French and English-speaking older adults.

Methods

Sample and Data

Data from the National Population Health Survey (NPHS) were used (Statistics Canada, 2008). The data include seven cycles of longitudinal data collected over a twelve year period from 1994/1995 to 2006/2007. The household component of the longitudinal NPHS includes information about the same individuals every two years from 10 provinces excluding those living on Indian Reserves and Crown Lands, full-time members of the Canadian Forces Bases, and some remote areas in Ontario and Quebec (Tambay & Catlin, 1995). The NPHS also includes a Health Institutions component which includes residents of health institutions. This component was ended after cycle five and will not be included in this study.

For all provinces, except for Quebec, a stratified two-stage sample design where dwellings were selected within clusters was used. The design was based on the Labour Force

Survey (LFS) The Quebec sample was selected based on a two-stage sample design from households participating in a survey called “Enquête sociale et de la santé” (ESS) (Tambay & Catlin, 1995) The longitudinal sample size is 17,276 persons In cycle three, while there were 17,276 respondents in the longitudinal data file, not all of them responded at that time That is, the response rate for cycle 3 was 88.3% (Statistics Canada, 2008) A computer-assisted personal and telephone interviewing (CAI) method was used to collect the data. The majority of interviews were conducted by telephone (e.g. 99% in cycle 7) and the rest were in-person (Statistics Canada, 2008). For the purpose of this study, only respondents 55 years of age and older when they first started the survey in 1994/1995 were included. For this study only information about the NPHS in cycle three (1998/1999) was used. The first two cycles were not used given that a social support scale other than the MOS social support scale was used.

Measures

Social Support. The Medical Outcomes Study (MOS) social support survey is a 19-item survey that measures four dimensions of functional social support (Sherbourne & Stewart, 1991). The survey also contains one item of structural support but it was not included in the current study. Emotional/informational support includes eight items measuring the extent to which interpersonal relationships provide guidance and positive affect. Tangible support includes four items measuring the extent to which behavioural help is provided to them. Affectionate support includes three items measuring the extent to which the function of love and affection is met. Positive social interaction includes four items measuring an individuals’ availability of someone to have fun with. Questions were answered on a five-point scale ranging from “none of the time” to “all of the time” with higher values indicating more social support. See Figure 1 for items included in the MOS scale.

Language. Before answering the NPHS, respondents were asked to select their preferred language of interview. This item was used to select and compare the MOS social support scale for French and English-speaking Canadians given that we were interested in comparing the English and French translation of the MOS social support scale. Although the identification of English and French-speaking individuals was inclusive of respondents living anywhere in Canada, the vast majority of participants who responded to the French version of the NPHS lived in the province of Quebec.

Analyses

The descriptive analyses for this study were generated using SAS software; Version 8 (2000). All other analyses were conducted using Mplus version 4.1 (2006). Mplus was chosen given its capacity to perform CFA of ordered categorical scales (Muthén & Muthén, 2007).

The internal consistency of the various dimensions of the MOS social support scale were measured using Cronbach's alpha using polychoric correlations provided that the data were ordered categorical (Zumbo, Gadermann, & Zeisser, 2007). Given the critics related to using Cronbach's alpha as an indication of composite reliability (Bentler, 2009; Huysamen, 2006; Raykov, 1997; Zumbo et al., 2007), especially when data are not continuous, the composite reliability for congeneric measures model (CRCMM) was also examined (Raykov, 1997).

Fitting ordered categorical variables to a model for continuous variables can distort the factor structure and fit of the model and affect comparisons made between groups (Flora & Curran, 2004; Lei, 2007; Lubke & Muthén, 2004). Therefore, the CFA and test of invariance were tested using procedures for ordered categorical data. A polychoric correlation matrix using weighted least square parameter estimates using a diagonal weight matrix and a mean- and variance-adjusted chi-square (WLSMV) was used (Flora & Curran, 2004; Muthén & Muthén, 2007). This method has been found to perform well for categorical variables even when modest

violations of normality are reported when the sample size is adequately large (Flora & Curran, 2004; Lei, 2007).

Given that ordered categorical variables were used and that the conventional method to testing the chi-square difference is inappropriate with this method, a method of chi-square testing for WLSMV was used (Muthén & Muthén, 2007). That is, a two step approach to testing measurement invariance was used (Muthén & Muthén, 2007). First, a baseline model where thresholds and factor loadings were free across both groups with reasonable fit to the data was established. Secondly, the equivalence of the social support scale for French and English-speaking participants was tested by constraining all factor loadings and thresholds as being equal across both groups.

Sample weights were used given that parameter estimate bias has been found to occur when weights are not included (Asparouhov, 2005). When including sample weights each respondent represents himself or herself but also numerous other people that are not in the survey in order for the non random NPHS sample to reflect the Canadian population. Therefore, each person in the survey is given a weight. These were calculated based on the formula provided by Statistics Canada (Statistics Canada, 2008). In order to deal with sample size inflation, the weighted value was further divided by the average weight in order to get a normalized weight.

As mentioned, data were collected using a complex survey design where stratified and cluster sampling was used. Therefore, it was important to adjust for the violation of the assumption of independence between observations. To achieve this, the bootstrap technique was used for the preliminary analyses. The bootstrap technique creates a file with 500 bootstrap weights.

In SEM, using complex survey design data may underestimate standard errors and in turn might have an effect on chi-square values. The linearization (also called Taylor Series

approximation) method with both the cluster and stratum identifiers was used. This method has been found to provide robust estimates of parameters and of standard errors (Stapleton, 2006).

We recognize the recent critics outlined in the special issue of *Personality and Individual Differences* (2007) in failing to report the significance of χ^2 and instead using approximate fit indices (AFIs) in SEM for models that fail the χ^2 test (Vernon & Eysenck, 2007). However, given our large sample size, it is likely that the χ^2 test statistic will be significant suggesting that the discrepancy between the observed and hypothesized model will be greater than would be expected by chance alone. Therefore, we have decided to report both the significance of the χ^2 test as well as the AFIs. We decided to report the approximate fit indices while keeping in mind that these are not meant to provide support or lack thereof of a perfectly fitting model but rather information about whether or not the model is acceptable based on the approximate fit (Millsap, 2007).

Similarly to tests of overall model fit, chi-square difference tests used in measurement invariance are sensitive to sample sizes (Meade, Johnson, & Braddy, 2008). Recent work suggests that AFIs in measurement invariance research are less sensitive to sample size than chi-square statistics (Chen, 2007; Cheung & Rensvold, 2002; Meade et al., 2008). Vandenberg and Lance (2000) recommend using change in CFI with a cutoff value of .02 to detect lack of invariance (Vandenberg & Lance, 2000). It is not recommend to use RMSEA values (Meade et al., 2008).

Unlike other estimation methods where degrees of freedom and consequently the χ^2 statistic are based on the specification of the model, the degrees of freedom of the WLSMV method are adjusted depending on both sample size and model specification (Flora & Curran, 2004; Muthén & Muthén, 2007; Muthén & Muthén, 2009). Therefore, only the p values and not

the degrees of freedom and χ^2 values are interpretable. For this reason, degrees of freedom and χ^2 values are not provided.

The following criteria were used to evaluate the model fit: (a) the p-values of χ^2 , (b) the Comparative Fit Index (CFI), (c) the Tucker–Lewis index (TLI), and (d) root mean square error of approximation (RMSEA). According to Hu and Bentler (1999), CFI and TLI values greater than .95 are indicative of an acceptable fit (Hu & Bentler, 1999). RMSEA values that are less than .05 represents a good fit and values up to .08 correspond to a reasonable fit (Byrne & Campbell, 1999; Hu & Bentler, 1999). Parameter estimates and standard error estimates will also be examined.

Results

Preliminary Analysis

Out of the respondents who responded to cycle three, 4,444 were 55 years of age or older in 1994/1995. Given that one of the objectives of the study was to look at the invariance between English and French-speaking Canadians, eight participants were deleted because they had missing data on the language of interview variable. A further 525 cases were deleted because they were deceased, and 111 because they had moved to an institution. This resulted in a sample size of 3800 participants. Still after removing these cases, more missing values were identified.

Six hundred sixty-nine (17.99%) participants had at least one missing value on the MOS social support scale. The majority were missing cases for no reason (“not stated”) with a few others who refused to respond (“refused”) and some that responded “don’t know”. The pattern of missing data was also verified to see whether data were missing completely at random (MCAR). Participants who had missing values were similar to those who did not have any missing values on gender and language of interview. However, participants with missing values were

significantly older, had a significantly lower level of education, and had a lower level of income than those with no missing values.

The 669 (17.99%) cases with missing values were deleted. For one, the majority had missing data on all MOS social support items [530 (14.58%)] making imputations more difficult for these cases. One possible option would have been to add covariates to our CFA model but this does not work well with categorical data and does not work with cases that are missing all values on the indicator variables.

Sample descriptives

The analyses were conducted on a sample of 3131 older adults. The participants ranged in age from 58 to 99 ($M = 69.72$, $SD = 7.91$). Descriptive statistics for the 3131 participants included in the analyses are presented in Table 1. Differences between the English and French-speaking older adults were found on education and income with the former having a significantly higher level of education and income than the latter. Moreover, fewer French-speaking Canadians were in a relationship. No differences were found on gender and age.

Reliability

As shown in Table 2, Cronbach's alphas all exceeded .90. The composite reliability was based on the standardized loadings and standardized measurement error variances of the fully constrained model. These estimates were used given that the model appears to function similarly between both groups. All values exceeded .93.

Confirmatory factor analysis

A CFA with four-factors was performed separately on the English and French-speaking groups. The fit statistics are presented in Table 3. For both the English and French-speaking groups, the model represented an adequate fit to the data. However, for the English group the RMSEA values were slightly high. We explored the modification indices (MIs). For the English

Table 1

Frequencies and percentages for the study variables for French and English-speaking participants

Variable	Frequency (%)	
	French (N = 489)	English (N = 2642)
Gender		
Male	198(40.33)	1020(43.55)
Female	291(59.67)	1622(56.45)
Marital status*		
Married, common law, or living with a partner	258(58.12)	1383(65.11)
Single	37(6.53)	160(4.35)
Widowed, separated, or divorced	194(35.35)	1099(30.53)
Income*		
Lowest income	23(4.36)	131(3.68)
Lower middle income	125(23.50)	477(12.92)
Middle income	198(41.83)	945(35.36)
Upper middle income	88(24.01)	677(33.46)
Highest income	19(6.30)	236(14.59)
Education*		
Less than a secondary school graduation	301(59.43)	1195(39.57)
Secondary school graduation	55(11.79)	328(13.00)
Some post-secondary education	56(11.87)	539(21.67)
Post-secondary graduation	77(16.90)	578(25.76)

Note. Frequencies are unweighted; percents are weighted estimates. * Significant differences were found between both French and English-speaking Canadians.

Table 2

Means, standard deviations, coefficient alpha estimates, and composite reliability estimates for the MOS social support factors

Scales	English (n = 2642)				French (n = 489)			
	Mean	S.D	alpha	CRCMM	Mean	S.D	Alpha	CRCMM
TS	13.54	3.47	.93	.93	12.69	4.89	.93	.93
AS	10.30	2.58	.94	.94	9.55	3.52	.90	.93
PSI	13.14	3.52	.95	.95	12.62	4.41	.93	.94
EIS	26.37	6.79	.97	.97	24.93	9.12	.96	.96

Note. CRCMM = composite reliability for congeneric measures model. TS = tangible support; AS = affectionate support; PSI = positive social interaction; EIS = emotional/informational support. The normalized survey sampling weights and the Taylor linearization method was used.

Table 3

Goodness of Fit Statistics for the MOS social support scale

Model	p	CFI	TLI	RMSEA
English Group	<.0001	.96	.99	.076
French Group	<.0001	.96	.99	.047
French & English combined	<.0001	.95	.99	.084
Test for Equality Across Language				
Factor loading & thresholds unconstrained	<.0001	.97	.99	.086
Factor loading & thresholds constrained	<.0001	.98	.10	.075

Note. p = probability values; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error of approximation. The normalized survey sampling weights and the Taylor linearization method was used.

group, the MIs suggested a cross-loading of item 5 on the affectionate (modification index = 41.30, standardized expected parameter change = .31), positive social interaction (modification index = 41.16, standardized expected parameter change = .29), and emotional/informational (modification index = 51.76, standardized expected parameter change = .33) factors of social support. It appears that item 5 (“someone to take you to the doctor if you needed it”), in addition to tangible social support, is also measuring affectionate social support, positive social interaction, and emotional/informational social support. For the French group, all MIs were low. After considering a number of factors, we opted not to change the specification of the model. For one, the RMSEA was only mildly high and was considered acceptable according to some, (Browne & Cudeck, 1993) the CFI and TLI values suggested an acceptable fit, and theoretically, it was difficult to explain why these items would be cross-loading on the other factors.

The items of the MOS social support scale all loaded significantly on their respective latent variable. All standardized and unstandardized factor loadings are presented in Table 4. See Figure 1 to view the model. Tables reporting the correlation matrix including the means and standard deviations for each item from the model are available by request to the authors.

Test of invariance

The multigroup model where the thresholds and the factor loadings are relaxed represents an acceptable fit to the data. The second model where factor loadings and thresholds are constrained to be equal across both groups also represents an acceptably fitting model. The p-values, RMSEA, CFI, and TLI are presented in Table 3. Constraining the factor loadings and thresholds to be equal across both groups resulted in a significant chi-square test for difference testing ($\Delta\chi^2[\Delta df = 21] = 50.84, p = .0003$). However, ΔCFI for testing the invariance of factor loadings and thresholds was .008 suggesting that the weight of the factor loading and the thresholds were

invariant across both models. Partial measurement invariance was examined by constraining each item one at a time as equal across both groups. No differences were found.

Table 4

Standardized and Unstandardized Estimates from Final Models

Parameters	English (n = 2642)		French (n = 489)	
	Standardized	Unstandardized(S.E)	Standardized	Unstandardized(S.E)
Item 2 on TS	.80 ^a	1.00	.83 ^a	1.00
Item 3 on EIS	.85 ^a	1.00	.82 ^a	1.00
Item 4 on EIS	.83	.97(.012)	.80	0.98(.030)
Item 5 on TS	.85	1.06(.024)	.89	1.08(.034)
Item 6 on AS	.90 ^a	1.00	.86 ^a	1.00
Item 7 on PSI	.89 ^a	1.00	.87 ^a	1.00
Item 8 on EIS	.88	1.03(.012)	.87	1.06(.029)
Item 9 on EIS	.91	1.07(.012)	.90	1.10(.025)
Item 10 on AS	.90	1.00(.014)	.90	1.04(.034)
Item 11 on PSI	.90	1.01(.009)	.88	1.00(.021)
Item 12 on TS	.92	1.14(.020)	.91	1.10(.029)
Item 13 on EIS	.87	1.02(.012)	.89	1.08(.027)
Item 14 on PSI	.93	1.05(.009)	.83	0.95(.020)
Item 15 on TS	.95	1.18(.021)	.90	1.09(.032)
Item 16 on EIS	.94	1.11(.013)	.91	1.11(.027)
Item 17 on EIS	.94	1.10(.012)	.92	1.11(.027)
Item 18 on PSI	.95	1.06(.008)	.91	1.04(.022)
Item 19 on EIS	.94	1.10(.013)	.88	1.07(.033)
Item 20 on AS	.94	1.04(.013)	.85	.99(.034)

Note. ^aFixed parameter. TS = tangible support; AS = affectionate support; PSI = positive social interaction; EIS = emotional/informational support. The normalized survey sampling weights and the Taylor linearization method was used.

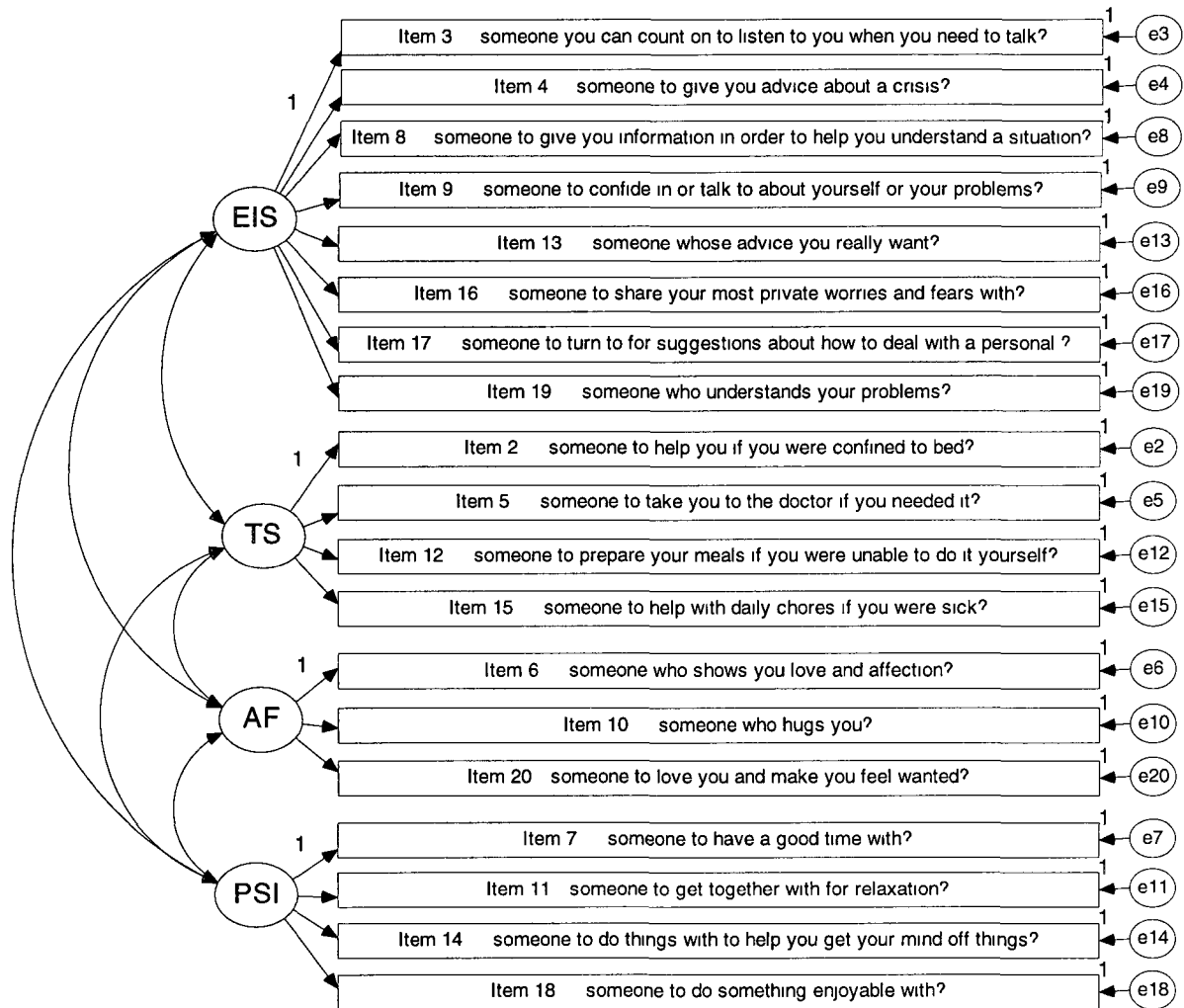


Figure 1. Model of the Factorial Structure of the MOS social support scale for a sample of English and French-speaking older adults. TS = tangible support; AS = affectionate support; PSI = positive social interaction; EIS = emotional/informational support. Item 1 was not included in the current figure because it measures structural support and was not included in the current study.

Discussion

The primary purpose of the study was to examine the psychometric properties of the MOS social support scale. Cronbach's alphas and CRCMM values were high for all subscales suggesting good internal consistency. Overall, these findings are consistent with prior studies that have also reported good psychometric properties for the MOS social support scale (Gjesfjeld et al., 2008; Sherbourne & Stewart, 1991).

A secondary objective of this study was to test the hypothesis of a four-factor structure of the MOS social support scale composed of 19 items. The present study suggests that the MOS social support scale as a four-factor model of functional social support is acceptable based on the AFIs both in a sample of French and English-speaking older adults. These results are consistent with previous studies that have examined the factor structure of the MOS social support scale (Sherbourne & Stewart, 1991). Still, some items appeared to be cross-loading on more than one factor suggesting that a better fitting model could be obtained by deleting some items. This finding aligns with Gjesfjeld and colleagues finding that a shorter version of the questionnaire might represent a better fit to the data (Gjesfjeld et al., 2008). Future studies should also explore the fit of shorter versions of the MOS social support scale (Gjesfjeld et al., 2008).

A third purpose was to examine the invariance of the model across French and English-speaking older adults. According to change in CFI, invariance was found for the 19-item MOS social support scale suggesting that the instrument functions somewhat uniformly across both groups. Furthermore, no differences between individual items were found when examining each item independently. Still, the chi-square difference test was significant suggesting that lack of measurement invariance cannot be ruled out.

The English and French versions of the MOS social support scale used in the National Population Health Survey appear to be good measures of the perceived availability of social

support in older adults. This is a valuable finding given that this concept is frequently included in research studies using the NPHS data. The perceived availability of social support has been found as an important predictor of healthy aging (Blazer, 2009, Camirand & Nanhou, 2008, Couture et al., 2005, Krause et al., 1990, Prévile et al., 2001) making it an appropriate measure to use in studies wishing to explore theoretical models on the importance of social support on a variety of health outcomes. Still, the MOS social support scale does not measure all dimensions of social support. For example, reassurance of worth is one type of support that has been found as important in the prediction of psychological distress and quality of life (Caron & Guay, 2005, Caron, Latimer, & Tousignant, 2007, Caron, Lecomte, Stip, & Renaud, 2005, Caron, Mercier, Martin, & Stip, 2005). It was recently suggested that items measuring reassurance of worth be added to those included in the MOS social support scale (Caron & Liu, 2008). Also, the MOS social support scale does not measure the amount of support provided to others as well as the source of support (relatives, friends, children, etc.). Items could be added to the MOS social support scale in order to address these important dimensions of support. This is an important area of future research.

Another limitation of this study is that the current findings can only apply to a population of older adults aged 55 and older with similar demographic characteristics. Another limitation was that there were significant differences between those with and without missing values. These participants were nevertheless excluded from the study as there was no valid way to impute their data. Slightly different results may have been found had participants with missing values not been excluded from the analyses.

In summary, the present findings add to the amount of cumulative evidence for a four factor solution across different samples. Furthermore, it is the first study to explore measurement invariance of the scale across French and English-speaking older adults. Our findings suggest

that previous studies that have compared rates of social support for French and English-speaking Canadians using the MOS were accurate in concluding that social support is affected by cultural differences between both groups. This objective of the study is valuable to researchers wishing to explore social support in French and English-speaking samples. Researchers all too often combine both groups in one analysis or compare findings from each group even though no research had examined measurement invariance across both groups. The present study provides this information.

What is already known on this subject?

- The Medical Outcomes Study (MOS) social support survey is a 19-item survey that measures four dimensions of functional social support.
- Given that it is brief in length, easy to understand, and was developed in order to minimize respondent burden, it is especially suited for a population of older adults.
- Information about whether the social support scale functions equally across the French and English speaking older Canadians is still lacking.

What does this study add?

- The MOS social support scale is an appropriate measure to use with a sample of French and English speaking older Canadians.
- This study provides further support that it measures four dimensions of functional support.
- The MOS social support scale appears to function uniformly across French and English speaking older Canadians.

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Contributions of the authors

Annie Robitaille conceived the project, conducted the analyses, and wrote the manuscript. Heather Orpana helped in the conception of the project, critically reviewed the different versions of the manuscript, and accepted the final version of the paper. Cameron McIntosh contributed to the design of the paper, assisted with the analyses, critically reviewed the different versions of the manuscript, and accepted the final version of the paper.

Ethical approval: Not required.

Study 2

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Reciprocal relationship between social support and psychological distress among a national sample of older adults: An autoregressive cross-lagged model.

Running head: SOCIAL SUPPORT AND PSYCHOLOGICAL DISTRESS

Reciprocal relationship between social support and psychological distress among a national sample of older adults: An autoregressive cross-lagged model

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Abstract

The current study investigated the longitudinal relationship between different dimensions of social support (affectionate support, tangible support, positive social interaction, emotional/informational support, and structural support) and psychological distress using an autoregressive cross-lagged model for five waves of data. Data from 2564 older adults who participated in a multiwave national survey were included in the analyses. Support for the reciprocal relationship between affectionate support and distress was found. Higher distress was related with subsequently higher levels of positive social interaction but little support was found for the role of support on distress two years later. Higher psychological distress was significantly related with subsequently higher emotional/informational support. No support was found for a reciprocal relationship between tangible and structural support and psychological distress. This study demonstrates how different types of support relate differently with psychological distress and how psychological distress may be important in predicting levels of social support two years later.

Keywords: PSYCHOLOGICAL DISTRESS, AUTOREGRESSIVE CROSS-LAGGED
MODEL, SOCIAL SUPPORT, LOGITUDINAL STUDY

Reciprocal relationship between social support and psychological distress among a national sample of older adults: An autoregressive cross-lagged model

The importance of social relationships has been noted by many researchers for over a century. For example, Durkheim (1897) found that suicide rates were higher amongst people with weaker connections to others (Durkheim, 1897). Since then, numerous studies have highlighted the importance of social relationships for successful aging (Depp & Jeste, 2006), physical health (Bosworth & Schaie, 1997; Shields & Martel, 2005), mortality (Blazer, 1982; Ceria et al., 2001; Dalgard & Lund Håheim, 1998; Hanson et al., 1989; Hirdes & Forbes, 1992; House et al., 1982; Kaplan et al., 1994; Kawachi et al., 1996; Lennartsson & Silverstein, 2001; Orth-Gomér & Johnson, 1987; Seeman, 1996; Seeman et al., 1987; Steinbach, 1992), and mental health outcomes (Blazer & Hybels, 2005; Krause, 1997; Krause et al., 1989; Lépine & Bouchez, 1998; Oxman et al., 1992; Ramos & Wilmoth, 2003; Russell & Cutrona, 1991; Shields & Martel, 2005). Concerning mental health specifically, findings have shown how lower social support is related to increased depression (Blazer & Hybels, 2005) and psychological distress (Couture et al., 2005; Cruza-Guet et al., 2008; Ferraro & Su, 1999; Matt & Dean, 1993; Shields, 2004). To date, more research has focused on the relationship between social relationships and clinical depression than on psychological distress.

Psychological distress is a non-specific negative psychological state that includes feelings of depression and anxiety combined (Kessler et al., 2003; Mirowsky & Ross, 2003). It is less severe and does not affect individuals to the same degree as depression does (Mirowsky & Ross, 2003). Still, it leads to important feelings of worthlessness, sadness, and irritability and in some cases can lead to depression and anxiety (Préville et al., 1995; Turcotte & Schellenberg, 2007). In more severe cases, it leads to increased use of psychotropic drugs, more suicidal thoughts, and suicide attempts (Préville et al., 1995). Higher psychological distress has been linked to

numerous negative outcomes such as lower perceived health and life satisfaction (Camirand & Nanhou, 2008) as well as increased mortality (Wilkins, 2006) and perceived health need (Préville, Potvin, & Boyer, 1998). Also, lower distress has been linked to thriving in old adulthood (Kaplan et al., 2008).

By using a measure of psychological distress rather than depression, we are taking into account the fact that anxiety and depression frequently occur together in older adults (Voyer et al., 2005). Given the larger percentage of the population living with psychological distress when compared to depression (Mirowsky & Ross, 2003), understanding the relationship between social relationships and psychological distress can lead to larger scale improvement in the lives of Canadians and can help paint a picture of the mental health of the general population of Canadians (Rose, 1985).

Today, older Canadians have longer life expectancies, are better off financially, and fare very well in terms of general health (Chen & Shields, 1999; Shields & Martel, 2005; Turcotte & Schellenberg, 2007). It is projected that the number of older adults in Canada will more than double between 2005 and 2036 (Turcotte & Schellenberg, 2007). In general, findings suggest slight decreases in the rate of psychological problems with aging with a slight increase in the old-old found in some studies (Jorm et al., 2005; Turcotte & Schellenberg, 2007). However, older age is also characterized by changes in social relationships that result from reduced mobility, widowhood, and the aging of friends (Powell, 2004; Shaw et al., 2007). Therefore, although a lower incidence of psychological problems is expected in later life, it is still important to gain more knowledge about how changes in social relationships with aging affect people's psychological distress. Still, the majority of the research has been about younger adults with fewer studies examining the relationship between social support and psychological distress in later life (Cairney & Krause, 2005). Understanding the relationship between social support and

psychological distress should lead to an improved understanding of how social interventions can be implemented over the life span and help improve the quality of life of older adults.

One theoretical model that helps explain the role of social support on mental health is the main-effect model (Cassel, 1976; Cohen & Wills, 1985). Proponents of this model suggest that having a large social network and being socially integrated in ones' community may increase the likelihood of experiencing positive feelings and fewer negative ones, provide a greater sense of community and stability, and make the person feel good about him or herself irrespective of whether or not stressors are present (Cassel, 1976; Cohen & Wills, 1985). Many studies have provided support for the positive role of social relationships on psychological distress (Camirand & Nanhon, 2008; Couture et al., 2005; Myer et al., 2008). Still, others have found no association between both variables (Cruza-Guet et al., 2008) with some even reporting that higher support was linked with higher distress (Cruza-Guet et al., 2008; Krause & Rook, 2003; Liang et al., 2001). One possible explanation for these discrepancies is that different measures and types of social support were used.

In order to get a better understanding of the role of social relationships on psychological distress, it is important to examine as many dimensions of social support as possible (Caron & Guay, 2005; Cohen et al., 2000; Cohen et al., 2001). For the purpose of this study, a categorization that is widely accepted and used by many authors was used (Hutchison, 1999; Langford et al., 1997): social network/structural support and functional support (emotional/informational, tangible/instrumental support, positive social interaction, and affectionate support). Emotional support refers to the extent to which relationships supply positive affect and reassurance and provide people with an opportunity to express their feelings (Cohen, 2004; Schwarzer et al., 2004; Sherbourne & Stewart, 1991). Informational support involves the provision of guidance, advice, and information to help the individual cope with

current stressors or difficulties (Cohen, 2004; Schwarzer et al., 2004; Sherbourne & Stewart, 1991). Tangible support refers to the provision of help with solving current problems or help with daily activities (Cohen, 2004; Schwarzer et al., 2004; Sherbourne & Stewart, 1991).

Affectionate support refers to the provision of love and affection (Cohen, 2004; Schwarzer et al., 2004; Sherbourne & Stewart, 1991). Positive social interaction involves having friends and family members to have a great time and engage in activities with (Sherbourne & Stewart, 1991).

Based on the conceptual differences between these dimensions of social support, it is not unlikely that different relationships with mental health would surface. For example, a study that uses a measure of structural or tangible support would not be expected to find an association between mental health and support. Structural support measures the number of friends and relatives. Having many friends and relatives does not necessarily suggest that more support is forthcoming and in some cases one friend or relative will provide more social support than numerous other friends and relatives combined (Cohen & Wills, 1985). Tangible support measures perceived help with solving current problems or with daily activities (Cohen, 2004; Schwarzer et al., 2004; Sherbourne & Stewart, 1991). We expect that this type of support would only be important when that help is needed such as when the person is ill (Cohen & Wills, 1985). On the other hand, different results would be expected with a positive social interaction measure. That is, having a good time with friends and family would be expected to improve people's overall mood.

Recently, a few studies examined the role of social network (Ryan & Willits, 2007), social integration (Ferraro & Su, 1999), overall perceived and received social support (Cairney & Krause, 2005; Couture et al., 2005; Gadalla, 2009; Matt & Dean, 1993; Prévile et al., 2001; Ryan & Willits, 2007), and perceived and received informational, emotional, and tangible

support separately (Camirand & Nanhou, 2008; Cruza-Guet et al., 2008; Krause et al., 1990; Kubzansky et al., 2000).

Cruza-Guet et al (2008) found that received informational support but not tangible and emotional support was significantly related with psychological distress with higher informational support being related to higher distress (Cruza-Guet et al., 2008). On the other hand, they found that higher satisfaction with their received tangible, emotional, and informational support was related with lower distress. Kubzansky found that lower levels of emotional support but not tangible support was related with increased distress (Kubzansky et al., 2000). Ferraro and Su (1999) found that, in general, higher social integration was related with lower psychological distress (Ferraro & Su, 1999). Although not specifically with a sample of older adults, the National Population Health Survey (NPHS) was also recently used to examine the relationship between social support and psychological distress (Gadalla, 2009). Higher social support (the four dimensions of social support combined together) was correlated with lower psychological distress levels for both men and women (Gadalla, 2009).

The studies just reviewed were all cross-sectional in nature. Cross-sectional observational studies make it impossible to make inferences about the sequence of events (Cruza-Guet et al., 2008). While it is likely that social support causes changes in psychological distress, another explanation is also possible, that psychological distress levels cause changes in social support (Blazer, 1983; Matt & Dean, 1993; Murphy, 1985). Individuals who are depressed or who have higher levels of psychological distress may view the world in a more negative light and be more dissatisfied with their social support, they may be more likely to isolate themselves from the rest of the world, and may be more likely to receive less support as a result of changes in their mood (Blazer, 1983; Murphy, 1985). For example, the revised fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) mentions social withdrawal as a possible

sign of major depression (American Psychiatric Association, 2000). Therefore, it is possible that they are at risk of decreased social support. However, to date, inconsistent results have been found with some studies suggesting that depression leads to lower social support (Lakey & Dickinson, 1994; Matt & Dean, 1993) and others saying that it results in higher support (Blazer, 1983). Others have failed to find that effect altogether (Cairney & Krause, 2005; Krause et al., 1989).

Matt and Dean (1993) examined the 'causal' relationship between received social support (they used a unidimensional measure of social support that included three items that appear to measure positive social interaction and emotional/informational support) from friends in the last month and psychological distress and found that, for the old-old group, higher social support from friends predicted lower psychological distress and higher psychological distress predicted lower social support. For the young-old group, this cross-lagged effect was not found (Matt & Dean, 1993). However, only two time points with a 22-month interval were included.

Overall, these studies highlight the possibility that the existence of a relationship and the direction of this association are dependent on the type of social support being studied. More research is needed to provide a more detailed theoretical explanation of the main-effect model in terms of which of the different dimensions of social support are important predictors of psychological distress and in order to gain a better understanding of the discrepancies found between studies.

More long-term studies of the bi-directional relationship between both variables and with multiple time points are also needed. Despite the practical importance of understanding the relationship between social support and psychological distress over time, there are only a few longitudinal studies on this topic. Few of these have been for a national population of Canadians and for an extended period of time. Studies more than five or even 10 years in time are important

because they can reveal more about psychological distress across the adult's life-span and are less likely to be affected by the test-retest artifact (Jorm et al., 1989). Although cross-sectional studies have highlighted the importance of social support for psychological distress, an autoregressive cross-lagged design would be more suitable to examine the reciprocal causal relation between both variables.

The primary purpose of this study was to examine the longitudinal relationship between the different types of social support and psychological distress to determine whether social support had an impact on subsequent psychological distress levels or if psychological distress levels had an impact on subsequent social support levels, or both. Based on the aforementioned literature and theoretical background, we hypothesized that higher positive social interaction would have a significant influence on lowering psychological distress levels and that higher distress would impact later social support in a negative way. For the perceived availability of tangible support and structural support, we hypothesized that there would be no relationship between support and subsequent distress levels and between distress and subsequent support. For affectionate support we expected to find either a unidirectional or reciprocal link between both variables with higher affectionate support predicting lower subsequent levels of distress and higher distress predicting lower affectionate support. For the perceived availability of emotional/informational support we hypothesized that higher support would predict subsequently lower distress and that higher distress would predict subsequently lower support.

Methods

Sample and Data

Data from the National Population Health Survey (NPHS) were used (Statistics Canada, 2008). The data include seven cycles of longitudinal data collected over a twelve year period from 1994/1995 to 2006/2007. The household component of the longitudinal NPHS includes

information about Canadian household residents' health, socio-demographic status, health services utilization, predictors of health, chronic conditions, and activity restrictions. It includes information about the same individuals every two years from 10 provinces excluding those living on Indian Reserves and Crown Lands, full-time members of the Canadian Forces Bases, and some remote areas in Ontario and Quebec. The NPHS also includes a Health Institutions component which includes residents of health institutions. People in health institutions were excluded from the current analyses.

For all provinces, except for Quebec, a stratified two-stage sample design where dwellings were selected within clusters was used. The design was based on the Labour Force Survey (LFS). The Quebec sample was selected based on a two-stage sample design from households participating in a survey called "Enquête sociale et de la santé" (ESS). The longitudinal sample size is 17,276 persons. A computer-assisted personal and telephone interviewing (CAI) method was used to collect the data. The majority of interviews were conducted by telephone and the rest were in-person. Only data from cycles 3 (1998/1999) to cycle 7 (2006/2007) were used provided that the two first cycles used a different social support scale. Respondents 55 years of age and older when they first started the survey in 1994/1995 were included.

Measures

Medical Outcomes Study Social Support Survey. The Medical Outcomes Study (MOS) social support survey is a 19-item survey that measures four dimensions of perceived availability of functional social support including emotional/informational support, tangible support, positive social interactions, and affectionate support (Sherbourne & Stewart, 1991). Functional support is the extent to which relationships serve particular functions. Emotional/informational support includes eight items measuring the extent to which interpersonal relationships provide guidance

and positive affect (e.g. “someone you can count on to listen to you when you need to talk”).

Tangible support includes four items measuring the extent to which behavioural help is provided to them (e.g. “someone to help you if you were confined to bed”). Affectionate support includes three items measuring the extent to which the function of love and affection is met (“someone to love and make you feel wanted”). Positive social interaction includes four items measuring individuals’ availability of someone to have fun with. Questions were answered on a five-point scale ranging from “none of the time” to “all of the time” with higher values indicating more social support. The survey also includes one structural measure of social support (“about how many close friends and close relatives do you have”). They are asked to report the exact number of close friends and the exact number of close relatives. Sherbourne and Stewart (1991) have found good convergent and discriminant validity for the MOS social support survey (Sherbourne & Stewart, 1991). Also, internal consistency values ranged from .90 to .97 and test-retest reliability ranged from .72 to .78 (Robitaille, Orpana, & McIntosh, 2010; Sherbourne & Stewart, 1991). Confirmatory factor analysis (CFA) produced a four-factor structure (Gjesfjeld et al., 2008; Robitaille et al., 2010; Sherbourne & Stewart, 1991) (See Appendices A and B).

Psychological distress. The K6 is a validated measure used to assess individuals’ non-specific psychological distress in population surveys (Kessler et al., 2003). It was initially developed for use in the US National Health Interview Survey (NHIS) in order to discriminate between community cases and non-cases of non-specific distress based on severity rather than diagnosis. Both a 10-item (K10) and a 6-item (K6) version of the survey were developed. For this study, the K6 version of the survey was used. Sample items includes “During the past month, about how often did you feel so sad that nothing could cheer you up?” and “During the past month, about how often did you feel hopeless”. Respondents were asked to answer on a five-point scale ranging from “none of the time” to “all of the time”. Each question score ranges

from 0 to 4 and the total scale score ranges from 0 to 24. The K6 has strong psychometric properties and can accurately discriminate between DSM-IV cases and non-cases (Furukawa et al., 2003; Kessler et al., 2002; Kessler et al., 2003). Furthermore, compared to the General Health Questionnaire (GHQ-12), the K6 and K10 were found to better discriminate DSM-IV anxiety and depression cases and non-cases and were found to be a better scale for measuring mental health (Furukawa et al., 2003) (See Appendices C and D for the English and French version of the questionnaire).

Covariates. Four covariates were measured at baseline. These included gender (1 = males; 2 = females), education level (grouped in four categories: less than secondary graduation, secondary graduation, some postsecondary education, and postsecondary graduation), language (1 = English; 2 = French), and age (See Appendices E and F for questions about education).

Analysis

Preliminary analyses. The descriptive analyses for this study were generated using SAS software; Version 8 (2000). The data were screened and cleaned before beginning the analyses in accordance with Tabachnick and Fidell (Tabachnick & Fidell, 2001). Total scores were used for these analyses.

Autoregressive cross-lagged model. Autoregressive cross-lagged modeling based on structural equation modeling was used where social support and psychological distress scores were regressed on both these variables that precede in time. The autoregressive cross-lagged model provided us with information about whether the different types of social ties predict psychological distress above and beyond the earlier observations of social support and similarly whether psychological distress predicted social support above and beyond earlier observations of distress. The coefficient estimates provided information about whether a relationship exists between both variables and the extent to which change in one variable can be predicted from

change in another variable at a previous time wave (Delsing & Oud, 2008). Given that the model controls for previous levels of the same construct over time as well as the correlation between the variables at time one, the reciprocal relationship between both variables is more accurate (Delsing & Oud, 2008). In addition to examining the bivariate autoregressive relationship between social support and psychological distress, four baseline covariates were included: gender, age, education, and language. These variables came first in the posited causal ordering. A total of five cross-lagged models were estimated. These were fit to five cycles of data. All models included the same four covariates and psychological distress. They differed only with respect to social support with each model including a different dimension of social support (emotional/informational support, tangible support, positive social interactions, affectionate support, and structural support).

All analyses were conducted using Mplus (2006). We used the GENERAL type of analysis given that we were modeling observed continuous variables. We also used the COMPLEX modeling procedure in order to take into account stratification and lack of independence between observations in our dataset. The maximum likelihood parameter estimate with standard errors and a chi-square statistic (MLR) was used given that all variables were continuous and that this estimator method is robust to non-normality and non-normality of observations when used in combination with the COMPLEX type of analysis.

Sample weights were calculated in order to be able to obtain meaningful estimates from the NPHS given that parameter estimate bias has been found to occur when weights are not included (Asparouhov, 2005). When including sample weights each respondent represents himself or herself but also numerous other people who are not in the survey in order for the non-random NPHS sample to reflect the Canadian population. Therefore, each person in the survey is given a weight. These were calculated based on the formula provided by Statistics Canada. In

order to deal with sample size inflation, the weighted value was further divided by the average weight in order to get a normalized weight.

As mentioned, data were collected using a complex survey design where stratified and cluster sampling was used. Although, this type of survey design decreases variability, it was nevertheless chosen as the study design method given that it is more efficient and represents a better representation of the entire population. Therefore, it was important that we adjusted for the violation of the assumption of independence between observations. The bootstrap technique was used for the preliminary analyses in order to address the problems associated with estimating the variance when using a multistage complex survey design method. The bootstrap technique creates a file with 500 bootstrap weights. In SEM, using complex survey design data may underestimate standard errors and intern might have an effect on chi-square values. The linearization (also called Taylor Series approximation) method with both the cluster and stratum identifiers was used. This method has been found to provide robust estimates of parameters and of standard errors (Stapleton, 2006).

In Mplus, the estimation of models can be done with missing data by using the covariates included in the model to predict missingness. This is based on the full information maximum likelihood (FIML) estimation (Enders, 2006). Mplus offers robust standard errors for missing data and estimates standard errors using the observed information matrix. The chi-square test statistics and model fit indices are calculated from the log likelihood of the data for each observation (Duncan, Duncan, & Strycker, 2006; Enders, 2006).

We recognize the recent critics outlined in the special issue of *Personality and Individual Differences* (2007) in failing to report the significance of χ^2 and instead using approximate fit indices (AFIs) in SEM for models that fail the χ^2 test (Vernon & Eysenck, 2007). However, given our large sample size, it was likely that the χ^2 test statistic would be significant suggesting that

the discrepancy between the observed and hypothesized model was greater than would be expected by chance alone. That is, the larger the sample size, the more likely the χ^2 goodness of fit test will be significant. Therefore, both the significance of the χ^2 test as well as the AFIs was reported. The approximate fit indices were reported while keeping in mind that these were not meant to provide support or lack thereof of a perfectly fitting model but rather information about whether or not the model was acceptable based on the approximate fit (Millsap, 2007).

In order to assess the overall fit of the models, the following fit indices were examined: likelihood ratio test statistic, p values, degrees of freedom (df), comparative fit index (CFI), Tucker-Lewis index (TLI), and root mean square error of approximation (RMSEA) (Browne & Cudeck, 1993). As a general rule, CFI and TLI values greater than .95 were indicative of an acceptable fit (Hu & Bentler, 1999). The RMSEA value represents the fit of the model to the population if parameter values were optimally chosen (Browne & Cudeck, 1993). RMSEA values that are less than .05 represents a good fit and values up to .08 correspond to a reasonable fit (Byrne & Campbell, 1999; Hu & Bentler, 1999). The model parameter estimates were also examined. Given that observed variables were modeled, standardized estimates were not reported.

Results

Preliminary Analyses

Univariate normality of the MOS social support scale was assessed by looking at the skewness and kurtosis of the distribution. The means, standard deviations, and absolute values of skewness and kurtosis for all variables are presented in Table 1. The Kolmogorov-Smirnov statistic was also examined to test the null hypothesis that the data were normally distributed. We rejected the null hypothesis. However, given the increased likelihood of finding significance with large sample sizes histograms were also examined. Based on the histograms, structural social

Table 1.

Mean, standard deviation, skewness, and kurtosis for study variables

Study Variables	Time 1	Time 2	Time 3	Time 4	Time 5	Skew ^a	Kur ^a
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)		
PSI	13.21(3.58)	13.61(3.40)	13.07(3.51)	13.23(3.59)	12.91(3.71)	-1.80	5.58
TS	13.41(3.71)	13.60(3.66)	13.15(3.71)	13.35(3.71)	13.03(3.69)	-2.12	6.70
EIS	26.28(7.15)	27.04(6.54)	25.94(6.95)	26.17(7.18)	26.02(7.28)	-1.75	5.53
AS	10.24(2.69)	10.39(2.55)	10.10(2.64)	10.23(2.67)	10.22(2.58)	-2.11	7.15
SS	6.39(6.74)	6.55(7.33)	6.63(7.18)	6.29(6.42)	7.08(8.43)	6.18	69.87
PD	2.27(3.04)	1.84(2.71)	2.00(3.00)	1.93(2.87)	1.96(2.91)	2.99	17.88

Note. TS = tangible support; AS = affectionate support; PSI = positive social interaction; EIS = emotional/informational support; SS = structural support; PD = psychological distress. The normalized survey sampling weights were used. ^aThese represent absolute values. Only the most extreme score for each variable is included rather than including values for each time.

support and psychological distress were positively skewed and the variables of functional social support were negatively skewed. Univariate outliers were also verified by looking at the histograms and frequencies and looking at the frequency table for zscores. All values above ± 3.29 were considered outliers. Outliers were found in tangible (15-33 cases), affectionate (18-35 cases), emotional/informational (16-29 cases), and structural support (20-32 cases), positive social interaction (16-28 cases), and psychological distress (29-44 cases) at all five data collection times. Multivariate outliers were also examined with Mahalanobis distance. Using a criterion of $\alpha = .001$ with 30 df, critical $\chi^2 = 59.70$, none of the 975 (only uses observations that have no missing values) cases produced scores that identified them as outliers. The highest mahalanobis value was 25.67. No bivariate correlations were greater than .90 and the greatest SMC value was .83 suggesting that multicollinearity was not a problem in this data set. Although the data showed some deviation from normality we nevertheless decided not to delete any

Table 2. Descriptive statistics for study variables

Variable	Frequency (%)
Language	
English	2131 (76.59)
French	433 (23.41)
Gender	
Male	991 (40.69)
Female	1573 (59.31)
Marital status	
Married, common law, or living with a partner	1365 (61.69)
Single	135 (4.19)
Widowed, separated, or divorced	828 (25.67)
Missing	236 (8.45)
Education	
Less than a secondary school graduation	1173 (42.31)
Secondary school graduation	328 (13.19)
Some post-secondary education	490 (19.25)
Post-secondary graduation	565 (24.72)

Note. Frequencies are unweighted; percents are weighted estimates.

variables or cases and not to perform any transformations. Rather, a maximum likelihood (ML) method that takes non-normality into account that is available with Mplus was used. The pattern of missing data was also verified. Given that a series of five models were tested, the pattern of missing values was verified for each type of social support separately. Those with missing values were older, had a lower level of education and income, and were less likely to be in a

relationship. There was no difference on language and gender except for structural support.

Statistics on the pattern of missing values are available by request to the authors.

Sample Description

The final sample was 2564 respondents ranging in age from 55 to 89 with an average age of 63.98 years ($SD = 6.86$) when they first start the study in 1994/1995. Only French and English-speaking respondents were included in the final analyses. Table 2 provides information about the participants' gender, language, marital status, and education.

Relationship between Affectionate Support and Psychological Distress

The initial bivariate autoregressive cross-lagged model between affectionate support and psychological distress with four covariates represented an inadequate fit to the data (see Table 3 for the goodness-of-fit statistics). Inspection of the modification indices ($MI = 131.90$, expected parameter change = -2.30) suggested that adding a correlation between psychological distress and affectionate support at time one would substantially improve the fit of the model. Given that it makes substantial sense that both these variables would be related together, an association between both was added. The revised model fit the data very well (see Table 3). This correlation was also added to all subsequent models given that it made sense theoretically.

The parameter estimates for the cross-lagged model provided some support for a reciprocal relationship between affectionate support and psychological distress after controlling for age, education, gender, and language (see Table 4). The paths from T1 psychological distress to T2 social support, T1 social support to T2 psychological distress, T2 social support to T3 psychological distress, and T3 psychological distress to T4 social support were significant. These findings suggested that higher affectionate support leads to higher levels of psychological distress two years later and that higher level of distress leads to higher levels of affectionate support. The other four paths were non-significant. For all time waves, prior affectionate support

Table 3.

Goodness of Fit Statistics for the MOS social support scale

Model	df	χ^2	p	CFI	TLI	RMSEA
AS (Initial)	40	264.21	p<.0001	.91	.80	.047
AS (Final)	39	84.94	p<.0001	.98	.96	.021
TS (Initial)	40	219.93	p<.0001	.93	.85	.042
TS (Final)	39	101.09	p<.0001	.98	.95	.025
PSI (Initial)	40	368.89	p<.0001	.87	.72	.057
PSI (Final)	39	68.46	p=.0025	.99	.97	.017
EIS (Initial)	40	292.10	p<.0001	.89	.77	0.05
EIS (Final)	39	74.19	p=.0006	.99	.97	.019
SS (Initial)	40	97.14	p<.0001	.97	.93	.024
SS (Final)	39	75.80	p=.0004	.98	.96	.019

Note. df = degrees of freedom; χ^2 = chi-square values; p = probability values; CFI = comparative fit index; TLI = Tucker-Lewis index; RMSEA = root mean square error approximation. TS = tangible support; AS = affectionate support; PSI = positive social interaction; EIS = emotional/informational support; SS = structural support. The normalized survey sampling weights and the Taylor linearization method was used.

predicted later support and prior psychological distress predicted later levels of distress. See Figure 1 for the structural equation model of the reciprocal relationship between affectionate support and psychological distress.

As for the covariates, the model showed a statistically significant relationship between language and affectionate support and distress at T1, with English-speaking Canadians being more likely to report higher social support and lower levels of distress. Gender was significantly related with affectionate support and distress at T1 with females reporting less support and higher distress. Higher educational level was significantly related with lower distress and higher affectionate support at T1. Age was not significantly related with social support and distress at T1 (see Table 5).

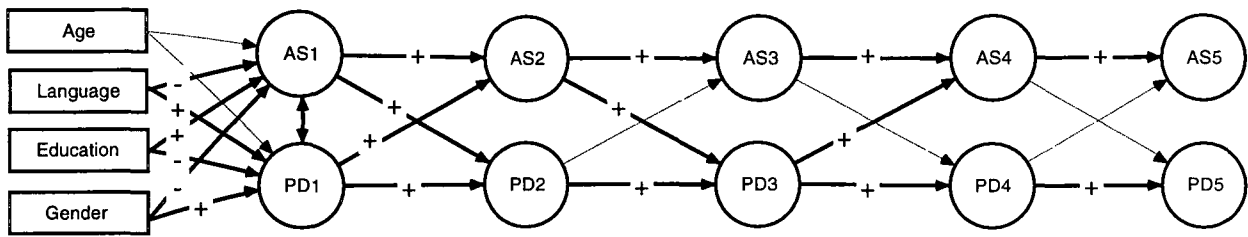


Figure 1. Bivariate autoregressive cross-lagged model of affectionate support and psychological distress. Dotted lines represent non-significant paths. AS = Affectionate support; PD = Psychological distress.

Relationship between Tangible Support and Psychological Distress

The model fit the data well (see Table 3). The paths relating tangible support and psychological distress were all small with only the path from T3 psychological distress to T4 tangible support being just barely significant (see Table 4). For all time waves, prior tangible support and psychological distress predicted later support and psychological distress, respectively. See Figure 2 for the model of the reciprocal relationship between tangible support and psychological distress.

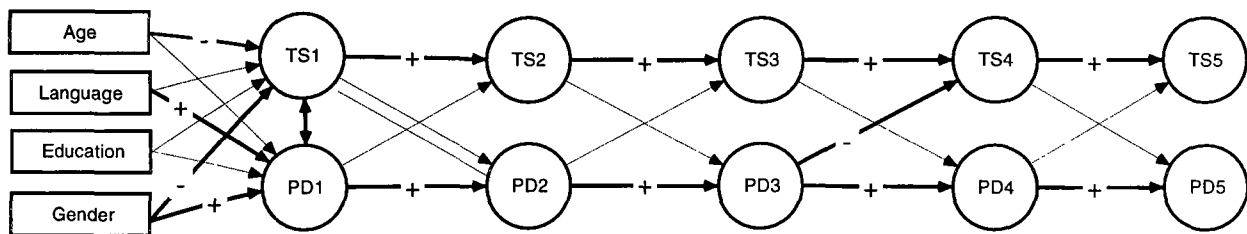


Figure 2. Bivariate autoregressive cross-lagged tangible social support and psychological distress. Dotted lines represent non-significant paths. TS = Tangible support; PD = Psychological distress.

When examining the covariates we found that English-speaking Canadians were less likely to be distressed at T1 when compared to French-speaking Canadians. Language was not associated with tangible support at T1. Gender was significantly related with tangible support and with distress at T1 with men reporting higher support and lower distress. Older adults that

were older when they started the study had lower levels of support. Age was not associated with distress. Education was not related with tangible support and distress at T1 (see Table 5).

Relationship between Positive Social Interaction and Psychological Distress

The model fit the data well (see Table 3). All paths for the effect of psychological distress on positive social interaction (from T1 to T2; T2 to T3; T3 to T4) except for the last time wave (T4 to T5) were significant suggesting that higher psychological distress was related with higher social support two years later even after controlling for previous social support, distress levels, and covariates (see Table 4). Only one path for the effect of positive social interaction on psychological distress was significant with higher levels of positive social interaction predicting lower psychological distress. For all time waves, prior positive social interaction predicted later support and prior psychological distress predicted later levels of distress. See Figure 3 for the model of the reciprocal relationship between positive social interaction and psychological distress.

The model showed a statistically significant relationship between language and positive social interaction and distress at T1, with English-speaking Canadians reporting higher social support but lower levels of distress. Gender was significantly related with positive social interaction and with distress at T1 with females reporting less support and higher distress. Higher educational level was significantly related with lower distress and higher positive social interaction at T1. Age was not significantly related with social support and distress at T1 (see Table 5).

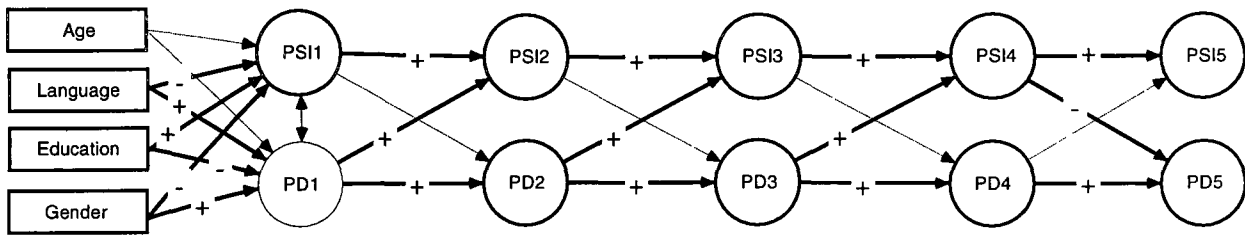


Figure 3. Bivariate autoregressive cross-lagged model of positive social interaction and psychological distress. Dotted lines represent non-significant paths. PSI = positive social interaction; PD = Psychological distress.

Relationship between Emotional/informational Support and Psychological Distress

The model fit the data well (see Table 3). The paths from T2 and T3 psychological distress on T3 and T4 emotional/informational support, respectively, were significant with higher psychological distress being related with subsequently higher emotional/informational support (see Table 4). All other cross-lagged paths were non-significant. For all time waves, prior emotional/informational support was related with later support and prior psychological distress was associated with later distress. See Figure 4 for an illustration of the model of the reciprocal relationship between emotional/informational support and psychological distress.

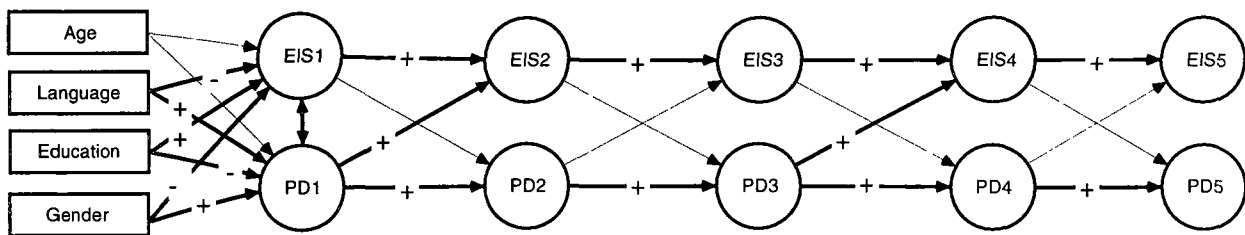


Figure 4. Bivariate autoregressive cross-lagged model of emotional/informational support and psychological distress. Dotted lines represent non-significant paths. EIS = Emotional/informational support; PD = Psychological distress.

We found a significant relationship between language and emotional/informational support and distress at T1, with English-speaking Canadians being more likely to report higher support and lower levels of distress. Gender was significantly related with emotional/informational support and distress at T1 with females reporting less support and higher distress. Higher educational level was significantly related with lower distress and higher emotional/informational support at T1. Age was not significantly related with support and distress at T1 (see Table 5).

Relationship between Structural Support and Psychological Distress

The model fit the data well (see Table 3). There was no cross-lagged relationship involving structural social support and psychological distress (see Table 4). The only paths that were significant in that model were for structural support predicting subsequent levels of structural support and psychological distress predicting later levels of distress over time.

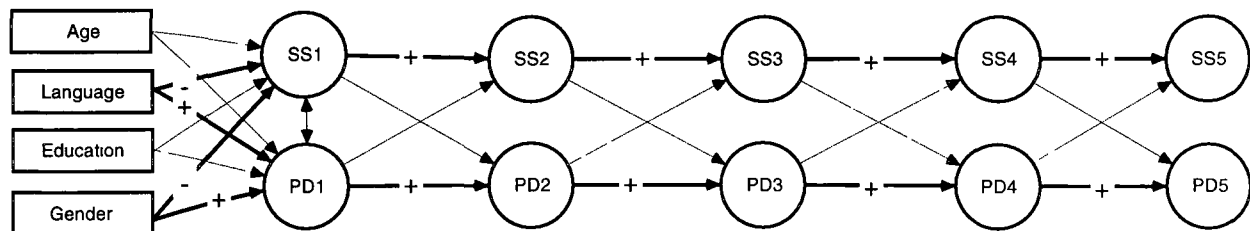


Figure 5. Bivariate autoregressive cross-lagged model of structural support and psychological distress. Dotted lines represent non-significant paths. SS = structural support; PD = Psychological distress.

The model estimates for the covariates showed a statistically significant relationship between language and structural support and distress at T1 with French-speaking Canadians reporting higher levels of distress and lower levels of structural support. Males were also more likely than females to report higher levels of structural support and lower levels of distress. Education and age were not related with structural support and psychological distress (Table 5).

Table 4. Unstandardized estimates, standard errors, and confidence intervals for the autoregressive cross-lagged models

Parameters	AS			TS			PSI			EIS			SS		
	95% CI			95% CI			95% CI			95% CI			95% CI		
	EST (SE)	low	high	EST (SE)	low	high	EST (SE)	low	high	EST (SE)	low	high	EST (SE)	Low	high
PD(T2) on PD(T1)	0.92(.20)*	0.54	1.31	0.86(.25)*	0.37	1.35	0.82(.15)*	0.53	1.11	0.84(.16)*	0.54	1.15	0.74(.14)*	0.48	1.01
PD(T2) on S(T1)	0.13(.06)*	0.01	0.26	0.06(.05)	-0.04	0.16	0.08(.05)	-0.01	0.17	0.04(.02)	-0.001	0.08	-0.002(.007)	-0.02	0.01
S(T2) on S(T1)	1.08(.21)*	0.67	1.49	1.16(.33)*	0.51	1.81	1.34(.29)*	0.77	1.91	1.24(.30)*	0.66	1.83	1.80(.40)*	1.03	2.58
S(T2) on PD(T1)	0.13(.06)*	0.01	0.25	0.16(.10)	-0.03	0.36	0.33(.12)*	0.09	0.57	0.51(.22)*	0.07	0.94	0.17(.10)	0.01	0.36
PD(T3) on PD(T2)	1.48(.27)*	0.94	2.01	1.49(.24)*	1.02	1.97	1.18(.20)*	0.79	1.57	1.16(.20)*	0.76	1.56	1.45(.25)*	0.95	1.95
PD(T3) on S(T2)	0.18(.08)*	0.04	0.33	0.05(.05)	-0.04	0.14	0.09(.05)	-0.01	0.18	0.03(.02)	0.01	0.07	0.02(.01)	0.01	0.04
S(T3) on S(T2)	0.97(.19)*	0.60	1.34	0.93(.14)*	0.65	1.21	1.45(.31)*	0.84	2.06	1.60(.43)*	0.77	2.44	0.69(.19)*	0.32	1.07
S(T3) on PD(T2)	0.01(.06)	-0.10	0.13	0.01(.05)	-0.10	0.08	0.27(.13)*	0.01	0.53	0.54(.32)	-0.08	1.15	0.05(.06)	-0.16	0.05
PD(T4) on PD(T3)	0.86(.10)*	0.66	1.06	0.86(.13)*	0.62	1.11	0.87(.09)*	0.69	1.06	0.82(.09)*	0.65	1.00	0.76(.15)*	0.46	1.05
PD(T4) on S(T3)	0.01(.04)	0.07	0.10	0.03(.03)	-0.04	0.09	0.02(.03)	0.04	0.08	0.002(.02)	-0.03	0.03	0.001(.01)	-0.02	0.02
S(T4) on S(T3)	1.40(.24)*	0.94	1.86	1.45(.27)*	0.92	1.99	1.74(.28)*	1.19	2.30	1.99(.41)*	1.20	2.79	0.86(.31)*	0.26	1.47
S(T4) on PD(T3)	0.17(.08)*	0.01	0.34	0.21(.11)*	0.004	0.42	0.38(.14)*	0.10	0.66	0.85(.35)*	0.17	1.54	0.02(.08)	0.13	0.17
PD(T5) on PD(T4)	1.13(.47)*	0.21	2.05	1.28(.31)*	0.68	1.89	0.66(.16)*	0.34	0.98	0.72(.17)*	0.39	1.06	1.34(.22)*	0.91	1.78
PD(T5) on S(T4)	0.04(.19)	0.33	0.40	0.05(.08)	-0.11	0.21	0.24(.12)*	0.46	-0.01	-0.12(.07)	-0.23	0.02	0.01(.01)	0.03	0.01
S(T5) on S(T4)	0.94(.25)*	0.45	1.43	0.93(.22)*	0.50	1.37	1.26(.22)*	0.83	1.68	1.09(.24)*	0.61	1.56	1.66(.38)*	0.91	2.40
S(T5) on PD(T4)	0.05(.08)	0.10	0.20	0.05(.09)	-0.13	0.23	0.23(.12)	0.01	0.47	0.26(.23)	-0.19	0.70	0.09(.12)	0.29	0.12

Note: EST = unstandardized estimates, SE = standard errors of estimates, S = social support, SS = structural social support, TS = tangible support, AS = affectionate support, PSI = positive social interaction, EIS = emotional/informational support, PD = psychological distress. The normalized survey sampling weights and the Taylor linearization method were used. * denote significant paths (critical value = +1.96).

Table 5. Unstandardized estimates, standard errors, and confidence intervals for the covariates

Parameters	AS			TS			PSI			EIS			SS		
	95% CI			95% CI			95% CI			95% CI			95% CI		
	EST (SE)	low	high	EST (SE)	low	high	EST (SE)	low	high	EST (SE)	low	high	EST (SE)	Low	high
PD on Language	0.80(.18)*	.45	1.15	0.77(.16)*	.45	1.09	0.64(.20)*	.25	1.04	0.68(.21)*	.27	1.08	0.86(.18)*	.50	1.22
PD on Education	-0.11(.05)*	-.20	-.02	-0.08(.05)	.18	.02	-0.12(.05)*	-.22	.01	0.12(.05)*	-.21	-.006	0.09(.05)	-.20	.01
PD on Age	-0.006(.02)	.04	.03	-0.006(.01)	.03	.02	-0.02(.01)	.04	.002	-0.02(.01)	-.04	.001	0.01(.01)	-.03	.007
PD on Gender	0.74(.27)*	.21	1.27	0.80(.22)*	.37	1.23	0.93(.16)*	.62	1.24	0.90(.17)*	.58	1.22	0.87(.18)*	.52	1.22
S on Language	-0.56(.18)*	.91	-.21	-0.34(.27)	-.86	.18	-0.36(.14)*	.63	-.09	-0.73(.30)*	1.39	.20	-1.34(.26)*	-1.85	.83
S on Education	0.10(.05)*	.008	.18	0.07(.05)	-.03	.16	0.10(.04)*	.02	.18	0.16(.07)*	.03	.30	0.07(.09)	-.10	.25
S on Age	-0.02(.01)	.04	.00	-0.03(.01)*	.05	.004	0.01(.01)	.03	.009	0.01(.02)	-.05	.03	0.01(.01)	-.04	.01
S on Gender	-0.23(.11)*	-.44	.009	0.80(.20)*	1.20	-.41	-0.49(.09)*	.67	.31	-0.81(.17)*	1.14	.48	0.79(.23)*	-1.25	.34

Note: EST = unstandardized estimates, SE = standard errors of estimates, S = social support, SS = structural social support, TS = tangible support, AS = affectionate support, PSI = positive social interaction, EIS = emotional/informational support, PD = psychological distress. The normalized survey sampling weights and the Taylor linearization method were used. * denote significant paths (critical value = + 1.96).

Discussion

Drawing upon national longitudinal data, the objective of the current study was to investigate the reciprocal relationship between the different dimensions of social support and psychological distress in a sample of older adults. This study is among the first to demonstrate that different results can be found for the long-term relationship between social support and psychological distress depending on the type of support being studied.

The finding that structural support is unrelated to distress aligns with our hypotheses as well as with previous research, suggesting that the number of close friends and relatives is not an important predictor of subsequent distress and, conversely, that the amount of structural support is not affected by previous distress (Ryan & Willits, 2007). It seems that having many friends and relatives is not an important predictor of lower distress levels. One explanation is that a greater number of friends and relatives does not necessarily suggest that more support is forthcoming. In some cases, one friend or relative will provide more social support than numerous other friends and relatives combined.

Similarly to what we had hypothesized, the longitudinal cross-lagged relationship between tangible support and distress was weak with higher distress marginally predicting subsequently higher support at only one time wave. This is not the first study to fail to find an association between social support and psychological distress (Krause et al., 1990) and more specifically between tangible support and distress (Cruza-Guet et al., 2008; Kubzansky et al., 2000). The type of help measured by tangible support such as receiving assistance around the house when sick or having someone to drive you to the hospital when needed is more likely be beneficial when this type of help is needed such as when a person is sick. Rather than being related directly with psychological distress, it is possible that tangible support acts as a

moderator when stressors are present (e.g. becoming ill) by reducing the impact of stressors and in turn decreasing distress (Cohen & Wills, 1985).

As hypothesized, the perception of having someone to have fun with (positive social interaction) was related with lower distress two years later. This is consistent with previous studies which have reported the importance of social support in alleviating distress in older adults (Matt & Dean, 1993). However, this association was only found for the last time wave suggesting only minimal support for this cross-lagged effect. One possible explanation is that having friends and family members to have a good time with may become more significant to older adults in the later years of their life. The relationship between higher distress and subsequently higher positive social interaction was clearly stronger and more consistent with only the last time wave being non-significant.

Some support was found for the reciprocal association between affectionate support and later psychological distress and between psychological distress and later support. Contrary to our hypothesis, affectionate support had a negative influence on later psychological distress for two of the four time intervals. One possible explanation is that this type of support may be detrimental. Some previous studies have also reported that increased social support is related with increased psychological distress (Cohen & Wills, 1985; Cruza-Guet et al., 2008; Krause et al., 1990). For older adults, it is possible that too much social support leads to a feeling of loss of independence and decreased self-worth. Still, this would be more likely to occur for other types of support such as tangible or informational support. Clearly, more research is needed to answer these questions. Another possible explanation is that support may act as a buffer between stressors and distress and that both social support and distress are positively related with stressors (Bienenfeld et al., 1997). Stressors can lead to increased social support and to increased distress.

Future research could use a longitudinal interaction model with stressors as the independent, distress as the dependent, and support as the moderating variable. This would demonstrate which dimensions of social support have a main effect on mental health outcomes and which ones act as buffers against stressors.

In the case of emotional/informational support, the temporal association was unidirectional. Contrary to our hypothesis, a higher level of distress was a significant antecedent of a higher level of social support for two of the four time waves. This is also contrary to Matt and Dean (1993) who found that higher distress was related with lower social support 22 months later (Matt & Dean, 1993). Still, as mentioned, this association between psychological distress and social support two years later was also found for positive social interaction and affectionate support in the current study. Although, the direction of the association between support and distress was unexpected, this is not the first study to find such a relationship (Blazer, 1983). Blazer found that depression was related with increased support 30 months later (Blazer, 1983). Some cross-sectional studies have also found a positive relationship between social support and distress. As mentioned as a possible explanation by the Cruza-Guet and colleagues (2008), those older adults that are more psychologically distressed may also be the ones that receive the most help.

A number of factors may help explain our results. For one, the level of psychological distress in the general population of the current study was low with a mean score ranging from 1.84 to 2.27 (depending on the data collection cycle) on a scale that ranges from 0 to 24. It is possible that psychological distress below a certain threshold be somewhat adaptive or at least not mal-adaptive (Blazer, 2009). In our sample, although some people had high distress scores, the majority had low distress scores. It is possible that people with higher levels of distress, but

still not experiencing severe distress, receive more support from friends and family to help them deal with the source of distress (ie. stressful situation). Mild psychological distress would not be expected to lead to withdrawal and to push friends and family away as is found in clinical depression. Future research should explore the longitudinal association between social support and severe psychological distress.

Overall, it is interesting that results from this study provide support for the effect of psychological distress on subsequent levels of social support rather than only on the effect of social support on distress. This is a valuable finding given that the majority of the research has focused on the role played by social support on distress, giving less attention to the possibility that distress may also be an important predictor of support. Furthermore, cross-sectional studies more often interpret a relationship between social support and distress as being that of social support as being protective against distress. We are not implying that social support is not protective against distress but rather that the opposing explanation also plays an important role when looking at the wide spectrum of psychological distress levels in the general population with two year intervals between the measurement of distress and later support levels.

The lack of a stronger predictive role of the different dimensions of social support on distress may be explained by the measures used. The MOS social support scale measures perceived availability of social support rather than people's evaluation of how satisfied they are by their received or perceived level of support. Some studies suggest that it is the subjective evaluation of support that is most important in explaining distress (Cruza-Guet et al., 2008). Unfortunately, we did not have access to such a measure making it impossible to test this hypothesis.

Another possible explanation for the lack of a strong cross-lagged effect is the discrete time interval that was used. It is possible that an interval of two years between the observation of social support and psychological distress is too long. Studies have been found to have different results depending on the discrete time interval used (Oud, 2002). Further cross-lagged models should explore the reciprocal relationship between social support and psychological distress with shorter time intervals in order to see if a stronger relationship would be found. Growth curve modeling of social support and psychological distress over an extended period of time would also help to enlighten us about the relationship between both variables over time. We initially attempted to run an autoregressive latent trajectory model (ALT). This method combines the autoregressive, cross-lagged, and latent trajectory model into one model. While the autoregressive model allows for variables to be regressed on a previous value, the latent growth curve model allows for separate trajectories with different intercepts and slopes across people. Unfortunately, the model was too complex to allow Mplus to converge on a solution.

It is also possible that there was not enough variation in the distribution of the different types of social support and psychological distress (Cohen & Pressman, 2003). Social support levels were fairly high in our sample. It is possible that a minimum level of support is needed and that additional support fails to be increasingly protective above that threshold (Cohen et al., 2000; Cohen et al., 2001; Cohen & Wills, 1985). This is a possible explanation for the lack of a strong cross-lagged effect over time. More work is needed in order to find out whether a certain threshold or whether a graded-like increase in support is present and how this is different for the different types of support (Cohen et al., 2000).

In addition to the autoregressive cross-lagged model we also included age, gender, language, and education as covariates. English-speaking Canadians were consistently found as

reporting higher levels of support and lower levels of distress for all the different types of social support. This finding is consistent with other studies conducted on the Canadian population that have found that French-speaking Canadians report lower levels of support and higher distress (Cairney & Krause, 2005; Camirand & Nanhou, 2008; Kaplan et al., 2008). Quebec is a distinct culture that may feel more isolated from the rest of Canada (Cairney & Krause, 2005). More research is needed to understand the reasons why French-speaking Canadians (Quebec residents) consistently report higher levels of distress when compare to English-speaking Canadians (Cairney & Krause, 2005).

Another finding was that age was not a significant predictor of distress or social support for a population of older adults. This finding is consistent with some previous studies (Préville et al., 2001). The only exception was for the effect of age on tangible support. Participants that were older in age when they started the study reported having lower levels of tangible support. However, the relationship was weak.

For all five models, women were more likely to show higher levels of distress than men. This aligns with previous research which has repeatedly found women at higher risk of depression and distress (Cairney & Krause, 2005; Camirand & Nanhou, 2008; Matt & Dean, 1993; Orpana, 2008; Préville et al., 1995). More mental health prevention initiatives should be focused on women given that they represent a population with a higher level of distress. In our study, men were more likely to report higher support. This is opposite to what was found by Matt and Dean (Matt & Dean, 1993).

Lastly, higher levels of education were associated with higher affectionate and emotional/informational support and positive social interaction and lower distress. This is similar to what other studies have found (Cairney & Krause, 2005; Préville et al., 1995).

In light of numerous important limitations, the results need to be interpreted with caution. First, the current study excluded adults living in health institutions. This can have an impact on the prevalence and scores of psychological distress over time. This limitation is relevant with older adults and especially with the old-old who are more likely to live in institutional care. Although we would have expected higher rates of distress for institutionalized older adults, interestingly, one study that compared the rates of severe psychological distress for frail elderly respondents living in institutions to those living in the community found lower rates of severe psychological distress for those living in institutions (Préville et al., 2001). Therefore, the impact of including or excluding respondents living in institutions is unclear.

Secondly, attrition of the panel over time is another shortcoming of this study; however the NPHS response rates are very good as compared to other cross sectional and longitudinal studies. For cycle one, the response rate was 83.6 percent (for cycle one, response rate is based on the 20,095 selected to be part of the NPHS), for cycle two it was 92.8 percent (for all the following cycles, it based on the 17, 276 that participated in NPHS), for cycle three it was 88.3 percent, for cycle four it was 84.9 percent, for cycle five it was 80.8 percent, for cycle six it was 77.6 percent, and for cycle seven it was 77.0 percent (Statistics Canada, 2008).

A third drawback of this study is that self-reported data were used in the NPHS. Older adults and especially old-old may respond to questions about psychological distress differently than younger adults. The mood of the respondent on the specific day of the survey may also bias the results slightly. Furthermore, given that the data were observational in nature, it is impossible to make claims of causality. Still, the longitudinal autoregressive cross-lagged model used for this study brings us one step closer to being able to establish the existence of causality between social support and psychological distress.

A fourth limitation of this study is that we did not account for all the possible predictors of psychological distress and social support. This is one disadvantage of using an existing database with no control over the content. However, the advantages in terms of the large sample size and the long-term longitudinal nature of the data outweigh the disadvantages. Moreover, although many different dimensions of social support were included in this study, not all of them were included. It was only possible for us to include those that were part of the MOS social support scale.

A fifth drawback of this study is that latent variables were not included in the model; therefore, we were unable to account for measurement error of multiple indicators. Although we attempted to run the model employing the latent variables and their indicators, it would not converge given the complexity of the model. Replications of the current study are warranted.

To our knowledge, this is the first study to investigate the long-term reciprocal association between different types of social support and psychological distress for older adults. This study highlights an important area of research and theory development that has been widely understudied. It would appear that psychological distress in the general population of older adults may be important in predicting subsequent levels of social support. We hope this study will encourage the development of carefully designed studies to more fully understand the role of psychological distress levels on perceived availability of support and on other people's willingness to provide support.

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Study 3

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Running Head: SOCIAL SUPPORT AND STRESSORS ON PSYCHOLOGICAL DISTRESS

Understanding the roles of social support and chronic stressors on psychological distress in older adults: A cross-sectional and longitudinal study

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Abstract

Background and Objective: The fact that the Canadian population is aging at a faster rate than before has led to an increased focus on healthy aging initiatives and on better understanding the determinants of mental health. The role of social support has been recognized as being an important aspect of healthy aging. The objective of this study was to look at the cross-sectional and longitudinal interaction effect of chronic stressors and different types of functional social support on psychological distress in a sample of older Canadians. **Data and Methods:** Data from the National Population Health Survey were used for the analyses. A latent moderated structural equations approach in SEM for modeling interactions in a single sample was used. **Results and Conclusions:** From the cross-sectional analyses, significant interaction effects were found for tangible and emotional/informational support. Our findings provided no evidence of buffering effects of positive social interaction and affectionate support on the association between stress and psychological distress. For the longitudinal analysis, the stress-buffering hypothesis was only supported for one wave of data with social support acting as a buffer against the relationship between stressors in 2002/2003 and subsequent psychological distress two years later (2004/2005). Implications of this study and future research needs are discussed.

Keywords: PSYCHOLOGICAL DISTRESS, CHRONIC STRESSORS, SOCIAL SUPPORT, INTERACTION MODEL, LOGITUDINAL STUDY

Introduction

Older adults, with their many life experiences, knowledge, and wisdom add greatly to the lives of other seniors and younger generations. Their dedication to volunteerism and to charities and the unpaid help they provide to their family and friends make them a vital part of all communities (Statistics Canada, 2007). The population of older Canadians is expected to more than double between 2005 and 2036 (Turcotte & Schellenberg, 2007). The fact that the population is aging at a faster rate than before has led to an increased focus on healthy aging initiatives. One of these initiatives has been on improving the mental and emotional health of older adults and on better understanding the determinants of mental health. For example, the Public Health Agency of Canada's (PHAC) five-year priorities for action plan includes addressing the health of Canadians including the mental health of seniors and gaining a better understanding of the key determinants of healthy aging (Public Health Agency of Canada, 2007). Similarly, the establishment of the Canadian Coalition for Seniors' Mental Health (CCSMH) in 2002 and the strategic goals of that coalition further demonstrate the importance set forth in promoting older adults' mental health. The role of social support has surfaced as being one important aspect of healthy aging that needs to be given more attention. For example, in 2005 the Ministers responsible for aging and seniors have pinpointed social connectedness as one of the five key issues important in healthy aging (Healthy Aging and Wellness Working Group, 2009).

The importance of social relationships on the mental health of older adults has been noted by many (Blazer & Hybels, 2005; Krause, 1997; Krause et al., 1989; Lépine & Bouchez, 1998; Oxman et al., 1992; Ramos & Wilmoth, 2003; Russell & Cutrona, 1991; Shields & Martel, 2005). However, the vast majority of the research has focused specifically on depression. One area of mental health that merits to be further studied in older adults is psychological distress.

Psychological distress is a non-specific negative psychological state that encompasses symptoms of depression and anxiety (Dohrenwend et al., 1980; Kessler et al., 2003; Krause, 1999; Mirowsky & Ross, 2003). Given that anxiety and depression have been found to co-occur frequently in older adults, a measure of psychological distress is especially well-suited with a population of older adults (Doraiswamy, 2001; Mineka et al., 1998; Voyer et al., 2005). Furthermore, although psychological distress is less severe than clinical depression, it nevertheless has an impact on the lives of older adults. It has been linked to feelings of worthlessness, suicidal thoughts and attempts, use of psychotropic drugs, decreased life satisfaction, lower perceived health, and mortality (Camirand & Nanhon, 2008; Prévile et al., 1995; Turcotte & Schellenberg, 2007).

Understanding the relationship between different types of social relationships and psychological outcomes can help improve the quality of life of older adults and lead to an improved understanding of how social interventions can be implemented over the life span. Two popular models that provide a theoretical explanation for the process by which social support interacts with physical and mental health are the main-effect and the stress-buffering model (Cohen & Wills, 1985).

According to the main-effect model, social support has a direct effect on physical and mental health. Proponents of this model suggest that being socially integrated in one's community may increase the likelihood of experiencing positive feelings, provide a greater sense of community, and make the person feel good about him or herself (Cohen & Wills, 1985). This may result in increased well-being irrespective of whether or not stressors are present (Cassel, 1976; Cohen & Wills, 1985). The stress-buffering model suggests that social support moderates the relationship between stress and health (Cassel, 1976; Cobb, 1976; Cohen & Wills, 1985).

Overall, the stress-buffering model suggests that the impact of stressors on mental well-being can be alleviated with social support. That is, social support will be beneficial for individuals in times of stress by reducing the stressful demands and providing individuals with a bolstered ability to cope with stressful events (Cohen & Wills, 1985).

Evidence has been found supporting both of these models suggesting that social support can act both as a buffer in the presence of stressors and have a direct impact on health independently of the presence of stressors (Cohen & Wills, 1985; Russell & Cutrona, 1991; Schwarzer et al., 2004). They suggest that the relationship between social support and health is dependent on the type of support being studied. According to an extensive review conducted by Cohen and Wills (1985), in general, it would appear that studies that measure the perceived availability of the functional support find support for the stress-buffering hypothesis (Cohen & Wills, 1985). However, those that use measures of social network or that measure the amount of received functional support have failed to find support for the stress-buffering model.

Studies that have looked at the stress-buffering role of social support on psychological distress with older adults have reported mixed results. Ferraro and Su (1999) examined the interaction effect between financial strain and different types of social relations (support from family and friends, financial support from family) on psychological distress among older adults from four different nations and found that different interaction effects were found depending on the nation studied (Ferraro & Su, 1999). Ulbrich and Warheit (1989), using items that measure help from friends and family (tangible support) and Bienenfeld and colleagues (1997) using a scale designed to measure perceived emotional and instrumental support, have found support for the moderating role of social support on the relationship between stress and psychological distress (Bienenfeld et al., 1997; Ulbrich & Warheit, 1989). On the other hand, Cruza-Guet and

colleagues (2008), using a measure of received social support and another that taps on the subjective evaluation of the quality and/or quantity of social support, found support for the main effect but not for the interaction model (Cruza-Guet et al., 2008). Although not specifically with older adults, using a composite measure of social support Gadalla (2009) found no support for the stress-buffering role of social support (Gadalla, 2009).

Although, these studies and other related studies have started to paint a picture of the role of social relationships on the link between stressors and psychological distress, the current study extends previous research in several ways. For one, the current paper attempts to address the complexity of social support by investigating four different dimensions of functional social support. Emotional support refers to the extent to which relationships supply positive affect and reassurance and provide people with an opportunity to express their feelings (Cohen, 2004; Schwarzer et al., 2004; Sherbourne & Stewart, 1991), for example, 'someone you can tell your worries to'. Informational support involves the provision of guidance, advice, and information to help the individual cope with current stressors or difficulties (Cohen, 2004; Schwarzer et al., 2004; Sherbourne & Stewart, 1991), for example, 'someone you can turn to for suggestions'. Tangible support refers to the provision of help with solving current problems or help with daily activities (Cohen, 2004; Schwarzer et al., 2004; Sherbourne & Stewart, 1991). Examples include someone to take you to the doctor or to help with chores around the house. Affectionate support refers to the provision of love and affection (Cohen, 2004; Schwarzer et al., 2004; Sherbourne & Stewart, 1991), for example, 'someone who hugs and loves you'. Positive social interaction involves having friends and family members to have a great time and engage in activities with (Sherbourne & Stewart, 1991). We have chosen to use measures of perceived availability of the

different functions of support given that studies using these measures have found more support for the stress-buffering hypothesis (Cohen & Wills, 1985).

Secondly, this study uses both a cross-sectional and longitudinal design (four waves of data). Despite the practical importance of understanding the relationship between the interaction effect of social support on the relationship between stress and psychological distress over time, most studies to date have been cross-sectional in nature or have used only two waves of data. More information is needed about the long-term effect of social support in the stress-buffering model.

A primary objective of this study was to look at the cross-sectional interaction effect of chronic stressors and functional social support on psychological distress in a sample of older Canadians. The secondary objective of this study was to examine the longitudinal effect of chronic stressors on psychological distress and how, if at all, the effect of chronic stressors was dependent on functional social support. We hypothesized that emotional/informational and tangible support would moderate the relationship between chronic stressors and psychological distress given that these types of support provided the information and help necessary to increase one's control over the stressful situation (Bienenfeld et al., 1997; Cohen & Wills, 1985; Ulbrich & Warheit, 1989). We hypothesized that positive social interaction and affectionate support would fail to moderate the relationship between chronic stressors and psychological distress. Although, this type of support could potentially make people feel better about themselves, it is less likely that it would help them address stressors in their lives.

Methods

Sample and Data

Data from the National Population Health Survey (NPHS) were used (Statistics Canada, 2008). The data include seven cycles of longitudinal data collected over a twelve year period from 1994/1995 to 2006/2007. The household component of the longitudinal NPHS includes information about Canadian household residents' health, socio-demographic status, health services utilization, predictors of health, chronic conditions, and activity restrictions. It includes information about the same individuals every two years from 10 provinces excluding those living on Indian Reserves and Crown Lands, full-time members of the Canadian Forces Bases, and some remote areas in Ontario and Quebec. The NPHS also includes a Health Institutions component which includes residents of health institutions. People in health institutions were excluded from the current analyses.

For all provinces, except for Quebec, a stratified two-stage sample design where dwellings were selected within clusters was used. The design was based on the Labour Force Survey (LFS). The Quebec sample was selected based on a two-stage sample design from households participating in a survey called "Enquête sociale et de la santé" (ESS). The longitudinal sample size is 17,276 persons. A computer-assisted personal and telephone interviewing (CAI) method was used to collect the data. The majority of interviews were conducted by telephone and the rest were in-person. Only the four last time points were used given that social support was not measured at time one and two and chronic stressors was not measured at time three. Given that we were interested in predictors of distress in older adults, only adults aged 55 years of age and older when they first started the study were included in the analyses.

Measures

Medical Outcomes Study Social Support Survey. The Medical Outcomes Study (MOS) social support survey is a 19-item survey that measures four dimensions of functional social support including emotional/informational support, tangible support, positive social interactions, and affectionate support (Sherbourne & Stewart, 1991). Functional support is the extent to which relationships serve particular functions. Emotional/informational support includes eight items measuring the extent to which interpersonal relationships provide guidance and positive affect (e.g. “someone you can count on to listen to you when you need to talk”). Tangible support includes four items measuring the extent to which behavioural help is provided to them (e.g. “someone to help you if you were confined to bed”). Affectionate support includes three items measuring the extent to which the function of love and affection is met (“someone to love and make you feel wanted”). Positive social interaction includes four items measuring individuals’ availability of someone to have fun with. Questions were answered on a five-point scale ranging from “none of the time” to “all of the time” with higher values indicating more social support. The survey also includes one structural measure of social support (“about how many close friends and close relatives do you have”) but it was not included in the current study. Sherbourne and Stewart (1991) have found good convergent and discriminant validity for the MOS social support survey (Sherbourne & Stewart, 1991). Also, internal consistency values ranged from .90 to .97 and test-retest reliability ranged from .72 to .78 (Robitaille et al., 2010; Sherbourne & Stewart, 1991). Confirmatory factor analysis (CFA) produced a four-factor structure (Gjesfjeld et al., 2008; Robitaille et al., 2010; Sherbourne & Stewart, 1991; See Appendices A and B).

Psychological distress. The K6 is a validated measure used to assess individuals’ non-specific psychological distress in population surveys (Kessler et al., 2003). It was initially

developed for use in the US National Health Interview Survey (NHIS) in order to discriminate between community cases and non-cases of non-specific distress based on severity rather than diagnosis. Both a ten-item (K10) and a six-item (K6) version of the survey were developed. For this study, the K6 version of the survey was used. Sample items include “During the past month, about how often did you feel so sad that nothing could cheer you up?” and “During the past month, about how often did you feel hopeless.” Respondents were asked to answer on a five-point scale ranging from “none of the time” to “all of the time.” Each question score ranges from zero to four and the total scale score ranges from 0 to 24. The K6 has strong psychometric properties and can accurately discriminate between DSM-IV cases and non-cases (Furukawa et al, 2003, Kessler et al, 2002, Kessler et al, 2003). Furthermore, compared to the General Health Questionnaire (GHQ-12), the K6 and K10 were found to better discriminate DSM-IV anxiety and depression cases and non-cases and were found to be a better scale for measuring mental health (Furukawa et al, 2003). See Appendices C and D for the psychological distress scale.

Chronic stressors The measure of chronic stressors was developed based on the work by Wheaton (1991, 1994, cited in Turner, Wheaton, & Lloyd, 1995). This scale was designed to measure the subjective presence of chronic stressors rather than the objective presence of stressful situations (Turner et al, 1995, Wheaton, 1994). The original measure includes 90 items designed to measure 12 different types of chronic stressors: general or ambient problems, financial issues, marriage and relationships, work, family, parental issues, residence, health, school, crime and legal matters, religion, and social life (Wheaton, 1994). The chronic stressors measure included in the NPHS encompasses fewer items and measures seven different dimensions of chronic stressors rather than 12: personal problems, financial problems,

relationship problems (with mate), relationship problems (without mate), relationship problems, child related problems (for respondents with children), environmental problems, and family health problems. Sample items include “You are trying to take on too many things at once” and “You don’t have enough money to buy the things you need”. Response options are “true” or “false” (See Appendices K and L). A dichotomous variable was created for each type of stressor where if “true” was reported for any of the items the respondent was identified as having that specific type of stressor (coded as 1) and if all “false” was reported the respondent was identified as having no stressor (coded as 0). Total scores were calculated based on items one to eight and items 10 to 18. Scores range from zero to 16 with higher values indicative of more stressors. These scores were calculated by using the mean of all answers other than “don’t know”, “refusal”, and “not stated” given that these three options were treated as missing values. Participants that had more than 25% of “don’t know”, “refusal”, and “not stated” were not included in the total score calculation. The range of the total score depended on the respondent’s personal life. For example, persons who do not have any children are not asked questions about children. This measure of chronic stressors is related with other measures of difficult life situations (Wheaton, 1994). Confirmatory factor analyses have indicated that the chronic stress index measures a concept that is distinct from distress (Turner et al., 1995; Wheaton, 1994).

We chose to use this type of stressor over other stressors such as recent life events given that chronic stressors represent a more long-term impact of difficult events. A measure of chronic stressors was more appropriate given that we are investigating the long-term impact of stressors on distress (two year time interval; See Appendices K and L for the English and French version of the survey). It has also been reported as being advantageous when examining the impact of stress on psychological distress (Mirowsky & Ross, 2003). Models of the reciprocal

association between chronic stressors and psychological distress have shown that chronic stressors were related to psychological distress even when controlling for the role of psychological distress on chronic stressors (Turner et al., 1995; Wheaton, 1994).

Covariates. Four covariates were measured at baseline. These included gender (1 = males; 2 = females), education level (grouped in four categories: less than secondary graduation, secondary graduation, some postsecondary education, and postsecondary graduation), language (1 = English; 2 = French), and age (See Appendices E and F for survey questions about education).

Analysis

For the cross-sectional study, all variables were tested at one time point for each time wave. For the longitudinal analyses, the interaction effects were tested with distress, functional support, chronic stressors, and the interaction term at time one predicting distress at time two and so forth for four waves of data. Chronic stressors was the predictor, the different dimensions of social support were the proposed moderators, and psychological distress was the outcome variable. Four additional variables were also controlled for: age, gender, language, and education. The cross-sectional and longitudinal models were tested for each dimension of social support. That is, for all of the models, chronic stressors and psychological distress remained the same but the moderating variable was different for each model in order to gain knowledge about the role of the different dimensions of social support. We tried to use a multiple indicator latent variable model, but the model would not converge. Instead we used single-indicator latent variables with zero measurement error. The four items making up the tangible support scale were added to create the tangible support variable, three items were added to create the affectionate support variable, 8 items were added to create the emotional/informational support variable, and

four items were added to create the positive social interaction scale. Sixteen items were added to create the chronic stressors variable, and six items were added to create the psychological distress variable. A significant negative relationship between the interaction (chronic stressors and support) was indicative of the existence of a buffering effect on distress. That is, the same amount of stressors leads to less increase in distress when functional social support is higher. Note that the term 'effect' used in this paper does not imply causality.

An SEM procedure called latent moderated structural (LMS) equations approach for modeling an interaction in a single sample was used given that both the interacting variables were continuous, the method is slightly more parsimonious, and a larger sample size can be used given that the sample is not divided into two groups. The multisample approach was considered, however, dividing social support into discrete variables such as low and high support would have yielded very unequal and smaller sample sizes.

With the estimation of latent interaction models, even if the exogenous variables are normally distributed, the distribution of the nonlinear variables (interaction) will not be normally distributed (Jöreskog & Yang, 1996; Klein & Moosbrugger, 2000; Moosbrugger, Schermelleh-Engel, Kelava, & Klein, in Press). Given that nonlinear terms should not be normalized, centered, or standardized (Aiken & West, 1991) it was important that a method that accounts for non-normality be used. The LMS equations approach has been found to take non-normality in latent interactions into account making it a more robust method that provides accurate results (Klein & Moosbrugger, 2000; Schermelleh-Engel, Klein, & Moosbrugger, 1998). Furthermore, the maximum likelihood parameter estimate (MLR) when used in combination with TYPE=COMPLEX is robust to non-normality and non-independence of observations (Muthén & Muthén, 2007).

Sample weights were calculated in order to be able to obtain meaningful estimates from the NPHS given that parameter estimate bias has been found to occur when weights are not included (Asparouhov, 2005). When including sample weights each respondent represents himself or herself but also numerous other people that are not in the survey in order for the non random NPHS sample to reflect the Canadian population (Statistics Canada, 2008; Tambay & Catlin, 1995). Therefore, each person in the survey is given a weight. These were calculated based on the formula provided by Statistics Canada. In order to deal with sample size inflation, the weighted value was further divided by the average weight in order to get a normalized weight (Statistics Canada, 2008).

As mentioned, data were collected using a complex survey design where stratified and cluster sampling was used. Although, this type of survey design decreases variability, it was nevertheless chosen as the study design method given that it is more efficient and represents a better representation of the entire population. Therefore, it is important that we adjust for the violation of the assumption of independence between observations. The bootstrap technique was used for the preliminary analyses in order to address the problems associated with estimating the variance when using a multistage complex survey design method. The bootstrap technique creates a file with 500 bootstrap weights. In SEM, using complex survey design data may underestimate standard errors and intern might have an effect on chi-square values. The linearization (also called Taylor Series approximation) method with both the cluster and stratum identifiers was used. This method has been found to provide robust estimates of parameters and of standard errors (Stapleton, 2006).

In Mplus, the estimation of models can be done with missing data by using the covariates included in the model to predict missingness. This is based on the full information maximum

likelihood (FIML) estimation (Enders, 2006). Mplus offers robust standard errors for missing data and estimates standard errors using the observed information matrix. The chi-square test statistics and model fit indices are calculated from the log likelihood of the data for each observation (Duncan et al., 2006; Enders, 2006). This method has been found to provide less biased estimator estimates than other methods to dealing with missing data (Schafer & Graham, 2002).

Indices of fit such as the Tucker-Lewis Index (TLI), the comparative fit index (CFI), and the root-mean-square-error of approximation (RMSEA) that are normally used in SEM models are not available with the LMS procedure for interaction models; therefore, they will not be reported here. This is because the LMS method requires the raw data file in order to be able to run the estimates (Schermerle-Engel et al., 1998). In order to be able to compute chi-square and related fit indices, the covariance structure analysis (means, variances, and covariances) must be used but this is not sufficient to be able to estimate interaction models (Muthén & Muthén, 2006). Therefore, only the unstandardized estimates, standard errors, and confidence intervals will be reported. Standardized estimates for these analyses are not provided by Mplus.

For models where chronic stressors and social support interacted, we also graphed the interaction in order to get a better understanding of the nature of the relationship between chronic stressors and distress. The following formula was used to graph the relationship between stress and distress with social support at different levels: $b_{1(\text{stressors})}|(M = \theta) = b_{1(\text{stressors})} + b_3\theta_{(\text{interaction})}$ where M is the moderator variable and θ is the chosen value of the moderator (Hayes & Matthes, 2009).

Results

Univariate normality of the MOS social support scale was assessed by looking at the skewness and kurtosis of the distribution. Absolute values of skewness and kurtosis for all variables are presented in Table 1. The Kolmogorov-Smirnov statistic was also examined to test

Table 1

Mean, standard deviation, skewness, and kurtosis for study variables

Variables	Time 1		Time 2		Time 3		Time 4		Skew ^a	Kurt ^a
	M	SD	M	SD	M	SD	M	SD		
Stress	1.63	2.05	1.75	2.02	1.73	2.07	1.81	2.09	2.10	7.99
TS	13.60	3.66	13.15	3.71	13.35	3.71	13.03	3.69	-2.12	6.70
PSI	13.61	3.40	13.07	3.51	13.23	3.59	12.91	3.71	-1.74	4.91
EIS	27.04	6.54	25.94	6.95	26.17	7.18	26.02	7.29	-1.74	5.53
AS	10.39	2.55	10.10	2.64	10.23	2.67	10.22	2.58	-2.11	7.15
PD	1.84	2.71	2.00	3.00	1.93	2.87	1.96	2.91	2.75	12.05

Note. Stress = chronic stressors; TS = tangible support; AS = affectionate support; PSI = positive social interaction; EIS = emotional/informational support; PD = psychological distress. The normalized survey sampling weights were used. ^aThese represent absolute values. Only the most extreme skewness and kurtosis score for each variable is included rather than including values for each time.

the null hypothesis that the data were normally distributed. We rejected the null hypothesis.

However, given the increased likelihood of finding significance with large sample sizes we also examined the histograms. Based on the histograms, psychological distress and chronic stressors were positively skewed and the variables of functional social support were negatively skewed.

Univariate outliers were also verified by looking at the histograms and frequencies and looking at the frequency table for zscores. All values above ± 3.29 were considered outliers. Outliers were found in tangible (12-33 cases), affectionate (18-35 cases), and emotional/informational

support (16-29 cases), and positive social interaction (13-28 cases), psychological distress (29-44 cases) and chronic stressors (18-28 cases) at all four data collection times. Multivariate outliers were also examined with Mahalanobis distance. No multivariate outliers were identified.

Multicollinearity was also not a problem in this data set. Although the data show some deviation from normality, we nevertheless decided not to delete any variables or cases and not to perform any transformations. Rather, the LMS equations approach and the MLR method that takes non-normality into account that is available with Mplus was used. The pattern of missing data was also verified. Given that a series of five models were tested, the pattern of missing values was verified for each type of social support separately. Those with missing values were older, had a lower level of education and income and were less likely to be in a relationship. There was no difference on language and gender except for structural support. Statistics on the pattern of missing values are available by request to the authors (See Appendices G and H for the survey questions about income and Appendices I and J for questions about marital status). The mean and standard deviations of the different dimensions of social support, chronic stressors, and psychological distress are presented in Table 1.

Sample Description

The final sample was 2564 respondents ranging in age from 55 to 89 with an average age of 63.98 years ($SD = 6.86$) when they first start the study in 1994/1995. Only French and English-speaking respondents were included in the final analyses. Table 2 provides information about the participants' gender, language, marital status, and education.

Cross-sectional Interaction Model

For the cross-sectional interaction models, differences were found depending on the type of functional support being modeled; therefore, each is discussed separately. See Figure 1 to 8

for the interaction models and the visual depiction of the relationship between chronic stressors and psychological distress for different levels of social support.

Table 2

Descriptive statistics for study variables

Variable	Frequency (%)
Language	
French	433 (23.41)
English	2131 (76.59)
Gender	
Male	991 (40.69)
Female	1573 (59.31)
Marital status	
Married, common law, or living with a partner	1365 (61.69)
Single	135 (4.19)
Widowed, separated, or divorced	828 (25.67)
Missing	236 (8.45)
Education	
Less than a secondary school graduation	1173 (42.31)
Secondary school graduation	328 (13.19)
Some post-secondary education	490 (19.25)
Post-secondary graduation	565 (24.72)

Note. Frequencies are unweighted; percents are weighted estimates.

Affectionate support. In general, affectionate support did not act as a buffer against chronic stressors. As an exception, there was an interaction effect at time one with lower distress levels being related to higher affectionate support in the presence of chronic stressors. As depicted in Figure 2, the plot shows that as the level of affectionate support increases, there is a gradual but steady corresponding decrease in the effect of stressors on distress. Higher levels of stressors were correlated with higher psychological distress at all four time points. Also, higher affectionate support was related with lower psychological distress for two of the four time points. See Table 3 for the unstandardized estimates, standard errors, and confidence intervals for all parameter estimates.

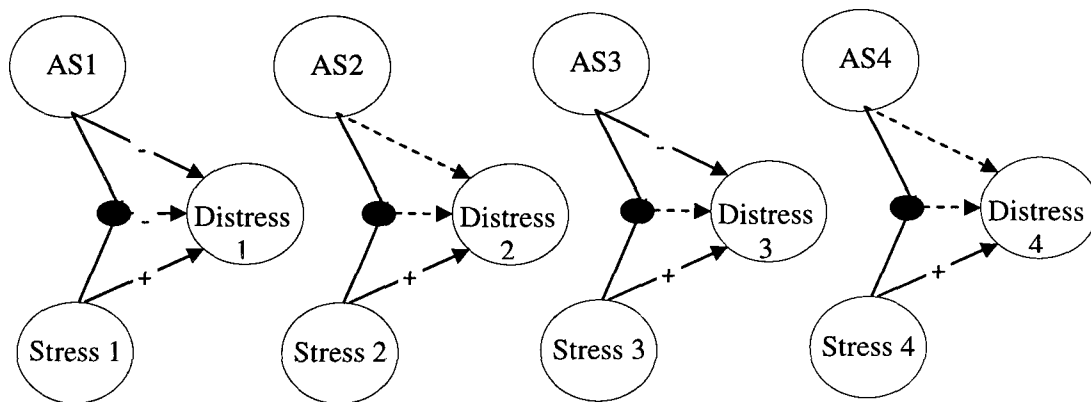


Figure 1. Cross-sectional model of the interaction of affectionate support and chronic stressors on psychological distress from time 1 to time 4. Dotted lines represent non-significant paths. AS = affectionate support; PD = psychological distress. The interaction is depicted as a filled circle.

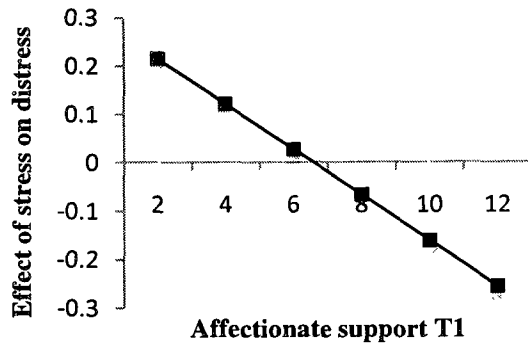


Figure 2. Visual depiction of the effect of chronic stressors on psychological distress with affectionate support at different levels. The computation is derived as $b_{1(\text{stressors})}|(M = \theta) = b_{1(\text{stressors})} + b_3\theta_{(\text{interaction})}$.

Tangible support. Results demonstrated that the relationship between tangible support and stressors and psychological distress was negatively and statistically significant at all four time points suggesting that tangible support acted as a buffer against the detrimental effect of chronic stressors. The plots in Figure 4 illustrate that as the level of tangible support increases, there is a gradual but steady corresponding decrease in the effect of stressors on distress. Higher levels of stressors were also related with higher distress. In general, tangible support was not related with psychological distress. Higher tangible support was only related with lower distress at one time point (time four). See Table 3 for the unstandardized estimates, standard errors, and confidence intervals for all parameter estimates.

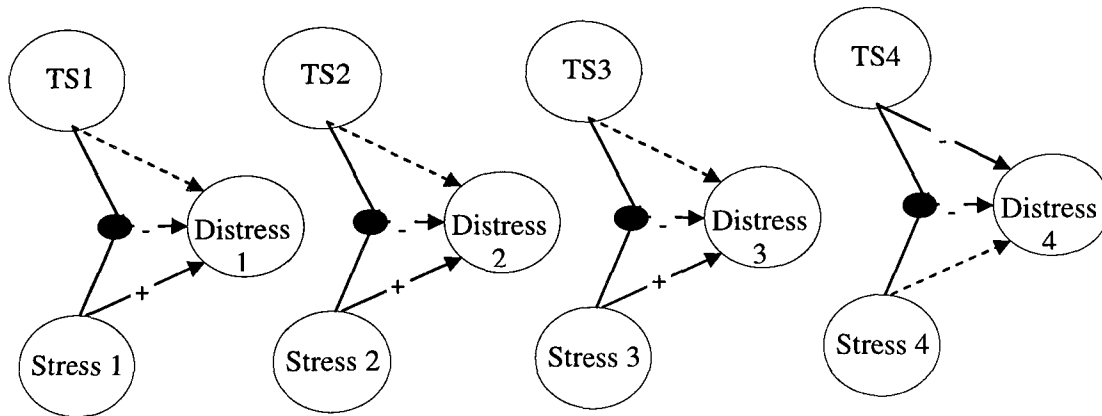


Figure 3. Cross-sectional model of the interaction of tangible support and chronic stressors on psychological distress from time 1 to time 4. Dotted lines represent non-significant paths. TS = tangible support; PD = psychological distress. The interaction is depicted as a filled circle.

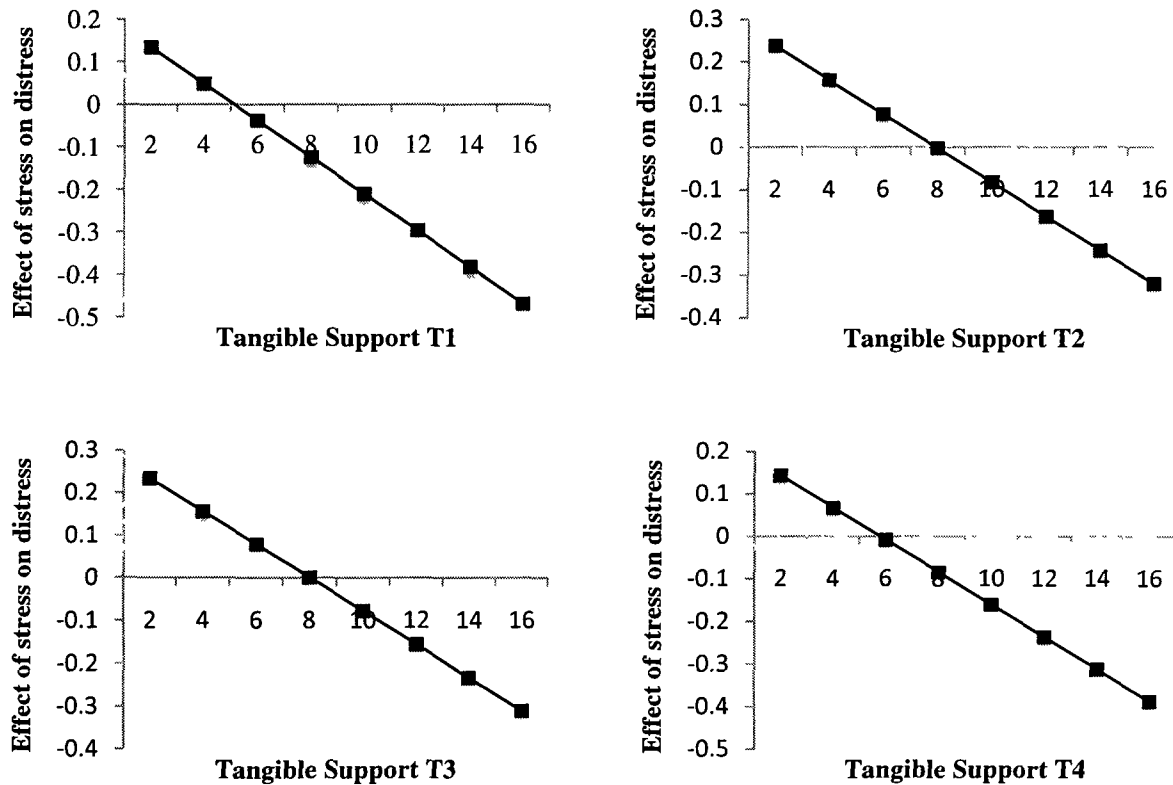


Figure 4. Visual depiction of the effect of chronic stressors on psychological distress with tangible support at different levels. The computation is derived as $b_{1(\text{stressors})}|(M = \theta) = b_{1(\text{stressors})} + b_3\theta_{(\text{interaction})}$.

Positive social interaction. In general, positive social interaction did not act as a buffer against chronic stressors. As an exception, a significant interaction effect at time four with lower distress levels being related with higher positive social interaction in the presence of chronic stressors was found. The plot shows that as the level of positive social interaction increases, there is a gradual but steady corresponding decrease in the effect of stressors on distress (see Figure 6).

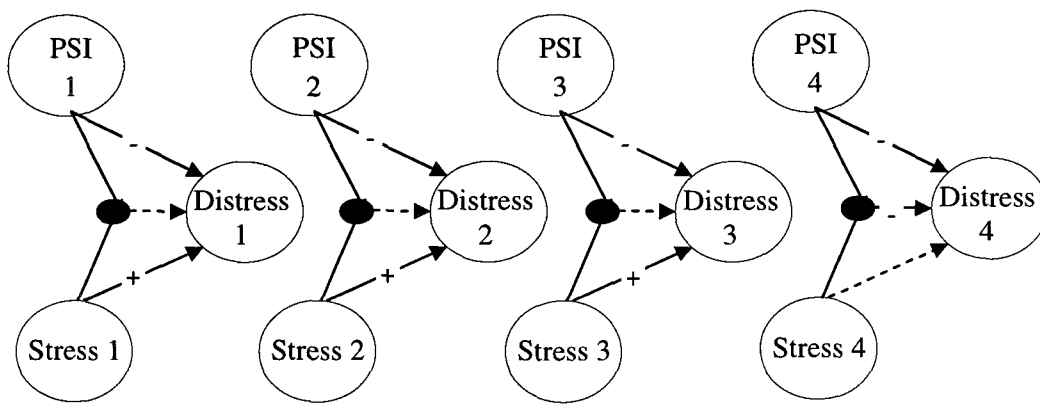


Figure 5. Cross-sectional model of the interaction of positive social interaction and chronic stressors on psychological distress from time 1 to time 4. Dotted lines represent non-significant paths. PSI = positive social interaction; PD = psychological distress. The interaction is depicted as a filled circle.

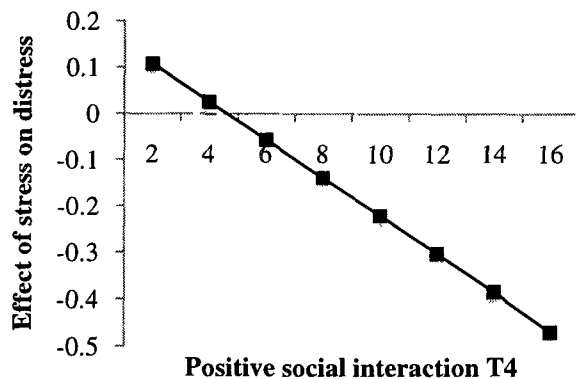


Figure 6. Visual depiction of the effect of chronic stressors on psychological distress with positive social interaction at different levels. The computation is derived as $b_{1(\text{stressors})}|(M = \theta) = b_{1(\text{stressors})} + b_3\theta_{(\text{interaction})}$.

Table 3

Unstandardized estimates, standard errors, and confidence intervals for the cross-sectional interaction models

Parameters	AS			TS			PSI			EIS		
	95% CI			95% CI			95% CI			95% CI		
	EST.(SE)	low	high	EST.(SE)	low	high	EST.(SE)	low	high	EST.(SE)	low	high
PD on Stress(T1)	0.31(.06)*	0.19	0.44	0.22(.09)*	0.04	0.40	0.33(.07)*	0.19	0.47	0.39(.06)*	0.28	0.51
PD on Support(T1)	-0.09(.04)*	-0.17	-0.007	-0.004(.02)	-0.05	0.04	-0.09(.03)*	-0.15	-0.04	-0.05(.01)*	-0.07	-0.02
Interaction(T1)	-0.05(.02)*	-0.08	-0.01	-0.04(.01)*	-0.07	-0.02	-0.02(.01)	-0.05	0.003	-0.008(.007)	-0.02	0.005
PD on Stress(T2)	0.52(.05)*	0.42	0.62	0.32(.11)*	0.12	0.53	0.39(.09)*	0.21	0.57	0.50(.07)*	0.36	0.63
PD on Support(T2)	-0.10(.05)	-0.19	0.00	-0.03(.03)	-0.09	0.04	-0.07(.04)*	-0.14	-0.003	-0.03(.02)	-0.07	0.005
Interaction(T2)	-0.03(.02)	-0.08	0.01	-0.04(.02)*	-0.07	-0.01	-0.03(.02)	-0.06	0.001	-0.02(.008)*	-0.04	-0.002
PD on Stress(T3)	0.38(.08)*	0.22	0.54	0.31(.09)*	0.14	0.48	0.35(.08)*	0.18	0.51	0.46(.07)*	0.31	0.60
PD on Support(T3)	-0.11(.05)*	-0.20	-0.02	-0.05(.03)	-0.11	0.01	-0.13(.04)*	-0.19	-0.06	-0.04(.02)*	-0.07	-0.005
Interaction(T3)	-0.04(.02)	-0.08	0.005	-0.04(.01)*	-0.06	-0.01	-0.03(.02)	-0.06	0.001	-0.02(.007)*	-0.04	-0.007
PD on Stress(T4)	0.32(.11)*	0.11	0.53	0.22(.12)	-0.02	0.46	0.19(.11)	-0.02	0.40	0.40(.10)*	0.21	0.59
PD on Support(T4)	-0.08(.05)	-0.18	0.019	-0.07(.03)*	-0.12	-0.01	-0.11(.04)*	-0.19	-0.03	-0.04(.02)*	-0.07	-0.01
Interaction(T4)	-0.04(.02)	-0.09	0.002	-0.04(.01)*	-0.07	-0.01	-0.04(.01)*	-0.07	-0.02	-0.02(.007)*	-0.04	-0.01

Note. EST = unstandardized estimates; SE = standard errors of estimates; Stress = chronic stressors; TS = tangible support; AS = affectionate support; PSI = positive social interaction; EIS = emotional/informational support; PD = psychological distress. The normalized survey sampling weights and the Taylor linearization method was used. * denote significant paths (critical value = ± 1.96).

The level of chronic stressors was significantly related with psychological distress with higher stressors being associated with higher distress for all four time points. Higher positive social interaction was related with lower psychological distress for all four time points. See Table 3 for the unstandardized estimates, standard errors, and confidence intervals for all parameter estimates.

Emotional/informational support. The interaction effect was significant for three of the four time points. As depicted in Figure 8, the plots show that as the level of emotional/informational support increases, there is a gradual but steady corresponding decrease in the effect of stressors on distress. A higher level of chronic stressors was significantly related with higher psychological distress for all four time points. Higher emotional/informational support was related with lower psychological distress for all four time points. See Table 3 for the unstandardized estimates, standard errors, and confidence intervals for all parameter estimates.

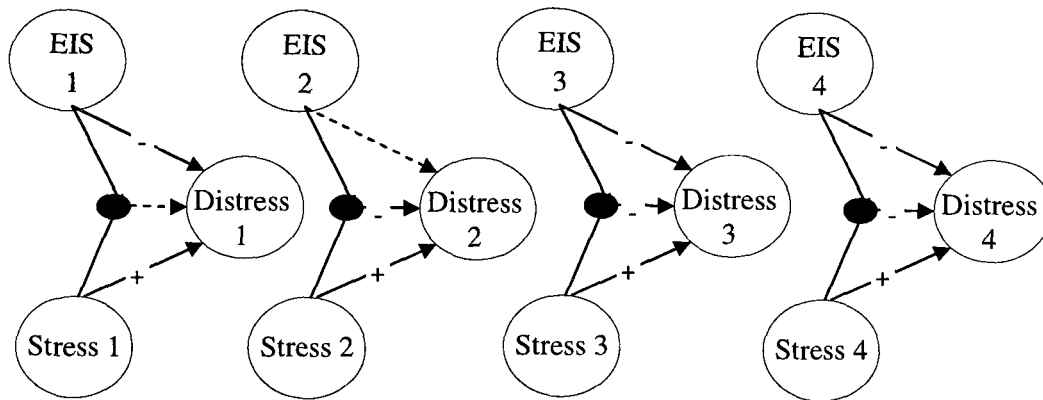


Figure 7. Cross-sectional model of the interaction of emotional/informational support and chronic stressors on psychological distress at time 1 to time 4. Dotted lines represent non-significant paths. EIS = emotional/informational support; PD = psychological distress. The interaction is depicted as a filled circle.

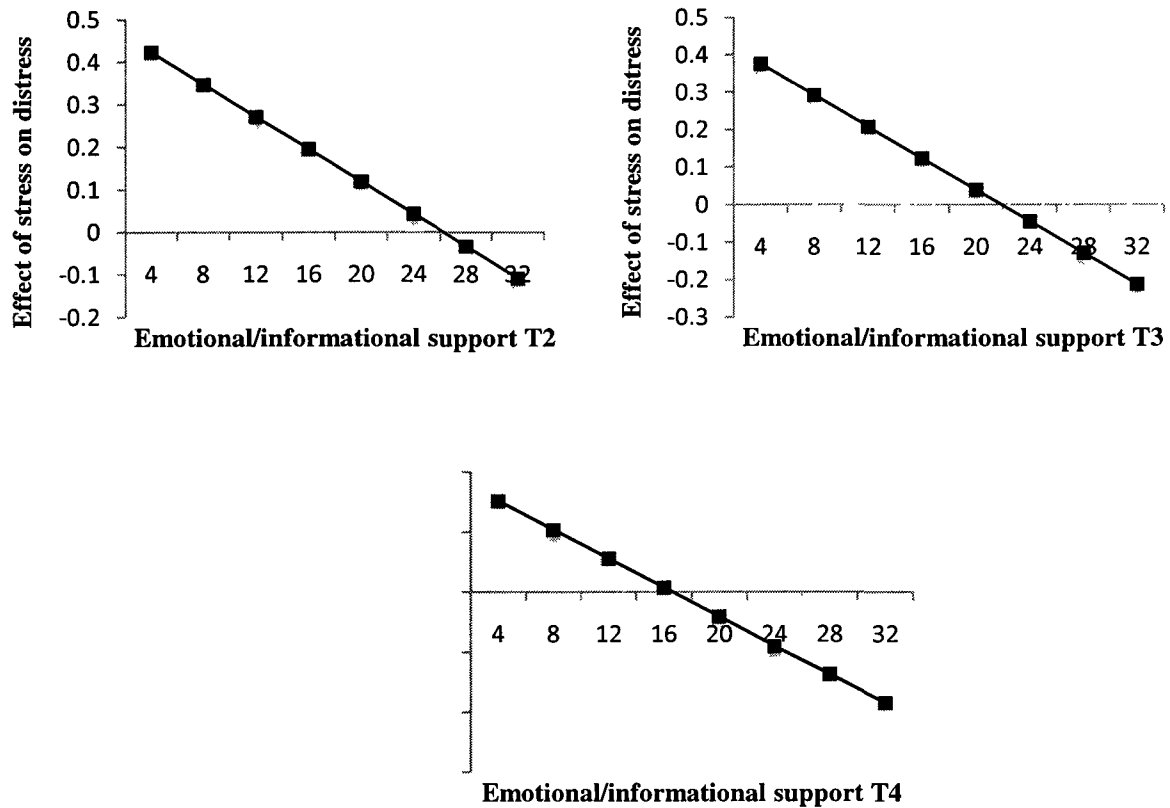


Figure 8. Visual depiction of the effect of chronic stressors on psychological distress with emotional/informational support at different levels. The computation is derived as $b_{1(\text{stressors})}|(M = \theta) = b_{1(\text{stressors})} + b_3\theta_{(\text{interaction})}$.

Longitudinal Interaction Model

Very few differences were found between the interaction models using different dimensions of functional support. For all four models (tangible, emotional/informational, and affectionate support, and positive social interaction), the interactive effect of functional support and stressors on distress was only significant at one time interval (time 2 to time 3). All other time intervals were nonsignificant. The plots show that as the level of functional support increases, there is a gradual but steady corresponding decrease in the effect of stressors on distress (Figure 10, 12, 14, 16). In terms of the main effects, for all four dimensions of functional support, stressors at time one were related with subsequent psychological distress at time two but

was nonsignificant for all other time waves. Higher affectionate and tangible support, and positive social interaction at time two were associated with higher psychological distress at time three but were nonsignificant for all other time waves. As expected, prior higher psychological distress was predictive of subsequently higher distress for all time waves. See Figure 9 to 16 for the interaction models and the visual depiction of the relationship between chronic stressors and psychological distress with support at different levels (the plots are only provided for the times where the interaction effects were significant).

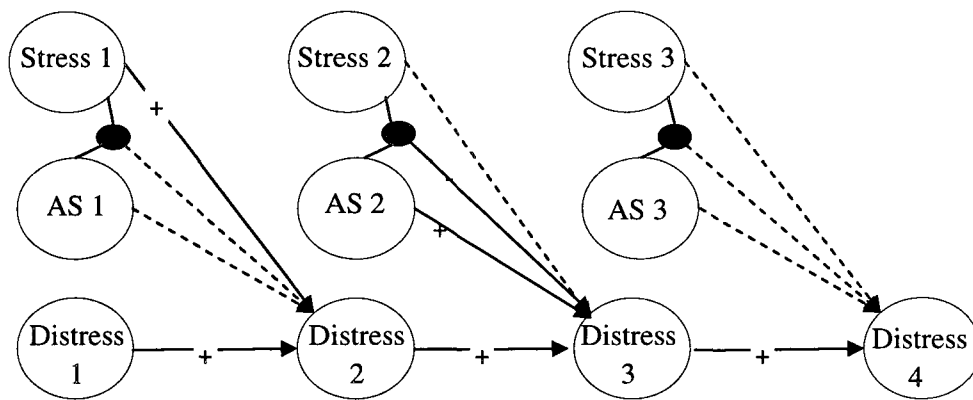


Figure 9. Longitudinal model of the interaction of affectionate support and chronic stressors on psychological distress four. Dotted lines represent non-significant paths. AS = affectionate support; PD = Psychological distress. The interaction is depicted as a filled circle.

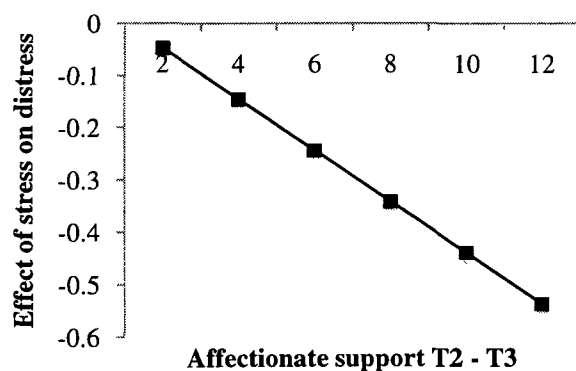


Figure 10. Visual depiction of the relationship between chronic stressors (time 2) and psychological distress (time 3) with affectionate support (time 2) at different levels.

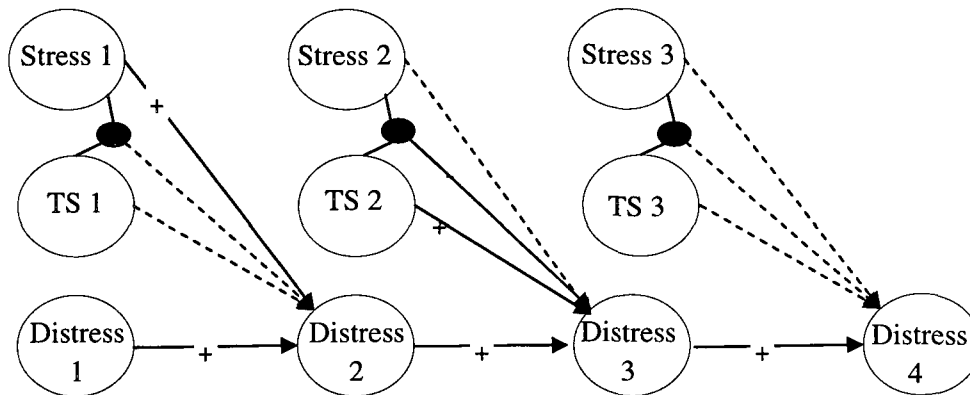


Figure 11. Longitudinal model of the interaction of tangible support and chronic stressors on psychological distress for 4 waves of data. Dotted lines represent non-significant paths. TS = tangible support; PD = psychological distress. The interaction is depicted as a filled circle.

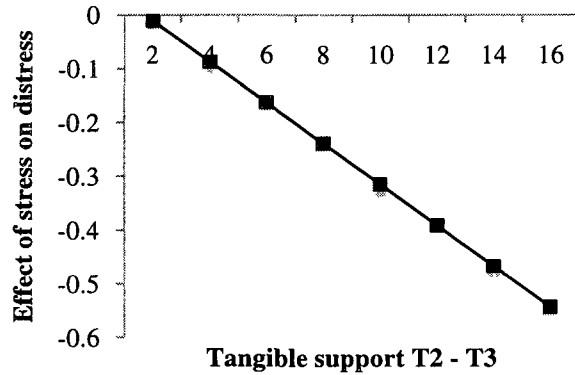


Figure 12. Visual depiction of the relationship between chronic stressors (time 2) and psychological distress (time 3) with tangible support (time 2) at different levels.

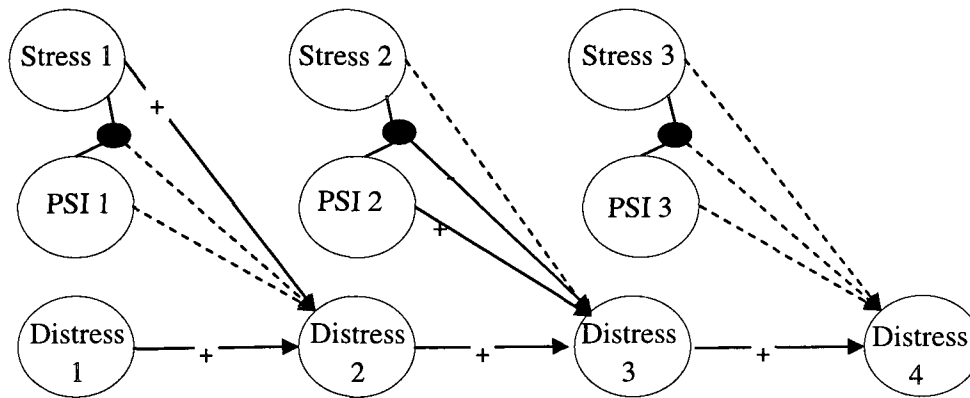


Figure 13. Longitudinal model of the interaction of positive social interaction and chronic stressors on psychological distress for 4 waves of data. Dotted lines represent non-significant paths. PSI = positive social interaction; PD = psychological distress. The interaction is depicted as a filled circle.

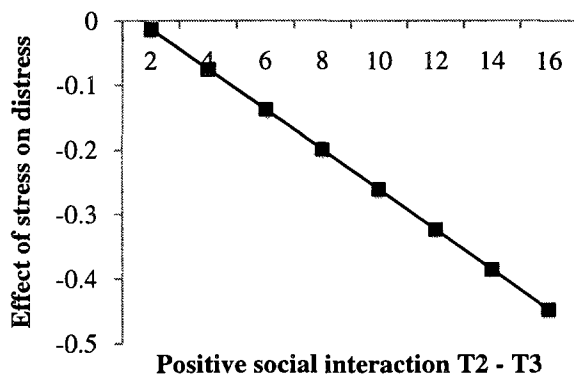


Figure 14. Visual depiction of the relationship between chronic stressors (time 2) and psychological distress (time 3) with positive social interaction (time 2) at different levels.

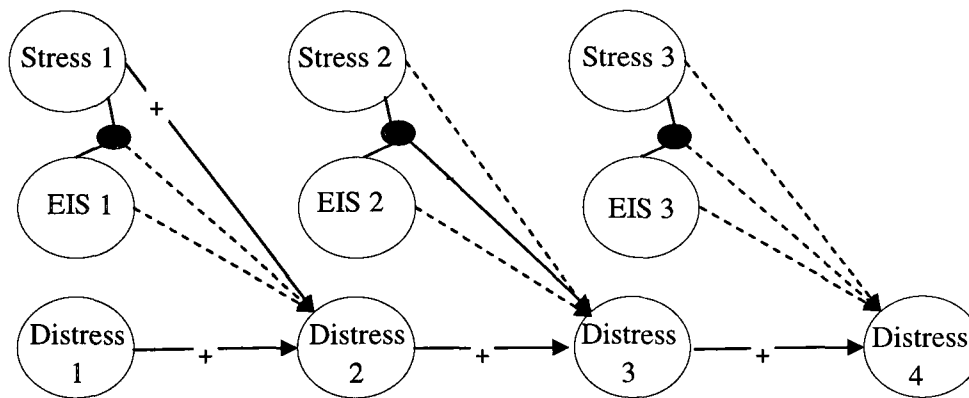


Figure 15. Longitudinal model of the interaction of emotional/informational support and chronic stressors on psychological distress for 4 waves of data. Dotted lines represent non-significant paths. EIS = emotional/informational support; PD = psychological distress. The interaction is depicted as a filled circle.

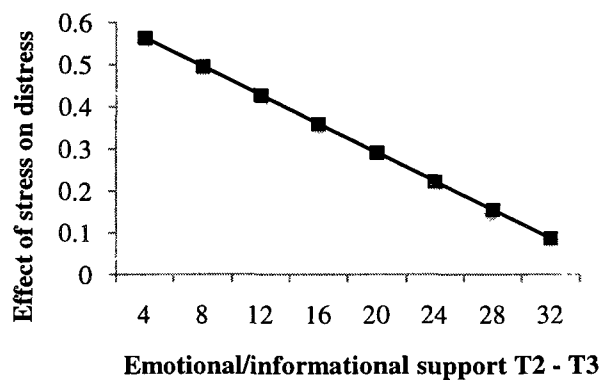


Figure 16. Visual depiction of the relationship between chronic stressors (time 2) and psychological distress (time 3) with emotional/informational support (time 2) at different levels.

Table 4

Unstandardized estimates, standard errors, and confidence intervals for the longitudinal interaction models

Parameters	AS			TS			PSI			EIS		
	95% CI			95% CI			95% CI			95% CI		
	EST.(SE)	Low	high	EST.(SE)	low	high	EST.(SE)	low	high	EST.(SE)	low	high
PD(T2) on PD(T1)	1.59(.41)*	0.77	2.40	1.55 (.40)*	0.77	2.33	1.59(.41)*	0.79	2.39	1.56(.39)*	0.79	2.34
PD(T2) on Stress(T1)	0.21(.04)*	0.13	0.30	0.19 (.04)*	0.11	0.28	0.20(.05)*	0.11	0.29	0.20(.05)*	0.11	0.29
PD(T2) on Support(T1)	0.01(.04)	-0.06	0.08	-0.04 (.03)	-0.10	0.03	0.01(.03)	-0.05	0.07	-0.008(.02)	-0.04	0.02
PD(T2) on Int(T1)	-0.01(.02)	-0.04	0.02	-0.02 (.02)	-0.05	0.007	-0.01(.01)	-0.04	0.01	-0.005(.006)	-0.02	0.01
PD(T3) on PD(T2)	0.61(.12)*	0.38	0.84	0.56(.12)*	0.33	0.79	0.61(.12)*	0.38	0.84	0.63(.11)*	0.41	0.85
PD(T3) on Stress(T2)	0.05(.05)	-0.04	0.14	0.07(.05)	-0.03	0.16	0.03(.06)	-.04	0.14	0.05(.05)	-0.04	0.13
PD(T3) on Support(T2)	0.08(.04)*	0.01	0.16	0.08(.03)*	0.02	0.15	0.06(.03)*	0.01	0.11	0.03(.02)	-0.01	0.06
PD(T3) on Int(T2)	-0.05(.02)*	-0.09	-0.01	-0.04(.01)*	-0.07	-0.01	-0.03(.01)*	-0.06	-0.01	-0.02(.007)*	-0.03	-0.00
PD(T4) on PD(T3)	1.17(.27)*	0.64	1.69	1.19(.29)*	0.62	1.76	1.20(.29)*	0.63	1.78	1.13(.28)*	0.59	1.67
PD(T4) on Stress(T3)	0.04(.06)	-0.08	0.16	0.03(.06)	0.11	0.28	0.03(.06)	-0.09	0.15	0.03(0.06)	-0.08	0.15
PD(T4) on Support(T3)	-0.02(.04)	-0.10	0.06	-0.03(.04)	-0.11	0.04	-0.06(.04)	-0.13	0.01	-0.01(.02)	-0.05	0.02
PD(T4) on Int(T3)	-0.01(.02)	-0.04	0.03	-0.03(.04)	-0.04	0.03	0.01(.02)	-0.03	0.04	-.002(.009)	-0.02	0.02

Note. EST = unstandardized estimates; SE = standard errors of estimates; Stress = chronic stressors; TS = tangible support; AS = affectionate support; PSI = positive social interaction; EIS = emotional/informational support; PD = psychological distress; Int = interaction between support and stress. The normalized survey sampling weights and the Taylor linearization method was used. * denote significant paths (critical value = ± 1.96).

Covariates

For the cross-sectional models, the estimates for the covariates showed a statistically significant relationship between gender and distress and stressors with males reporting lower levels of psychological distress and fewer chronic stressors than females. Older adults also reported fewer chronic stressors. For approximately half of the models, language was significantly related with psychological distress with French-speaking Canadians reporting higher levels of distress, and education was negatively related with chronic stressors. Education and age were not significantly related with psychological distress. Language was not significantly associated with chronic stressors. Unstandardized estimates, standard errors, and confidence intervals for the covariates included in the cross-sectional interaction models are available by request to the authors.

For the longitudinal models, the estimates for the covariates showed a statistically significant association between language and psychological distress with French-speaking Canadians reporting higher levels of distress. Males were also more likely than females to report lower levels of distress. Education and age were not significantly related with psychological distress. Older adults and males reported having fewer chronic stressors. Education and language were not significantly associated with chronic stressors. See Table 5 for the unstandardized estimates, standard errors, and confidence intervals for the covariates included in the longitudinal interaction models.

Discussion

In the current study we examine the main and interactive effect of chronic stressors and different dimensions of functional support on psychological distress using four waves of data spanning over an eight year period with a sample of older adults. Unlike previous studies, this

Table 5

Unstandardized estimates, standard errors, and confidence intervals for the covariates included in the longitudinal interaction models

Parameters	AS			TS			PSI			EIS		
	95% CI			95% CI			95% CI			95% CI		
	EST.(SE)	low	high	EST.(SE)	low	high	EST.(SE)	low	high	EST.(SE)	low	high
PD1 on Language	0.74 (.24)*	0.26	1.22	0.75(.24)*	0.28	1.22	0.75(.25)*	0.27	1.23	0.74(.24)*	0.26	1.2
PD1 on Education	-0.005(.04)	-0.09	0.08	-0.007(.04)	-0.09	0.08	-0.003(.04)	-0.09	0.08	-0.003(.04)	-0.09	0.08
PD1 on Age	0.000(.009)	-0.02	0.02	-0.003(.009)	-0.02	0.01	0.000(.009)	-0.02	0.02	-0.001(.009)	-0.02	0.02
PD1 on Sex	0.49(.16)*	0.19	0.80	0.48(.15)*	0.18	0.78	0.49(.15)*	0.19	0.79	0.51(.15)*	0.21	0.81
STR1 on Language	-0.08(.12)	-0.31	0.15	-0.09(.12)	-0.32	0.14	-0.10(.12)	-0.33	0.14	-0.08(.12)	-0.31	0.16
STR1 on Education	-0.002(.04)	-0.08	0.07	-0.002(.04)	-0.08	0.07	-0.003(.04)	-0.08	0.07	-0.004(.04)	-0.08	0.07
STR1 on Age	-0.02(.007)*	-0.03	-0.003	-0.02(.007)*	-0.03	-0.003	-0.02(.007)*	-0.03	-0.003	-0.02(.007)*	-0.03	-0.003
STR1 on Sex	0.25(.09)*	0.07	0.43	0.26(.09)*	0.08	0.45	0.26(.09)*	0.07	0.44	0.25(.09)*	0.07	0.43

Note. EST = unstandardized estimates; SE = standard errors of estimates; TS = tangible support; AS = affectionate support; PSI = positive social interaction; EIS = emotional/informational support; PD = psychological distress; STR = chronic stressors. The normalized survey sampling weights and the Taylor linearization method was used. * denote significant paths (critical value = ± 1.96).

study adds to the previous research in several ways. It has a large sample size providing us with sufficient power to find an interaction effect, uses measures with adequate psychometric properties, and looks at the various types of support in a single study. Furthermore, we were able to examine our data both cross-sectionally and longitudinally over an extended period of time.

From the cross-sectional analyses, significant interaction effects were found for tangible and emotional/informational support. These findings suggest that the perceived availability of having someone to count on for behavioural help (tangible support) and having someone to talk to and who provides guidance (emotional/informational support) modifies the relationship between chronic stressors and psychological distress for older adults. This aligns with other research studies that have also reported support for the buffering hypothesis of tangible support and emotional/informational support on the relation between chronic stressors and distress (Bienenfeld et al., 1997; Cohen & Wills, 1985; Ulbrich & Warheit, 1989).

Emotional/informational support likely helps the person reappraise the chronic stressors as less threatening making it an important buffer against a wide range of stressors (cumulative measure of stressors) and tangible support provides the help needed to better deal with the stressors (Cohen & Wills, 1985). The main effect for tangible support was nonsignificant at all four times. This suggests that the perceived availability of behavioural help does not directly influence distress levels but rather helps people to better cope in times of stress. On the other hand, emotional/informational support was negatively and significantly related with psychological distress suggesting that the perceived availability of guidance and positive affect from others acts as a buffer against chronic stressors but is also related with distress irrespective of the level of stressors.

Our findings provide no evidence of a buffering effect of positive social interaction and affectionate support on the association between stressors and psychological distress. Having

someone to have a good time with and feeling loved does not appear to buffer the negative effects of the stressful events studied herein. Rather, having someone to have a good time with was negatively and significantly related with distress irrespective of stressor levels. The relationship between affectionate support and distress was less clear with two models finding a negative relationship with distress and two finding a nonsignificant relationship. Having a good time with friends and family and feeling loved improves people's overall mood. However, this type of support does not modify the impact of the stressors given that they really do not address these at all. For example, having friends and family to have a good time with would be unlikely to help someone who is overloaded with too many things to do ("you are trying to take too many things at once") or who is in a financially stressful situation ("you don't have enough money to buy things you want"). Rather, having people to count on for help (tangible support) or having someone to get advice from or to be able to talk to about the stressor (emotional/informational support) would seem more helpful.

Overall, it appears that different types of social support are differently related with psychological distress providing some support for the matching hypothesis (Cohen & Wills, 1985; Taylor & Aspinwall, 1996; Thoits, 1986). This might explain why many studies of the buffering effect of social support on the relationship between stressors and distress have failed to find significant results. Many of these studies have used measures of overall social support or types of support that do not interact with the stressors being measured (Cruza-Guet et al., 2008; Gadalla, 2009; Russell & Cutrona, 1991). Cruza-Guet and colleagues combined three types of support [tangible support, informational support, and affectionate support (they refer to it as emotional support but we refer to it as affectionate support given that it is most similar to our measure of affectionate support)] into one measure of support but failed to find a significant buffering effect of support on the relationship between financial strain and psychological

distress. It is possible that different results would have surfaced had these types of support been explored separately, especially given that affectionate support was nonsignificant for our study. The current study adds to the previous work in that area in that it examined different types of social support all in one paper.

For the longitudinal analysis, the stress-buffering hypothesis was only supported for one wave of data with social support acting as a buffer against the relationship between stressors in 2002/2003 and subsequent psychological distress two years later (2004/2005). The other two waves of data did not support the stress-buffering hypothesis. These findings suggest that there might have been some external factor that might have been responsible for these findings. Unfortunately, we were unable to locate a more thorough explanation for these findings. Another study using the NPHS data has also found inconsistent results when testing the stress-buffering hypothesis with longitudinal and cross-sectional data (Shields, 2004).

A conditional effect of support in 2002/2003 on distress in 2004/2005 was also found for affectionate support, tangible support, and positive social interaction. One possible explanation is that higher support does in fact lead to higher distress. However, in the current model we did not control for the possible effect of psychological distress on social support. In another study currently in preparation, using an autoregressive cross-lagged model with the same data, higher psychological distress in 2002/2003 was related with higher social support in 2004/2005. Still, for the current study a significant effect was only found for one time wave suggesting weak evidence in the long run.

One possible explanation for the different findings between the cross-sectional and longitudinal analysis is that in the short-term social support may moderate the effect of stressors on distress but that in the long run participants may adapt to the stressors and the moderating effect of social support may disappear (Lepore, Evans, & Schneider, 1991; Shields, 2004; Taylor

& Aspinwall, 1996). This would also help explain why the relationship between chronic stressors and distress two years later was mostly nonsignificant. Over a two year period it is probable that people learn to deal with and adapt to their stressors. Therefore, it would not result in increased distress over such an extended period of time (Mirowsky & Ross, 2003). Shorter intervals between the different time waves would be needed to shed some light of the adaptation process and role of support over time. Further research is needed that would investigate the stress-buffering hypothesis with different lengths of time intervals (e.g. one month, six months, one year) given that two years is a long time interval and that different and potentially stronger results could be found with shorter intervals.

Our findings should be interpreted in the light of a number of important limitations. Claims of causality should not be made from the current study. For the cross-sectional analyses, it is impossible to conclude the temporal relationship between stressors, support, and distress. Although we speculate that chronic stressors lead to increased distress, the opposite explanation is also possible and cannot be ruled out for this study. Even though a longitudinal design was also used, conclusions about causality cannot be made given that this is still an observational study and that findings may have been affected by other variables that were not assessed by the current study (Finkel, 1995). Still, longitudinal models are one step closer to explaining causation when compared to cross-sectional studies.

Another limitation of this study is that both the chronic stressors and distress measures were measured using respondent self-report. Therefore, both measures are biased by a number of factors including the mood of the person on that specific day (Cohen et al., 1995). This is especially problematic in the cross-sectional design. However, we also examined the longitudinal relationship between both variables making the bias still present but less important.

Another limitation of this study is that we used a measure of overall chronic stressors rather than looking at different stressors individually (Mirowsky & Ross, 2003). It is expected that different types of stressors will impact psychological distress differently (Mirowsky & Ross, 2003) and also that different types of social support will have different effects depending on the type of stressor present (Cohen & Wills, 1985). Our measure of chronic stressors averages out the effect of chronic stressors on psychological distress and the interaction between stressors and support on distress. We might have found different results had we used a measure of a specific stressor such as having to deal with the bad health of a loved one. This type of stressor is less controllable and might require a different type of social support than a financial strain for example. Still, many people are faced with more than one stressor and so this study provides some important information about the cumulative impact of stressors on distress and the role of support in moderating that relationship. To further complicate the matter, since chronic stressors are more long-term, experiencing one stressor (e.g. bad health of a loved one) in the long run may result in other stressors (e.g. financial strain; Taylor & Aspinwall, 1996) suggesting that it is more important to be high on more than one type of social support or on types of support that address a wide variety of stressors (e.g. tangible support and emotional/informational support measured by the MOS social support scale). Furthermore, events might be stressful when lived cumulatively even though individually they are not.

Another limitation of this study is that latent variables were not included in the model; therefore, we were unable to account for measurement error of multiple indicators. Although we attempted to run the model employing the latent variables and their indicators, the model would not converge given the complexity of the model. Replications of the current study are warranted.

This study is based on a general population sample of older adults with low levels of distress. Therefore, our findings cannot be generalized to a clinical sample of older adults with

severe psychological distress. Still, it is important to investigate distress in the general population given that there is still a significant proportion of the Canadian population of older adults who report experiencing severe psychological distress and an even greater percent who report experiencing distress at least “some of the time”. The current findings are also based on a sample with relatively high levels of functional social support and therefore cannot be generalized to samples with low levels of support.

In relation to the previously mentioned limitation, the combination of constantly high support, low distress, and stable levels of stressors overtime may have limited our power to find a significant interaction (Cohen & Pressman, 2003; Kessler, Magee, & Nelson, 1996). Different results may have been found had a population with more fluctuating levels of distress, support, and chronic stressors been used. Still, these findings are important because they represent results for a normative sample of older Canadians. It provides a better understanding of the moderating role of support on the link between stressors and distress in the general population of older Canadians. This is an area that warrants to be studied but is less frequently explored in favour of focusing rather on clinical samples. One option would have been to use a multi-model approach and dichotomize support between high support and low support or to include only participants with high levels of chronic stressors. However, picking a point on the continuum as dividing between high and low support or as being a significant stressor is questionable.

Clearly more research is needed to explain the possible mechanisms for the protective effect of support on stressors. We can postulate that higher tangible and emotional/informational support makes a person feel better able to cope with stressors which in turn result in reduced psychological distress. Still, other mechanisms are also possible and should be examined. This study has focused on an overall measure of chronic stressors. Many questions about the role of support on different types of stressors remain. Although the focus of this study is on the role of

social support as a moderator, other moderators and mediators are also important and likely play an important role in combination with social support (Cairney & Krause, 2005). More multivariate models that include more moderators and mediators of the relationship between stressors and distress should be examined.

In summary, this study is one of the first to look at the stress-buffering hypothesis on psychological distress with a national sample of older adults over an eight year period. It also adds to previous research by further disentangling the importance of different dimensions of support on the mental health-deteriorating consequences of stressors. Findings from this study can be applied to help support the mental health of older adults. Our findings suggest that in order for social interventions to be successful they need to be tailored to the needs of the older adults. For those experiencing recent stressors in their lives, it would appear that it is providing them with behavioural help and with guidance that may help them to better cope with their situation and in turn may lead to declines in psychological distress levels. A decline in the level of psychological distress in the general population of older adults can enhance healthy aging and help prevent the development of a more severe depressive state.

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Contributions of the authors

Annie Robitaille conceived the project, conducted the analyses, and wrote the manuscript. Heather Orpana helped in the conception of the project, critically reviewed the different versions of the manuscript, and accepted the final version of the paper. Cameron McIntosh contributed to the design of the paper, provided advice for the analyses, critically reviewed the different versions of the manuscript, and accepted the final version of the paper.

Ethical approval: Not required.

General Discussion

Overall, the goal of the current thesis, composed of three studies, was to improve our knowledge about the role of different types of social support on psychological distress levels in the general population of older adults living in Canada. The thesis used data from the NPHS spanning over a period from 1994/1995 to 2006/2007 and included information about French and English-speaking older adults. Before beginning to answer questions about the mechanisms that explain the association between social support and psychological distress, more information about the social support scale used in the NPHS was needed. Information about the English version of the MOS social support scale for a sample of older adults and about the French version of the scale was still lacking. For this reason, the objective of the first study was to examine the psychometric properties and factor structure of the English and French version of the MOS social support scale for a sample of older adults. Furthermore, the first study also tested for invariance between French and English-speaking Canadians. The purpose of the second study was to examine the longitudinal relationship between the different types of social support and psychological distress to determine whether social support had an impact on subsequent psychological distress levels or if psychological distress levels had an impact on subsequent social support levels, or both. The objective of the third study was to look at the cross-sectional and longitudinal effect of chronic stressors on psychological distress and how, if at all, that effect of chronic stressors depended on functional social support.

Before discussing the relationship between the different dimensions of social support and psychological distress and the role of social support as a buffer against chronic stressors, findings from the first study about the psychometric properties of the MOS social support scale are discussed. Next, evidence about the relationship between chronic stressors, social support, and psychological distress are presented. Finally, important limitations of the studies,

recommendations for future research, and theoretical and practical implication of the findings are discussed.

Psychometric Properties of the MOS Social Support Scale

Overall, findings from the first study suggest that the MOS social support scale has good internal consistency and that the scale, as a four-factor model of functional social support, is acceptable both in a sample of French and English-speaking older adults. These findings are consistent with the findings of other researchers (Gjesfjeld et al., 2008; Sherbourne & Stewart, 1991). As mentioned, another purpose of the first study was to examine the invariance of the model across French and English-speaking older adults. It appears that the instrument functions somewhat uniformly across both groups. The present findings are important because they add to the amount of cumulative evidence for a four-factor solution across different samples.

Furthermore, it is the first study to explore measurement invariance of the scale across French and English-speaking older adults. Our findings suggest that previous studies that have compared rates of social support for French and English-speaking Canadians using the MOS social support scale were likely accurate in concluding that social support is affected by cultural differences between both groups. This study is valuable to researchers wishing to explore social support in French and English-speaking samples. Researchers all too often combine both groups in one analysis or compare findings from each group even though no research had examined measurement invariance across both groups. The present study provides this information. In terms of this thesis specifically, these findings provide support for the use of the measure with a sample of French and English-speaking older adults.

Social Support, Chronic Stressors, and Psychological Distress

Overall, findings from the autoregressive and interaction models suggest that the mechanism by which social support is associated with psychological distress is dependent on the

dimension of functional support measured. Therefore, this next section will be divided accordingly: structural support, affectionate support, tangible support, positive social interaction, emotional/informational support, and covariates.

Structural Support

The finding that structural support is unrelated to distress aligns with our hypotheses as well as with previous research suggesting that the number of close friends and relatives is not an important predictor of subsequent distress and, conversely, that the amount of structural support is not affected by previous distress (Ryan & Willits, 2007). It seems that having many friends and relatives does not protect older Canadians living in the community against psychological distress. One possible explanation is that having many friends and relatives does not necessarily suggest that more support is forthcoming. In some cases, one friend or relative will provide more social support than numerous other friends and relatives combined (Cohen & Wills, 1985). Furthermore, someone with very few friends and relatives may nevertheless be very satisfied with his/her support while someone with many friends and relatives may be unsatisfied with his/her support.

Affectionate Support

To date few studies have considered the effect of affectionate support (e.g. feeling love and affection from friends and family) on mental health outcomes. In the second study, contrary to our hypothesis, higher affectionate support is associated with higher psychological distress two years later. This relationship is present for two out of 4 time points (1998/99 to 2000/01 and 2000/01 to 2002/03). However, when chronic stressors are included in a longitudinal interaction model, the relationship between affectionate support and psychological distress that was found in 2000/01 to 2002/03 disappears (stress is not measured in 1998/99, therefore, we cannot make any

conclusions about that time point). This suggests that affectionate support may not be related with psychological distress two years later.

Little support for the stress-buffering model is found from the longitudinal interaction model with only one time wave being significant. Furthermore, no support for the stress-buffering hypothesis is found for the cross-sectional analysis. However, higher affectionate support is related with lower psychological distress. Overall, combining results from both studies suggests that affectionate support has little impact both directly and as a buffer against chronic stressors on distress levels two years later. Theoretically, it makes sense that affectionate support would fail to act as a buffer against chronic stressors given that it provides no tools to help the person deal with the chronic stressors. More research is needed about the role of affectionate support specifically. Compared to the other types of support included in this thesis, affectionate support appears to be the least researched. Unlike the other types of support, this one is not based on receiving guidance, advice, or behavioural help with everyday activities. Rather it is based on emotions such as feeling loved. Further research should examine the long-term relationship between affectionate support and mental health outcomes with shorter time intervals. It is highly probable that an interval of two years between the observation of social support and psychological distress was too long. Studies have been found to have different results depending on the discrete time interval used (Oud, 2002). Furthermore, our cross-sectional analysis of the interaction model suggests that higher affectionate support is correlated with lower psychological distress. Unfortunately, shorter intervals were not available with the NPHS data.

Tangible Support

The longitudinal cross-lagged relationship between tangible support and distress is weak with higher distress marginally predicting subsequently higher support at only one time wave. This is not the first study to fail to find a link between social support and psychological distress

(Krause et al., 1990) and more specifically between tangible support and distress (Cruza-Guet et al., 2008). The cross-sectional interaction model provides similar results. The relationship between tangible support and psychological distress was non-significant at all time points. Rather, results from the cross-sectional interaction model demonstrated that the relationship between tangible support and chronic stressors and psychological distress is negatively and statistically significant at all four time points suggesting that tangible support acts as a buffer against the detrimental effect of chronic stressors. The type of help measured by tangible support such as receiving assistance around the house when sick or having someone to drive you to the hospital when needed would more likely be beneficial when this type of help is needed such as when a person is sick. Rather than being related directly with psychological distress, it seems that tangible support acts as a moderator when stressors are present (e.g. becoming ill) by reducing the impact of stressors and in turn decreasing distress (Cohen & Wills, 1985).

Positive Social Interaction

As depicted in the third study, positive social interaction does not appear to act as a buffer against chronic stressors. It seems that having a good time with friends and family improves people's overall mood but does not moderate the relationship between stressors and psychological distress. One likely explanation is that this type of social support fails to address the source of stress. For example, having friends and family to have a good time with is unlikely to help someone who is overloaded with too many things to do ("you are trying to take too many things at once") or who is in a financially stressful situation ("you don't have enough money to buy things you want"). In the cross-sectional part of the third study, positive social interaction was related with psychological distress with higher support being related with lower distress for all four time points. However, results from the third study are cross-sectional in nature making it impossible to make assumptions of causality or of the sequence of the relationship. Results from

the second study suggest that higher psychological distress levels lead to higher levels of positive social interaction two years later suggesting that over long term intervals, it is psychological distress levels that impact later social support rather than the alternate explanation.

Emotional/informational Support

In the case of emotional/informational support, the second study demonstrates that the temporal association was unidirectional, with higher levels of distress associated with increased subsequent emotional/information support for two of the four time waves. This is contrary to Matt and Dean (1993) who found that higher distress was related with lower social support 22 months later (Matt & Dean, 1993). The cross-sectional section of study three suggests that having access to informational and emotional support acts as a buffer against chronic stressors. It is also related with psychological distress with higher support being related with lower distress for all four time points. Emotional/informational support likely helps people to reappraise chronic stressors as less threatening making it an important buffer against a wide range of stressors (cumulative measure of stressors) such as the one used in the current study (Cohen & Wills, 1985).

In general, it appears that when the association between social support and psychological distress is examined with two year intervals, it is the role of distress on later levels of perceived social support that is most important. That is, the results suggest that for older adults living in the community, higher levels of psychological distress result in higher levels of perceived availability of social support two years later. This finding has also been found by Blazer (1983). This is a valuable finding given that the majority of the research has focused on the role played by social support on distress, giving less attention to the possibility that distress may also be an important predictor of support. Furthermore, cross-sectional studies more often interpret a relationship between social support and distress as being that of social support being protective

against distress. We are not implying that social support is not protective against distress but rather that the opposing explanation also plays an important role when looking at the wide spectrum of psychological distress levels in the general population over an extended period of time. When examining the cross-sectional analyses of the third study, higher support is associated with lower distress, however, when a two year interval is used, a positive relationship between both variables surfaces. This suggests that the time interval used is important for studies examining the role of social support on mental health outcomes and that social support is likely protective against distress but not over extended periods of time. More studies are needed to further clarify the role of social support and psychological distress at smaller interval times (e.g. one month, six months, one year). The majority of longitudinal studies to date have only measured social support at baseline. However, the current thesis highlights the importance of measuring social support at different times.

The level of psychological distress in the general population of the current study was low with a mean score ranging from 1.84 to 2.27 (depending on the data collection cycle) on a scale that ranges from 0 to 24. It is possible that psychological distress below a certain threshold be somewhat adaptive (Blazer, 2009). In our sample, people with higher distress scores nevertheless had low distress scores. It is possible that people with higher levels of distress, but still not experiencing severe distress, receive more support from friends and family to help them deal with the source of distress (e.g. stressful situation). Mild psychological distress would not be expected to lead to withdrawal and to push friends and family away as is found in clinical depression. Future research should explore the longitudinal association between social support and severe psychological distress. Although unexpected based on our hypotheses, this is not the first study to find a positive link between support and distress (Blazer, 1983). As mentioned as a

possible explanation by the Cruza-Guet and colleagues (2008), those older adults that are more psychologically distressed may also be the ones that receive the most help.

It is also possible that there was not enough variation in the distribution of the different types of social support and psychological distress (Cohen & Pressman, 2003). Social support levels were fairly high in our sample. It is possible that a minimum level of support is needed and that additional support fails to be increasingly protective above that threshold (Cohen & Wills, 1985). This is a possible explanation for the lack of a strong cross-lagged effect over time (Cohen et al., 2000). More work is needed in order to find out whether a certain threshold or whether a graded-like increase in support is present and how this is different for the different types of support (Cohen et al., 2000).

The lack of a stronger predictive role of the different dimensions of social support on distress may be explained by the measures used. The MOS social support scale measures perceived availability of social support rather than people's evaluation of how satisfied they are by their received or perceived level of support. Some studies suggest that it is the subjective evaluation of support that is most important in explaining distress (Cruza-Guet et al., 2008). Unfortunately, we did not have access to such a measure making it impossible to test this hypothesis. Furthermore, reassurance of worth is one type of support that has been found as important in the prediction of psychological distress and quality of life (Caron & Guay, 2005; Caron et al., 2007; Caron et al., 2005; Caron et al., 2005). It was recently suggested that items measuring reassurance of worth be added to those included in the MOS social support scale (Caron & Liu, 2008). Items could be added to the MOS social support scale in order to address these important dimensions of support. This is an important area of future research.

Although I discuss the results of the longitudinal models throughout the discussion, an important aspect of the results also merit to be mentioned here. Interestingly, for the longitudinal

part of the third study, a similar pattern was found for all the different types of social support. Social support acted as a buffer against the effect of chronic stressors on distress for only one time wave (2002/2003 to 2004/2005). No other time waves were significant. These findings suggest that there might have been some external factor that might have been responsible for these findings. Unfortunately, we were unable to locate a more thorough explanation for these findings.

Limitations

This thesis should be interpreted in the light of a number of important limitations. One limitation of this thesis is that all variables were measured using respondent self-report. Therefore, these measures are biased by a number of factors including the mood of the person on that specific day (Cohen et al., 1995). For example, psychological distress levels may have been affected by the mood of the person on the specific day they completed the questionnaire. This is especially problematic in the cross-sectional design. However, we also examined the longitudinal relationship between both variables making the bias still present but less important. Another drawback related to the use of self-reported data is that older adults and especially old-old may respond to questions about psychological distress differently than younger adults.

The results of the studies included in this thesis should also be interpreted with caution given that older adults living in health institutions were excluded from the analyses. This can have an impact on the prevalence and scores of psychological distress over time. This limitation is relevant with older adults and especially with the old-old who are more likely to live in institutional care. Although we would have expected higher rates of distress for institutionalized older adults, interestingly, one study that compared the rates of severe psychological distress for frail elderly respondents living in institutions to those living in the community found lower rates

of severe psychological distress for those living in institutions (Préville et al., 2001). Therefore, the impact of including or excluding respondents living in institutions is unclear.

Another important drawback is that claims of causality should not be made. For the cross-sectional analyses, it is impossible to conclude the temporal relationship between stressors, support, and distress. Although we speculate that chronic stressors lead to increased distress, the opposite explanation is also possible and cannot be ruled out for this study. The same can also be said about the longitudinal analysis. Given that the data were observational in nature, it is impossible to make claims of causality given that the variables may have been affected by other variables that were not assessed and controlled for by the current study (Finkel, 1995). Still, the longitudinal autoregressive cross-lagged and interaction model used for this thesis brings us one step closer to being able to establish a potential causal link between social support and psychological distress and the role of social support as a buffer against chronic stressors.

This study is based on a nonclinical sample of older adults with generally low levels of distress. Therefore, our findings cannot be generalized to a clinical sample of older adults with severe psychological distress. Still, it is important to investigate distress in the general population given that there is still a significant proportion of the Canadian population of older adults that report experiencing severe psychological distress and an even greater percent that report experiencing distress at least “some of the time”. The current findings are also based on a sample with relatively high levels of functional social support and therefore cannot be generalized to samples with low levels of support.

In relation to the previously mentioned limitation, the combination of constantly high support, low distress, and a stable level of chronic stressors overtime may have limited our power to find a significant interaction (Cohen & Pressman, 2003; Kessler et al., 1996). Different results may have been found had a population with more fluctuating levels of distress, support,

and chronic stressors been used. Still, these findings are important because they represent results for a normative sample of older Canadians. It provides a better understanding of the moderating role of support on the link between chronic stressors and distress in the general population of older Canadians. This is an area that warrants to be studied but is less frequently explored in favour of focusing rather on clinical samples. One option would have been to use a multi-model approach and dichotomize support between high support and low support or to include only participants with high levels of chronic stressors. However, picking some point on the continuum as dividing between high and low support or as representing high stressors is questionable.

Another limitation of this study is that it does not account for all the possible predictors of psychological distress and social support (Orpana, 2008). For the current thesis, only time-invariant covariates were included given that time-variant covariates would have increased the complexity of the model making it unlikely that the model would have converged. Moreover, as mentioned, although many different dimensions of social support were included in this study, not all of them were included. It was only possible to include dimensions of social support that were part of the MOS social support scale. This is one disadvantage of using an existing database. However, the large-scale nationally-representative sample of older Canadians and the long-term longitudinal nature of the data is an important strength of this thesis.

Attrition of the panel over time is another shortcoming of this study. The NPHS response rates are very good as compared to other cross sectional and longitudinal studies, therefore, it is unlikely that attrition would have a significant impact on the results. For cycle one, the response rate was 83.6 percent (for cycle one, response rate is based on the 20,095 selected to be part of the NPHS), for cycle two it was 92.8 percent (for all the following cycles, it based on the 17, 276 that participated in NPHS), for cycle three it was 88.3 percent, for cycle four it was 84.9 percent,

for cycle five it was 80.8 percent, for cycle six it was 77.6 percent, and for cycle seven 77.0 percent (Statistics Canada, 2008).

Another shortcoming of this thesis is that, for the second and third study, latent variables were not included in the SEM models; therefore, we were unable to account for measurement error of multiple indicators. Although we attempted to run the autoregressive cross-lagged models and the interaction models employing the latent variables and their indicators, the model would not converge given the complexity of the model. Replications of the current study are warranted.

These findings are promising and suggest that interventions and programs that consider whether or not chronic stressors are present and that take the type of social support into account would be most helpful in improving older adults' mental health. Given that an overall measure of chronic stressors was used and that we did not only investigate one specific stressor, our findings are more easily applied to the general population of older adults. Among the different dimensions of social support, it appears that emotional/informational support is most likely to have an impact on distress irrespective of whether or not stressors are present. In the presence of stressors, tangible support also appears to be important in decreasing distress in the general population of Canadians.

Hopefully, this thesis will help in the implementation of social interventions tailored to the needs of the elderly and raise awareness among Canadians about the role of social support in improving population mental health. Also, these studies will help leaders make better-informed decisions and lead to the development of policies to improve the mental health of older Canadians.

References

- SAS (2000). (Version 8) [Computer software]. Cary, NC: SAS Institute Inc.
- Mplus (2006). (Version 4.1) [Computer software]. Los Angeles: Muthén & Muthén.
- Aiken, L. S. & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage Publications.
- American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders*. (4th ed., text rev. ed.) Washington, DC: Author.
- Anderson, D., Bilodeau, B., Deshaies, G., Gilbert, M., & Jobin, J. (2005). French-Canadian validation of the MOS Social Support Survey. *Canadian Journal of Cardiology*, 21, 867-873.
- Andrews, G. & Slade, T. (2001). Interpreting scores on the Kessler Psychological Distress Scale (K10). *Australian and New Zealand Journal of Public Health*, 25, 494-497.
- Asparouhov, T. (2005). Sampling weights in latent variable modeling. *Structural Equation Modeling*, 12, 411-434.
- Badoux, A. (2000). Social support in healthy and psychologically distressed French populations. *Psychology, Health, & Medicine*, 5, 143-154.
- Barrera, M. J. (1986). Distinctions between social support concepts, measures, and models. *American Journal of Community Psychology*, 14, 413-445.
- Bentler, P. M. (2009). Alpha, dimension-free, and model-based internal consistency reliability. *Psychometrika*, 74, 137-143.
- Berkman, P., Heinik, J., Rosenthal, M., & Burke, M. (1999). Supportive telephone outreach as an interventional strategy for elderly patients in a period of crisis. *Social Work in Health Care*, 28, 63-76.

- Bienenfeld, D., Koenig, H. G., Larson, D. B., & Sherrill, K. A. (1997). Psychosocial predictors of mental health in a population of elderly women: test of an explanatory model. *The American Journal of Geriatric Psychiatry*, 5, 43-53.
- Blazer, D. G. (1983). Impact of late-life depression on the social network. *American Journal of Psychiatry*, 140, 162-166.
- Blazer, D. G. & Hybels, C. F. (2005). Origins of depression in later life. *Psychological Medicine*, 35, 1241-1252.
- Blazer, D. G. (1982). Social support and mortality in an elderly community population. *American Journal of Epidemiology*, 115, 684-694.
- Blazer, D. G. (2009). Depression in late life: Review and commentary. *Focus*, 7, 118-136.
- Bosworth, H. B. & Schaie, W. K. (1997). The relationship of social environment, social networks, and health outcomes in The Seattle Longitudinal Study: Two analytical approaches. *Journal of Gerontology, Series B: Psychological Sciences and Social Sciences*, 52B, 197-205.
- Brisette, I., Cohen, S., & Seeman, T. E. (2000). Measuring social integration and social networks. In S. Cohen, L. G. Underwood, & B. H. Gottlieb (Eds.), *Social support measurement and intervention* (pp. 53-85). New York: Oxford University Press.
- Browne, M. W. & Cudeck, R. (1993). Alternative ways of assessing model fit. In K.A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136-162). Newbury Park, CA: Sage.
- Byrne, B. M. & Campbell, T. L. (1999). Cross-cultural comparisons and the presumption of equivalent measurement and theoretical structure: A look beneath the surface. *Journal of Cross-Cultural Psychology*, 30, 555-574.

- Cairney, J., Veldhuizen, S., Wade, T. J., Kurdyak, P., & Streiner, D. L. (2007). Evaluation of 2 measures of psychological distress as screeners for depression in the general population. *The Canadian Journal of Psychiatry*, 52, 111-120.
- Cairney, J. & Krause, N. (2005). The social distribution of psychological distress and depression in older adults. *Journal of Aging and Health*, 17, 807-835.
- Camirand, H. & Nanhou, V. (2008). La détresse psychologique chez les Québécois en 2005: Série Enquête sur la santé dans les collectivités canadiennes. *Institut de la statistique du Québec, Zoom Santé*, 1-4.
- Cappeliez, P., Sèvre-Rousseau, S., Landreville, P., Prévile, M., & Scientific Committee of ESA Study (2004). Physical health, subjective health, and psychological distress in older adults: Reciprocal relationship concurrently and over time. *Aging International*, 29, 247-266.
- Caron, J. & Guay, S. (2005). Soutien social et santé mentale: concept, mesure, recherche récentes et implications pour l'intervention. *Santé Mentale au Québec*, 30, 15-38.
- Caron, J., Latimer, E., & Tousignant, M. (2007). Predictors of psychological distress in low income populations of Montreal. *Canadian Journal of Public Health*, 98, 35-44.
- Caron, J., Lecomte, Y., Stip, E., & Renaud, S. (2005). Predictors of quality of life in schizophrenia. *Community Mental Health Journal*, 41, 399-417.
- Caron, J. & Liu, A. (2008). *Measuring psychological well-being on a population health survey on mental health*. Report presented to Statistic Canada, March 2008.
- Caron, J., Mercier, C., Martin, A., & Stip, E. (2005). Le rôle du soutien social, du fardeau familial et de la satisfaction des services dans la détresse psychologique et la qualité de vie des familles de personnes atteintes de schizophrénie. *Santé Mentale au Québec*, 30, 165-182.

- Cassel, J. (1976). The contribution of the social environment to host resistance. *American Journal of Epidemiology*, 104, 107-123.
- Ceria, C. D., Masaki, K. H., Rodriguez, B. L., Chen, R., Yano, K., & Curb, J. D. (2001). The relationship of psychosocial factors to total mortality among older Japanese-American men: The Honolulu Heart Program. *Journal of the American Geriatrics Society*, 49, 725-731.
- Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. *Structural Equation Modeling*, 14, 464-504.
- Chen, J. & Shields, M. (1999). Health among older adults. *Health Reports*, 11, 47-61.
- Cheung, G. W. & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling*, 9, 233-255.
- Cobb, S. (1976). Social support as a moderator of life stress. *Psychosomatic Medicine*, 38, 300-314.
- Cohen, S. (2004). Social relationships and health. *American Psychologist*, 59, 676-684.
- Cohen, S., Gottlieb, B. H., & Underwood, L. G. (2000). Social relationships and health. In S. Cohen, L. G. Underwood, & B. H. Gottlieb (Eds.), *Measuring and intervening in social support* (pp. 3-25). New York: Oxford University Press.
- Cohen, S., Gottlieb, B. H., & Underwood, L. G. (2001). Social relationships and health: Challenges for measurement and intervention. *Advances in Mind-Body Medicine*, 17, 129-142.
- Cohen, S., Kessler, R. C., & Underwood, L. G. (1995). Strategies for measuring stress in studies of psychiatric and physical disorders. In S. Cohen, R. C. Kessler, & L. G. Underwood (Eds.), *Measuring stress: a guide for health and social scientists* (pp. 3-26). New York, NY: Oxford University Press.

- Cohen, S. & Pressman, S. (2003). Stress-buffering hypothesis. In N. Anderson (Ed.), *Encyclopedia of health and behavior* (pp. 780-782). Thousand Oaks, CA: Sage Publications.
- Cohen, S. & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin*, 98, 310-357.
- Couture, M., Larivière, N., & Lefrançois, R. (2005). Psychological distress in older adults with low functional independence: A multidimensional perspective. *Archives of Gerontology and Geriatrics*, 41, 101-111.
- Cruza-Guet, M. C., Spokane, A. R., Caskie, G. I. L., Brown, S. C., & Szapocznik, J. (2008). The relationship between social support and psychological distress among Hispanic elders in Miami, Florida. *Journal of Counseling Psychology*, 55, 427-441.
- Cutrona, C. E. & Russell, D. W. (1987). The provisions of social support and adaptation to stress. *Advance in Personal Relationship*, 1, 37-67.
- Cutrona, C. E. & Russell, D. W. (1990). Type of social support and specific stress: Toward a theory of optimal matching. In B.R. Sarason, I. G. Sarason, & G. R. Pierce (Eds.), *Social support: An interactional view* (pp. 319-366). New York, NY: John Wiley.
- Dalgard, O. S. & Lund Håheim, L. (1998). Psychosocial risk factors and mortality: a prospective study with special focus on social support, social participation, and locus of control in Norway. *Journal of Epidemiology and Community Health*, 52, 476-481.
- Delsing, M. J. M. H. & Oud, J. H. L. (2008). Analyzing reciprocal relationships by means of the continuous-time autoregressive latent trajectory model. *Statistica Neerlandica*, 62, 58-82.
- Depp, C. A. & Jeste, D. V. (2006). Definitions and predictors of successful aging: A comprehensive review of larger quantitative studies. *American Journal of Geriatric Psychiatry*, 14, 6-20.

- Derogatis, L. R. (1992). *SCL-90-R, administration, scoring & procedures manual-II for the R (revised) version and other instruments of the psychopathology rating scale series*. Townson: Clinical Psychometric Research, Inc.
- Derogatis, L. R., Lipman, R. S., & Covi, L. (1973). SCL-90: an outpatient psychiatric rating scale-preliminary report. *Psychopharmacology Bulletin*, 9, 13-28.
- Derogatis, L. R. & Melisaratos, N. (1983). The Brief Symptom Inventory: an introductory report. *Psychological Medicine*, 13, 595-605.
- Dohrenwend, B. P., Shrout, P. E., Egri, G., & Mendelsohn, F. S. (1980). Nonspecific psychological distress and other dimensions of psychopathology: Measures for use in the general population. *Archives of General Psychiatry*, 37, 1229-1236.
- Doraiswamy, P. M. (2001). Contemporary management of comorbid anxiety and depression in geriatric patients. *Journal of Clinical Psychiatry*, 62, 30-35.
- Duncan, T. E., Duncan, S. C., & Strycker, L. A. (2006). *An introduction to latent variable growth curve modeling. Concepts, issues, and applications*. (2nd ed.) Mahwah, NJ: Lawrence Erlbaum Associates.
- Durkheim, E. (1897). *Le suicide*. Paris: Alcan.
- Enders, C. K. (2006). Analyzing structural equation models with missing data. In G.R.Hancock & R. O. Mueller (Eds.), *Structural equation modeling: a second course* (pp. 313-342). Greenwich, CT: Information Age Publishing, Inc.
- Feinson, M. C. & Thoits, P. A. (1986). The distribution of distress among elders. *Journal of gerontology*, 41, 225-233.
- Ferraro, K. F. & Su, Y. (1999). Financial strain, social relations, and psychological distress among older people: a cross-cultural analysis. *Journal of Gerontology, Series B: Psychological Sciences and Social Sciences*, 54, S3-S15.

- Finkel, S. E. (1995). *Causal analysis with panel data*. Thousand Oaks, CA: Sage Publications.
- Flora, D. B. & Curran, P. J. (2004). An empirical evaluation of alternative methods of estimation for confirmatory factor analysis with ordinal data. *Psychological Methods*, 9, 466-491.
- Furukawa, T. A., Kessler, R. C., Slade, T., & Andrews, G. (2003). The performance of the K6 and K10 screening scales for psychological distress in the Australian National Survey of Mental Health and Well-Being. *Psychological Medicine*, 33, 357-362.
- Gadalla, T. M. (2009). Determinants, correlates and mediators of psychological distress: A longitudinal study. *Social Science & Medicine*, 68(12), 2199-2205.
- Gjesfjeld, C. D., Greeno, C. G., & Kim, K. H. (2008). A confirmatory factor analysis of an abbreviated social support instrument: The MOS-SSS. *Research on Social Work Practice*, 18, 231-237.
- Goldberg, D. P. (1978). *Manual of the General Health Questionnaire*. Windsor, England: NFER Publishing.
- Gottlieb, B. H. (1992). Quandaries in translating support concepts to intervention. In H.O.F. Veiel & U. Baumann (Eds.), *The meaning and measurement of social support* (pp. 293-309). Washington, DC: Hemisphere.
- Hanson, B. S., Isacson, S. O., Janzon, L., & Lindell, S. E. (1989). Social network and social support influence mortality in elderly men: prospective population study of "men born in 1914", Malmö, Sweden. *American Journal of Epidemiology*, 130, 100-111.
- Hayes, A. F. & Matthes, J. (2009). Computational procedures for probing interactions in OLS and logistic regression: SPSS and SAS implementations. *Behavior Research Methods*, 41, 924-936.
- Healthy Aging and Wellness Working Group. (1-10-2009). Healthy Aging in Canada: A New Vision, A Vital Investment-A Discussion Brief Prepared for the Federal, Provincial and

- Territorial Committee of Officials (Seniors). Retrieved February 28, 2010, <http://www.phac-aspc.gc.ca/seniors-aines/publications/public/healthy-sante/vision/vision-bref/index-eng.php>.
- Henderson, S., Duncan-Jones, P., Byrne, D. G., & Scott, R. (1980). Measuring social relationships. The Interview Schedule for Social Interaction. *Psychological Medicine*, 10, 723-734.
- Herbert, T. B. & Cohen, S. (1996). Measurement issues in research on psychosocial stress. In H.B.Kaplan (Ed.), *Psychosocial stress. Perspectives on structure, theory, life-course, and methods* (pp. 295-332). San Diego, CA: Academic Press.
- Hirdes, J. P. & Forbes, W. F. (1992). The importance of social relationships, socioeconomic status and health practices with respect to mortality among healthy Ontario males. *Journal of Clinical Epidemiology*, 45, 175-182.
- Hobfoll, S. E. & Vaux, A. (1993). Social support: Social resources and social context. In L.Goldberger & S. Breznitz (Eds.), *Handbook of stress. Theoretical and clinical aspects* (2nd ed., pp. 685-705). New York, NY: The Free Press.
- House, J. S., Robbins, C., & Metzner, H. L. (1982). The association of social relationships and activities with mortality: prospective evidence from the Tecumseh Community Health Study. *American Journal of Epidemiology*, 116, 123-140.
- Hu, L. & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1-55.
- Hutchison, C. (1999). Social support: factors to consider when designing studies that measure social support. *Journal of Advanced Nursing*, 29, 1520-1526.
- Huysamen, G. K. (2006). Coefficient alpha: unnecessarily ambiguous; unduly ubiquitous. *Journal of Industrial Psychology*, 32, 34-40.

- Ilfeld, F. W. (1976). Further validation of a psychiatric symptom index in a normal population. *Psychological Reports*, 39, 1215-1228.
- Jackson, C. (2007). The General Health Questionnaire. *Occupational Medicine*, 57, 79.
- Jenkins, R., Mann, A. H., & Belsey, E. (1981). The background, design and use of a short interview to assess social stress and support in research and clinical settings. *Social Science & Medicine*, 15, 195-203.
- Jones, F. & Kinman, G. (2001). Approaches to studying stress. In F. Jones & J. Bright (Eds.), *Stress. Myth, theory and research* (pp. 17-45). London, England: Pearson Education Limited.
- Jöreskog, K. G. & Yang, F. (1996). Nonlinear structural equation models: The Kenny-Judd model with interaction effects. In G. A. Marcoulides & R. E. Schumacker (Eds.), *Advanced Structural Equation Modeling: Issues and Techniques* (pp. 57-88). Mahwah, NJ: Erlbaum.
- Jorm, A. F. (2000). Does old age reduce the risk of anxiety and depression? A review of epidemiological studies across the adult life span. *Psychological Medicine*, 30, 11-22.
- Jorm, A. F., Duncan-Jones, P., & Scott, R. (1989). An analysis of the re-test artifact in longitudinal studies of psychiatric symptoms and personality. *Psychological Medicine*, 19, 487-493.
- Jorm, A. F., Windsor, T. D., Dear, K. B. G., Anstey, K. J., Christensen, H., & Rodgers, B. (2005). Age group differences in psychological distress: the role of psychosocial risk factors that vary with age. *Psychological Medicine*, 35, 1253-1263.
- Kanner, A. D., Coyne, J. C., Schaefer, C., & Lazarus, R. S. (1981). Comparison of two modes of stress measurement: Daily hassles and uplifts versus major life events. *Journal of Behavioral Medicine*, 4, 1-39.

Kaplan, G. A., Wilson, T. W., Cohen, R. D., Kauhanen, J., Wu, M., & Salonen, J. T. (1994).

Social functioning and overall mortality: prospective evidence from the Kuopio Ischemic Heart Disease Risk Factor Study. *Epidemiology*, 5, 495-500.

Kaplan, M. S., Huguet, N., Orpana, H., Feeny, D., McFarland, B. H., & Ross, N. (2008).

Prevalence and factors associated with thriving in older adulthood: A 10-year population-based study. *The Journals of Gerontology, Series A: Biological Sciences and Medical sciences*, 63A, 1097-1104.

Kawachi, I., Colditz, G. A., Ascherio, A., Rimm, E. B., Giovannucci, E., Stampfer, M. J. et al.

(1996). A prospective study of social networks in relation to total mortality and cardiovascular disease in men in the USA. *Journal of Epidemiology and Community Health*, 50, 245-251.

Kessler, R. C., Andrews, G., Colpe, L. J., Hiripi, E., Mroczek, D. K., Normand, S. L. T. et al.

(2002). Short screening scales to monitor population prevalences and trends in nonspecific psychological distress. *Psychological Medicine*, 32, 959-976.

Kessler, R. C., Barker, P. R., Colpe, L. J., Epstein, J. F., & et al. (2003). Screening for serious

mental illness in the general population. *Archives of General Psychiatry*, 60, 184-189.

Kessler, R. C., Magee, W. J., & Nelson, C. B. (1996). Analysis of psychosocial stress. In

H.B.Kaplan (Ed.), *Psychosocial stress. Perspectives on structure, theory, life-course, and methods* (pp. 333-366). San Diego, CA: Academic Press.

Klein, A. & Moosbrugger, H. (2000). Maximum likelihood estimation of latent interaction

effects with the LMS method. *Psychometrika*, 65, 457-474.

Koenig, H. G., Weslund, R. E., George, L. K., Hughes, D. C., Blazer, D. G., & Hybels, C.

(1993). Abbreviating the Duke Social Support Index for use in chronically ill elderly individuals. *Psychosomatics*, 34, 61-69.

- Krause, N. (1997). Anticipated support, received support, and economic stress among older adults. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 52, 284-293.
- Krause, N., Liang, J., & Keith, V. (1990). Personality, social support, and psychological distress in later life. *Psychology and Aging*, 5, 315-326.
- Krause, N. & Markides, K. (1990). Measuring social support among older adults. *International Journal of Aging & Human Development*, 30, 37-53.
- Krause, N. & Rook, K. S. (2003). Negative interaction in late life: Issues in the stability and generalizability of conflict across relationships. *Journal of Gerontology: Psychological Sciences*, 58, 88-99.
- Krause, N. (1999). Mental disorder in late life: exploring the influence of stress and socioeconomic status. In C.S. Aneshensel & J. C. Phelan (Eds.), *Handbook of the Sociology of Mental Health* (pp. 183-208). New York: Kluwer Academic/Plenum Publishers.
- Krause, N. (2001). Social support. In R.H. Binstock & L. K. George (Eds.), *Handbook of aging and the social sciences* (5th ed., pp. 272-294). San Diego: Academic Press.
- Krause, N. & Borawski-Clark, E. (1995). Social class differences in social support among older adults. *The Gerontologist*, 35, 498-508.
- Krause, N., Liang, J., & Yatomi, N. (1989). Satisfaction with social support and depressive symptoms: A panel analysis. *Psychology and Aging*, 4, 88-97.
- Kubzansky, L. D., Berkman, L. F., & Seeman, T. E. (2000). Social conditions and distress in elderly persons: Findings from the MacArthur studies of successful aging. *Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 55B, 238-246.

- Laireiter, A. & Baumann, U. (1992). Network structures and support functions: theoretical and empirical analyses. In H.O.F. Veiel & U. Baumann (Eds.), *The meaning and measurement of social support* (pp. 33-55). New York: Hemisphere Publishing Corporation.
- Lahey, B. (1989). Personal and environmental antecedents of perceived social support. *American Journal of Community Psychology*, 17, 503-519.
- Lahey, B. & Dickinson, L. G. (1994). Antecedents of perceived support: Is perceived family environment generalized to new social relationships? *Cognitive Therapy and Research*, 18, 39-53.
- Langford, C. P., Bowsher, J., Maloney, J. P., & Lillis, P. P. (1997). Social support: a conceptual analysis. *Journal of Advanced Nursing*, 25, 95-100.
- Lazarus, R. S. & Folkman, S. (1984). *Stress, Appraisal and Coping*. New York: Springer.
- Lei, P.-W. (2007). Evaluating estimation methods for ordinal data in structural equation modeling. *Quality and Quantity*, 43, 495-507.
- Lennartsson, C. & Silverstein, M. (2001). Does engagement with life enhance survival of elderly people in Sweden? The role of social and leisure activities. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 56, S335-S342.
- Lépine, J. P. & Bouchez, S. (1998). Epidemiology of depression in the elderly. *International Clinical Psychopharmacology*, 13, S7-S12.
- Lepore, S. J., Evans, G. W., & Schneider, M. L. (1991). Dynamic role of social support in the link between chronic stress and psychological distress. *Journal of Personality and Social Psychology*, 61, 899-909.
- Liang, J., Krause, N. M., & Bennett, J. M. (2001). Social exchange and well-being: Is giving better than receiving? *Psychology and Aging*, 16, 511-523.

- Lubke, G. H. & Muthén, B. O. (2004). Applying Multigroup Confirmatory Factor Models for Continuous Outcomes to Likert Scale Data Complicates Meaningful Group Comparisons. *Structural Equation Modeling, 11*, 514-534.
- Matt, G. E. & Dean, A. (1993). Social support from friends and psychological distress among elderly persons: Moderator effects of age. *Journal of Health and Social Behavior, 34*, 187-200.
- McCallum, J. (1995). The SF 36 in an Australian sample: validating a new, generic health status measure. *Australian Journal of Public Health, 19*, 166.
- McHorney, C. A., Ware, J. E. Jr., & Raczek, A. E. (1993). The MOS 36 Item Short Form Health Survey (SF36): 2. Psychometric and clinical tests of validity measuring physical and mental health constructs. *Medical Care, 31*, 247-263.
- Meade, A. W., Johnson, E. C., & Braddy, P. W. (2008). Power and sensitivity of alternative fit indices in tests of measurement invariance. *Journal of Applied Psychology, 93*, 568-592.
- Melzer, D., Buxton, J., & Villamil, E. (2004). Decline in Common Mental Disorder prevalence in men during the sixth decade of life. *Social Psychiatry and Psychiatric Epidemiology, 39*, 33-38.
- Millsap, R. E. (2007). Structural equation modeling made difficult. *Personality and Individual Differences, 42*, 875-881.
- Mineka, S., Watson, D., & Clark, L. A. (1998). Comorbidity of anxiety and unipolar mood disorders. *Annual Review of Psychology, 49*, 377-412.
- Mirowsky, J. & Ross, C. E. (1986). Social patterns of distress. *Annual Review of Sociology, 12*, 23-45.
- Mirowsky, J. & Ross, C. E. (2003). *Social causes of psychological distress*. (2nd ed.) Hawthorne, NY: Aldine De Gruyter.

- Moosbrugger, H., Schermelleh-Engel, K., Kelava, A., & Klein, A. G. (in press). Testing multiple nonlinear effects in structural equation modeling: A comparison of alternative estimation approaches. In T. Teo & M. S. Khine (Eds.), *Structural Equation Modelling in Educational Research: Concepts and Applications* (Rotterdam, NL: Sense Publishers).
- Mroczek, D. K. & Kolarz, C. M. (1998). The effect of age on positive and negative affect: A developmental perspective on happiness. *Journal of Personality and Social Psychology*, 75, 1333-1349.
- Murphy, E. (1985). The impact of depression in old age on close social relationships. *American Journal of Psychiatry*, 142, 323-327.
- Muthén, L. K. & Muthén, B. O. (30-7-2006). Mplus discussion board. 8-12-2009.
- Muthén, L. K. & Muthén, B. O. (2007). *Mplus User's Guide*. (5th ed.) Los Angeles, CA: Muthén & Muthén.
- Muthén, L. K. & Muthén, B. O. (2009). Mplus discussion board. 12-10-2009.
- Myer, L., Stein, D. J., Grimsrud, A., Seedat, S., & Williams, D. R. (2008). Social determinants of psychological distress in a nationally-representative sample of South African adults. *Social Science & Medicine*, 66, 1828-1840.
- Newton, T. (1995). *Managing stress: Emotions and power at work*. London: Sage.
- Norris, F. & Murrell, S. A. (1987). Older adult family stress and adaptation before and after bereavement. *Journal of gerontology*, 42, 606-612.
- Orpana, H. M., Lemyre, L., & Gravel, R. (2009). Income and psychological distress: The role of the social environment. *Health Reports*, 20, 21-28.
- Orpana, H. M. (2008). Using the National Population Health Survey to identify factors associated with patterns of psychological distress over 10 years. *Healthcare Policy / Politiques de Santé*, 3, 55-65.

- Orth-Gomér, K. & Johnson, J. V. (1987). Social network interaction and mortality: A six-year follow-up study of a random sample of the Swedish population. *Journal of Chronic Diseases, 40*, 949-957.
- Oud, J. H. L. (2002). Continuous time modeling of the cross-lagged panel design. *Kwantitatieve Methoden, 69*, 1-26.
- Oxman, T. E., Berkman, L. F., Kasl, S., Freeman, D. H., & Barrett, J. (1992). Social support and depressive symptoms in the elderly. *American Journal of Epidemiology, 135*, 356-368.
- Powell, S. (2004). Meeting the mental health needs of seniors. *Senior Care Canada*. <http://seniorcarecanada.com/articles/2004/q1/mental.health/>.
- Pratt, L. A., Dey, A. N., & Cohen, A. J. (2007). *Characteristics of adults with serious psychological distress as measured by the K6 scale: United states, 2001-04* (Rep. No. 382). Hyattsville, MD: National Center for Health Statistics.
- Préville, M., Hébert, R., Bravo, G., & Boyer, R. (2001). Predisposing and facilitating factors of severe psychological distress among frail elderly adults. *Canadian Journal on Aging, 21*, 195-204.
- Préville, M., Potvin, L., & Boyer, R. (1995). The structure of psychological distress. *Psychological Reports, 77*, 275-293.
- Préville, M., Potvin, L., & Boyer, R. (1998). Psychological distress and use of ambulatory medical services in the Quebec medicare system. *Health Services Research, 33*, 275-286.
- Préville, M., Potvin, L., Boyer, R., & Boulerice, B. (2000). Relationship between physical health status and response to a psychological distress measure. *Canadian Journal on Aging, 19*, 363-379.

- Public Health Agency of Canada (2007). *Public Health Agency of Canada Strategic Plan: 2007-2012, Information, Knowledge, Action*. Canada: Minister of Canada. Retrieved February 28, 2010, from http://www.phac-aspc.gc.ca/publicat/2007/sp-ps/pdfs/PHAC_StratPlan_E_WEB.pdf.
- Ramos, M. & Wilmoth, J. (2003). Social relationships and depressive symptoms among older adults in Southern Brazil. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 58, S253-S261.
- Raykov, T. (1997). Estimation of composite reliability for congeneric measures. *Applied Psychological Measurement*, 21, 173-184.
- Robitaille, A., Orpana, H., & McIntosh, C. N. Psychometric properties, factorial structure, and measurement invariance of the English and French versions of the Medical Outcomes Study social support scale. *Health Reports*, (in press).
- Rose, G. (1985). Sick individuals and sick populations. *International Journal of Epidemiology*, 14, 32-38.
- Russell, D. W. & Cutrona, C. E. (1991). Social support, stress, and depressive symptoms among the elderly: Test of a process model. *Psychology and Aging*, 6, 190-201.
- Ryan, A. K. & Willits, F. K. (2007). Family ties, physical health, and psychological well-being. *Journal of Aging and Health*, 19, 907-920.
- Sarason, I. G., Levine, H. M., Basham, R. B., & Sarason, B. R. (1983). Assessing social support: the social support questionnaire. *Journal of Personality and Social Psychology*, 44, 127-139.
- Sarason, I. G., Pierce, G. R., & Sarason, B. R. (1994). General and specific perceptions of social support. In W.R.Avison & I. H. Gotlib (Eds.), *Stress and mental health. Contemporary issues and prospects for the future* (pp. 151-177). New York, NY: Plenum Press.

- Schafer, J. L. & Graham, J. W. (2002). Missing data: our view of the state of the art. *Psychological Methods*, 7, 147-177.
- Schermelleh-Engel, K., Klein, A., & Moosbrugger, H. (1998). Estimating nonlinear effects using a latent moderated structural equations approach. In R.E.Schumacker & G. A. Marcoulides (Eds.), *Interaction and nonlinear effects in structural equation modeling* (pp. 203-238). Mahwah, NJ: Lawrence Erlbaum Associates.
- Schwarzer, R., Knoll, N., & Rieckmann, N. (2004). Social support. In A.Kaptein & J. Weinman (Eds.), *Health Psychology* (pp. 158-182). Oxford, England: Blackwell.
- Seeman, T. E. (1996). Social ties and health: the benefits of social integration. *Annals of Epidemiology*, 6, 442-451.
- Seeman, T. E., Kaplan, G. A., Knudsen, L., Cohen, R., & Guralnik, J. (1987). Social network ties and mortality among the elderly in the Alameda county study. *American Journal of Epidemiology*, 126, 714-723.
- Selye, H. (1993). History of the stress concept. In L.Golberger & S. Breznitz (Eds.), *Handbook of stress: Theoretical and clinical aspects*. New York, NY: The Free Press.
- Shaw, B. A., Krause, N., Liang, J., & Bennett, J. (2007). Tracking changes in social relations throughout late life. *Journal of Gerontology: Social Sciences*, 62B, S90-S99.
- Sheikh, J. I. & Yesavage, J. A. (1986). *Geriatric Depression Scale (GDS): Recent evidence and development of a shorter version*. *Clinical Gerontology : A Guide to Assessment and Intervention*. New York, NY: The Haworth Press.
- Sheikh, J. I., Yesavage, J. A., Brooks, J. O., Friedman, L. F., Gratzinger, P., Hill, R. D. et al. (1991). Proposed factor structure of the Geriatric Depression Scale. *International Psychogeriatrics*, 3, 23-28.

- Sherbourne, C. D. & Stewart, A. L. (1991). The MOS social support survey. *Social Science & Medicine*, 32, 705-714.
- Shields, M. (2004). Stress, health, and the benefit of social support. *Health Reports*, 15, 9-38.
- Shields, M. & Martel, L. (2005). Healthy living among seniors. *Health Reports*, 16 Suppl, 7-20.
- Spielberger, C. D., Gorsuch, R. L., Lushene, P. R., Vagg, P. R., & Jacobs, A. G. (1983). *Manual for the State-Trait Anxiety Inventory (Form Y)*. Palo Alto, CA: Consulting Psychologists Press, Inc.
- Stapleton, L. M. (2006). An assessment of practical solutions for structural equation modeling with complex sample data. *Structural Equation Modeling*, 13, 28-58.
- Statistics Canada. (2007). Caring Canadians, involved Canadians: Highlights from the 2007 Canada survey of giving, volunteering and participating. Catalogue no. 71-542-XPE. Canada, Minister responsible for Statistics Canada.
- Statistics Canada (2008). *National Population Health Survey, Household Component, Cycles 1 to 7 (1994/1995 to 2006/2007), Longitudinal Documentation*. Ottawa: Statistic Canada.
- Statistics Canada and Canadian Institute for Health Information. (2006). Proportion of the population 12 years and over without a high level of social support, Quebec and some Canadian provinces, 2005. *Health Indicators 1*, 82-221.
- Steinbach, U. (1992). Social networks, institutionalization, and mortality among elderly people in the United States. *Journal of gerontology*, 47, S183-S190.
- Tabachnick, B. G. & Fidell, L. S. (2001). *Using multivariate statistics*. (4th ed.) Northridge: Allyn and Bacon.
- Tambay, J.-L. & Catlin, G. (1995). Sample design of the National Population Health Survey. *Health Reports*, 7, 29-39.

- Taylor, M. G. & Lynch, S. M. (2004). Trajectories of impairment, social support, and depressive symptoms in later life. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences*, 59B, S238-S246.
- Taylor, S. E. & Aspinwall, L. G. (1996). Mediating and moderating processes in psychosocial stress: Appraisal, coping, resistance, and vulnerability. In H.B.Kaplan (Ed.), *Psychosocial stress. Perspectives on structure, theory, life-course, and methods* (pp. 71-110). San Diego, CA: Academic Press.
- Thoits, P. A. (1986). Social support as coping assistance. *Journal of Consulting and Clinical Psychology*, 54, 416-423.
- Turcotte, M. & Schellenberg, G. (2007). *A portrait of seniors in Canada*. Ottawa: Statistics Canada, Social and Aboriginal Statistics Division.
- Turner, R. J., Wheaton, B., & Lloyd, D. A. (1995). The epidemiology of social stress. *American Sociological Review*, 60, 104-125.
- Ulbrich, P. M. & Warheit, G. J. (1989). Social support, stress, and psychological distress among older Black and White adults. *Journal of Aging and Health*, 1, 286-305.
- Vandenberg, R. J. & Lance, C. E. (2000). A review and synthesis of the measurements invariance literature: Suggestions, practices, and recommendations for organizational research. *Organizational Research Methods*, 3, 4-70.
- Vaux, A., Phillips, J., Holly, L., Thomson, B., Williams, D., & Stewart, D. (1986). The social support appraisals (SS-A) scale: studies of reliability and validity. *American Journal of Community Psychology*, 14, 195-219.
- Vernon, T. & Eysenck, S. B. G. (2007). Special issue on structural equation modeling [Special Issue]. *Personality and Individual Differences*: 42.

- Voyer, P., Verreault, R., Cappeliez, P., Holmes, D., & Mengue, P. N. (2005). Symptoms of psychological distress among older adults in Canadian long-term care centres. *Aging & Mental Health*, 9, 542-554.
- Wang, P. S., Berglund, P., Olfson, M., Pincus, H. A., Wells, K. B., & Kessler, R. C. (2005). Failure and delay in initial treatment contact after first onset of mental disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62, 603-613.
- Wheaton, B. (1994). Sampling the stress universe. In W.R.Avison & I. H. Gotlib (Eds.), *Stress and mental health: Contemporary issues and prospects for the future* (pp. 77-114). New York, NY: Plenum Press.
- Wheaton, B. (1996). The domains and boundaries of stress concepts. In H.B.Kaplan (Ed.), *Psychosocial stress. Perspectives on structure, theory, life-course, and methods* (pp. 29-70). San Diego, CA: Academic Press.
- Wheaton, B. (1997). The nature of chronic stress. In B.H.Gottlieb (Ed.), *Coping with chronic stress* (pp. 43-73). New York: Plenum Press.
- Wilkins, K. (2006). Predictors of death in seniors. *Health Reports*, 16 suppl, 57-67.
- Wills, T. A. & Shinar, O. (2000). Measuring perceived and received social support. In S.Colditz, L. G. Underwood, & B. H. Gottlieb (Eds.), *Social Support Measurement and Intervention : A Guide for Health and Social Scientists* (pp. 86-135). New York: Oxford University Press.
- Winemiller, D. R., Mitchell, M. E., Sutliff, J., & Cline, D. (1993). Measurement strategies in social support: A descriptive review of the literature. *Journal of Clinical Psychology*, 49, 638-648.

Yesavage, J. A., Brink, T. L., Rose, T. L., Lum, O., Huang, V., Adey, M. B. et al. (1983).

Development and validation of a geriatric depression screening scale: A preliminary report. *Journal of Psychiatric Research*, 17, 37-49.

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of Personality Assessment*, 52, 30-41.

Zumbo, B. D., Gadermann, A. M., & Zeisser, C. (2007). Ordinal versions of coefficients alpha and theta for likert rating scales. *Journal of Modern Applied Statistical Methods*, 6, 21-29.

Appendix A. MOS social support scale (English version)

Social Support (Medical Outcomes Study questions)

SS_C01 If proxy interview or age < 12, go to next section.

SS_Q01 Next are some questions about the support that is available to you.

~~SSC0_101~~ About how many close friends and close relatives do you have, that is, people you feel at ease with and can talk to about what is on your mind?

[] Close friends and relatives
(MIN: 0) (MAX: 99; warning after 20)
DK, R (Go to next section)

SS_QINT2 People sometimes look to others for companionship, assistance, or other types of support.

INTERVIEWER: Press <Enter> to continue.

SS_Q02 How often is each of the following kinds of support available to you if you need it :

~~SSC0_102~~ ... someone to help you if you were confined to bed?

INTERVIEWER: Read categories to respondent.

- 1 None of the time
 - 2 A little of the time
 - 3 Some of the time
 - 4 Most of the time
 - 5 All of the time
- DK, R (Go to next section)

SS_Q03 ... someone you can count on to listen to you when you need to talk?

~~SSC0_103~~ INTERVIEWER: Read categories to respondent.

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

SS_Q04 ... someone to give you advice about a crisis?

~~SSC0_104~~ INTERVIEWER: Read categories to respondent.

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

SS_Q05 ... someone to take you to the doctor if you needed it?

~~SSC0_105~~ INTERVIEWER: Read categories to respondent.

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

SS_Q06 ... someone who shows you love and affection?
 SSC0_106 INTERVIEWER: Read categories to respondent.

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

SS_Q07 How often is each of the following kinds of support available to you if you need it :

SSC0_107 ... someone to have a good time with?
INTERVIEWER: Read categories to respondent.

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

SS_Q08 ... someone to give you information in order to help you understand a situation?
 SSC0_108 INTERVIEWER: Read categories to respondent.

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

SS_Q09 ... someone to confide in or talk to about yourself or your problems?
 SSC0_109 INTERVIEWER: Read categories to respondent.

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

SS_Q10 ... someone who hugs you?
 SSC0_110 INTERVIEWER: Read categories to respondent.

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

SS_Q11 ... someone to get together with for relaxation?
 SSC0_111 INTERVIEWER: Read categories to respondent.

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

SS_Q12 ... someone to prepare your meals if you were unable to do it yourself?
 SSC0_112 INTERVIEWER: Read categories to respondent.

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

SS_Q13 ... someone whose advice you really want?
 SSC0_113 INTERVIEWER: Read categories to respondent.

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

SS_Q14 How often is each of the following kinds of support available to you if you need it :

SSC0_114 ... someone to do things with to help you get your mind off things?
INTERVIEWER: Read categories to respondent.

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

SS_Q15 ... someone to help with daily chores if you were sick?
 SSC0_115 INTERVIEWER: Read categories to respondent.

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

SS_Q16 ... someone to share your most private worries and fears with?
 SSC0_116 INTERVIEWER: Read categories to respondent.

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

SS_Q17 ... someone to turn to for suggestions about how to deal with a personal problem?
 SSC0_117 INTERVIEWER: Read categories to respondent.

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

SS_Q18 ... someone to do something enjoyable with?
SSC0_118 INTERVIEWER: Read categories to respondent.

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

SS_Q19 ... someone who understands your problems?
SSC0_119 INTERVIEWER: Read categories to respondent.

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

SS_Q20 ... someone to love you and make you feel wanted?
SSC0_120 INTERVIEWER: Read categories to respondent.

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

Appendix B. MOS social support scale (French version)

Soutien social (Questions relatives à l'Étude sur les issues médicales)

SS_C01 Si interview par procuration ou âge < 12, passez à la section suivante.

SS_Q01 **Voici maintenant quelques questions concernant le soutien social auquel vous avez accès.**

~~SSC0_101~~

Environ combien de parents ou d'amis proches avez-vous, c'est-à-dire des personnes avec lesquelles vous vous sentez à l'aise et à qui vous pouvez vous confier?

Parents ou amis proches
(MIN : 0) (MAX : 99; avertissement après 20)
NSP, R (Passez à la section suivante)

SS_QINT2 **Nous nous tournons parfois vers les autres pour avoir de la compagnie, de l'aide ou une autre forme de soutien.**

INTERVIEWEUR : Appuyez sur <Enter> pour continuer.

SS_Q02 **Dans quelle mesure avez-vous accès si vous en aviez besoin à :**

~~SSC0_102~~ **... une personne pour vous venir en aide si vous deviez garder le lit?**

INTERVIEWEUR : Lisez les catégories au répondant.

- 1 **Jamais**
 - 2 **Rarement**
 - 3 **Parfois**
 - 4 **La plupart du temps**
 - 5 **Tout le temps**
- NSP, R (Passez à la section suivante)

SS_Q03 **... une personne qui vous écoute quand vous avez besoin de parler?**

~~SSC0_103~~

INTERVIEWEUR : Lisez les catégories au répondant.

- 1 **Jamais**
- 2 **Rarement**
- 3 **Parfois**
- 4 **La plupart du temps**
- 5 **Tout le temps**

SS_Q04 **... une personne qui vous conseille en situation de crise?**

~~SSC0_104~~

INTERVIEWEUR : Lisez les catégories au répondant.

- 1 **Jamais**
- 2 **Rarement**
- 3 **Parfois**
- 4 **La plupart du temps**
- 5 **Tout le temps**

SS_Q05 **... une personne pouvant vous accompagner chez le médecin si vous en aviez besoin?**

~~SSC0_105~~

INTERVIEWEUR : Lisez les catégories au répondant.

- 1 **Jamais**
- 2 **Rarement**
- 3 **Parfois**
- 4 **La plupart du temps**
- 5 **Tout le temps**

SS_Q06 **... une personne qui vous témoigne de l'amour et de l'affection?**

~~SSC0_106~~

INTERVIEWEUR : Lisez les catégories au répondant.

- 1 Jamais
- 2 Rarement
- 3 Parfois
- 4 La plupart du temps
- 5 Tout le temps

SS_Q07 Dans quelle mesure avez-vous accès si vous en aviez besoin à :

~~SSQ0_107~~ ... une personne avec qui partager du bon temps?

INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Jamais
- 2 Rarement
- 3 Parfois
- 4 La plupart du temps
- 5 Tout le temps

SS_Q08 ... une personne pouvant vous renseigner pour vous aider à comprendre les situations que vous traversez?

~~SSQ0_108~~

INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Jamais
- 2 Rarement
- 3 Parfois
- 4 La plupart du temps
- 5 Tout le temps

SS_Q09 ... une personne à qui vous confier ou à qui parler de vous et de vos problèmes?

~~SSQ0_109~~

INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Jamais
- 2 Rarement
- 3 Parfois
- 4 La plupart du temps
- 5 Tout le temps

SS_Q10 ... une personne qui vous serre dans ses bras?

~~SSQ0_110~~

INTERVIEWEUR: Lisez les catégories au répondant

- 1 Jamais
- 2 Rarement
- 3 Parfois
- 4 La plupart du temps
- 5 Tout le temps

SS_Q11 ... une personne avec qui vous détendre?

~~SSQ0_111~~

INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Jamais
- 2 Rarement
- 3 Parfois
- 4 La plupart du temps
- 5 Tout le temps

SS_Q11 ... une personne avec qui vous détendre?

~~SSQ0_111~~

INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Jamais
- 2 Rarement
- 3 Parfois
- 4 La plupart du temps
- 5 Tout le temps

SS_Q12 ... une personne pouvant préparer vos repas si vous étiez incapable de le faire?
 SSC0_112 INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Jamais
- 2 Rarement
- 3 Parfois
- 4 La plupart du temps
- 5 Tout le temps

SS_Q13 ... une personne dont vous recherchez vraiment les conseils?
 SSC0_113 INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Jamais
- 2 Rarement
- 3 Parfois
- 4 La plupart du temps
- 5 Tout le temps

- 1 Jamais
- 2 Rarement
- 3 Parfois
- 4 La plupart du temps
- 5 Tout le temps

SS_Q14 Dans quelle mesure avez-vous accès si vous en aviez besoin à :

SSC0_114 ... une personne avec qui faire des activités distrayantes?
INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Jamais
- 2 Rarement
- 3 Parfois
- 4 La plupart du temps
- 5 Tout le temps

SS_Q15 ... une personne pouvant vous aider à accomplir les tâches ménagères si vous
 SSC0_115 étiez malade?

INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Jamais
- 2 Rarement
- 3 Parfois
- 4 La plupart du temps
- 5 Tout le temps

SS_Q16 ... une personne à qui confier vos inquiétudes et vos peurs les plus intimes?
 SSC0_116 INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Jamais
- 2 Rarement
- 3 Parfois
- 4 La plupart du temps
- 5 Tout le temps

SS_Q17 ... une personne à qui demander des suggestions quand vous avez un problème
 SSC0_117 d'ordre personnel?

INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Jamais
- 2 Rarement
- 3 Parfois
- 4 La plupart du temps
- 5 Tout le temps

SS_Q18 ... une personne avec qui faire des choses agréables?
 SSC0_118 INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Jamais
- 2 Rarement
- 3 Parfois
- 4 La plupart du temps
- 5 Tout le temps

SS_Q19 ... une personne qui comprend vos problèmes?
 SSC0_119 INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Jamais
- 2 Rarement
- 3 Parfois
- 4 La plupart du temps
- 5 Tout le temps

SS_Q20 ... une personne qui vous aime et vous donne le sentiment d'être désiré(e)?
 SSC0_120 INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Jamais
- 2 Rarement
- 3 Parfois
- 4 La plupart du temps
- 5 Tout le temps

Appendix C. Psychological distress (K6; English version)

Mental Health

MH_C01 If proxy interview or age < 12, go to next section

MH_QINT **Now some questions about mental and emotional well-being.**
INTERVIEWER: Press <Enter> to continue.

MH_Q01A **During the past month, that is, from [date one month ago] to yesterday, about how**
~~MHC0_1A~~ **often did you feel:**

... so sad that nothing could cheer you up?

INTERVIEWER: Read categories to respondent.

- 1 All of the time
 - 2 Most of the time
 - 3 Some of the time
 - 4 A little of the time
 - 5 None of the time
- DK, R (Go to MH_Q01K)

MH_Q01B **... nervous?**
~~MHC0_1B~~ INTERVIEWER: Read categories to respondent.

- 1 All of the time
 - 2 Most of the time
 - 3 Some of the time
 - 4 A little of the time
 - 5 None of the time
- DK, R (Go to MH_Q01K)

MH_Q01C **... restless or fidgety?**
~~MHC0_1C~~ INTERVIEWER: Read categories to respondent

- 1 All of the time
 - 2 Most of the time
 - 3 Some of the time
 - 4 A little of the time
 - 5 None of the time
- DK, R (Go to MH_Q01K)

MH_Q01D **... hopeless?**
~~MHC0_1D~~ INTERVIEWER: Read categories to respondent.

- 1 All of the time
 - 2 Most of the time
 - 3 Some of the time
 - 4 A little of the time
 - 5 None of the time
- DK, R (Go to MH_Q01K)

MH_Q01E **... worthless?**
~~MHC0_1E~~ INTERVIEWER: Read categories to respondent.

- 1 All of the time
 - 2 Most of the time
 - 3 Some of the time
 - 4 A little of the time
 - 5 None of the time
- DK, R (Go to MH_Q01K)

MH_Q01F
~~MHC0_1F~~

... that everything was an effort?

INTERVIEWER: Read categories to respondent.

- 1 All of the time
 - 2 Most of the time
 - 3 Some of the time
 - 4 A little of the time
 - 5 None of the time
- DK, R (Go to MH_Q01K)

Appendix D. Psychological distress (K6; French version)

Santé mentale

MH_C01 Si interview par procuration ou âge < 12, passez à la section suivante.

MH_QINT J'aimerais maintenant vous poser quelques questions concernant le bien-être mental et émotif.

INTERVIEWEUR : Appuyez sur <Enter> pour continuer.

MH_Q01A ~~MHC0_1A~~ Au cours du dernier mois, c'est-à-dire la période commençant [la date d'il y a un mois] et se terminant hier, combien de fois vous êtes-vous senti(e) :

... si triste que plus rien ne pouvait vous faire sourire?

INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Tout le temps
 - 2 La plupart du temps
 - 3 Parfois
 - 4 Rarement
 - 5 Jamais
- NSP, R (Passez à MH_Q01K)

MH_Q01B ... nerveux(se)?

~~MHC0_1B~~ INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Tout le temps
 - 2 La plupart du temps
 - 3 Parfois
 - 4 Rarement
 - 5 Jamais
- NSP, R (Passez à MH_Q01K)

MH_Q01C ... agité(e) ou ne tenant pas en place?

~~MHC0_1C~~ INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Tout le temps
 - 2 La plupart du temps
 - 3 Parfois
 - 4 Rarement
 - 5 Jamais
- NSP, R (Passez à MH_Q01K)

MH_Q01D ... désespéré(e)?

~~MHC0_1D~~ INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Tout le temps
 - 2 La plupart du temps
 - 3 Parfois
 - 4 Rarement
 - 5 Jamais
- NSP, R (Passez à MH_Q01K)

MH_Q01E ... bon(ne) à rien?

~~MHC0_1E~~ INTERVIEWEUR: Lisez les catégories au répondant.

- 1 Tout le temps
 - 2 La plupart du temps
 - 3 Parfois
 - 4 Rarement
 - 5 Jamais
- NSP, R (Passez à MH_Q01K)

MH_Q01F
MHC0_1F

... que tout était un effort?

INTERVIEWEUR: Lisez les catégories au répondant.

- 1 **Tout le temps**
 - 2 **La plupart du temps**
 - 3 **Parfois**
 - 4 **Rarement**
 - 5 **Jamais**
- NSP, R (Passez à MH_Q01K)

Appendix E. Education (English version)

ED_Q4
EDC0_4 Excluding kindergarten, how many years of elementary and high school [have/has] [you/FNAME] successfully completed?

- | | | |
|---|--------------|----------------------------|
| 1 | No schooling | (Go to next section) |
| 2 | 1 to 5 years | 7 10 years |
| 3 | 6 years | 8 11 years |
| 4 | 7 years | 9 12 years |
| 5 | 8 years | 10 13 years |
| 6 | 9 years | DK, R (Go to next section) |

ED_C4 If age < 15, go to next section.

ED_Q5
EDC0_5 [Have/Has] [you/FNAME] graduated from high school?

- 1 Yes
- 2 No

ED_Q6
EDC0_6 [Have/Has] [you/FNAME] ever attended any other kind of school such as a university, community college, business school, trade or vocational school, CEGEP or other post-secondary institution?

- 1 Yes
- 2 No (Go to next section)
- DK, R (Go to next section)

ED_Q7
EDC0_7 What is the highest level of education that [you/FNAME] [have/has] ever attained?

- 1 Some - trade, technical or vocational school, or business college
- 2 Some - community college, CEGEP or nursing school
- 3 Some - university
- 4 Diploma or certificate from - trade, technical or vocational school, or business college
- 5 Diploma or certificate from - community college, CEGEP or nursing school
- 6 Bachelor's or undergraduate degree, or teacher's college (e.g., B.A., B.Sc., L.I.B.)
- 7 Master's degree (e.g., M.A., M. Sc., M.Ed.)
- 8 Degree in Medicine, Dentistry, Veterinary Medicine or Optometry (M.D., D.D.S., D.M.D., D.V.M., O.D.)
- 9 Earned doctorate (e.g., Ph.D., D.Sc., D.Ed.)
- 10 Other - Specify

Appendix F. Education (French version)

ED_Q4
EDC0_4**Sans compter la maternelle, combien d'années d'études primaires et secondaires avez-vous terminées avec succès?**

- | | | |
|---|------------------|---------------------------------------|
| 1 | Aucune scolarité | (Passez à la section suivante) |
| 2 | 1 à 5 années | 7 10 années |
| 3 | 6 années | 8 11 années |
| 4 | 7 années | 9 12 années |
| 5 | 8 années | 10 13 années |
| 6 | 9 années | NSP, R (Passez à la section suivante) |

ED_C4

Si l'âge < 15, passez à la section suivante.

ED_Q5
EDC0_5**Avez-vous un certificat d'études secondaires?**

- 1 Oui
- 2 Non

ED_Q6
EDC0_6**Avez-vous fréquenté un autre genre d'établissement d'enseignement comme une université, un collège communautaire, une école de commerce, de métiers ou de formation professionnelle, un CÉGEP, ou un autre établissement d'enseignement postsecondaire?**

- 1 Oui
 - 2 Non (Passez à la section suivante)
- NSP, R (Passez à la section suivante)

ED_Q7
EDC0_7**Quel est le plus haut niveau de scolarité que vous avez atteint?**

- 1 Études partielles - dans une école de métiers, formation technique, ou de formation professionnelle, ou un collège commercial
- 2 Études partielles - dans un collège communautaire, au CÉGEP ou une école de sciences infirmières
- 3 Études partielles - à l'université
- 4 Diplôme ou certificat d'études - d'une école de métiers, de formation technique ou de formation professionnelle, ou d'un collège commercial
- 5 Diplôme ou certificat d'études - d'un collège communautaire, d'un CÉGEP ou d'une école de sciences infirmières
- 6 Baccalauréat, diplôme de 1er cycle ou certificat d'école normale (p.ex., B.A., B.Sc., LL.B.)
- 7 Maîtrise (p.ex., M.A., M.Sc., M.Ed.)
- 8 Diplôme en médecine, médecine dentaire, vétérinaire, ou optométrie (p.ex., M.D., D.D.S., D.M.D., D.M.V., O.D.)
- 9 Doctorat acquis (p.ex., Ph.D., D.Sc., D.Ed.)
- 10 Autre - Précisez

Appendix G. Income (English version)

IN_Q3
INC0_3

What is your best estimate of the total income, before taxes and deductions, of all household members from all sources in the past 12 months?

Income
(MIN 0) (MAX: 500,000, warning after 150,000)
0 (Go to next section)
DK, R (Go to IN_Q3A)

Go to IN_C4

IN_Q3A
INC0_3A

Can you estimate in which of the following groups your household income falls?
Was the total household income less than \$20,000 or \$20,000 or more?

- 1 Less than \$20,000
- 2 \$20,000 or more (Go to IN_Q3E)
- 3 No income (Go to next section)
DK, R (Go to next section)

IN_Q3B
INC0_3B

Was the total household income from all sources less than \$10,000 or \$10,000 or more?

- 1 Less than \$10,000
- 2 \$10,000 or more (Go to IN_Q3D)
DK, R (Go to IN_C4)

IN_Q3C
INC0_3C

Was the total household income from all sources less than \$5,000 or \$5,000 or more?

- 1 Less than \$5,000
- 2 \$5,000 or more

Go to IN_C4

IN_Q3D
INC0_3D

Was the total household income from all sources less than \$15,000 or \$15,000 or more?

- 1 Less than \$15,000
- 2 \$15,000 or more

Go to IN_C4

IN_Q3E
INC0_3E

Was the total household income from all sources less than \$40,000 or \$40,000 or more?

- 1 Less than \$40,000
- 2 \$40,000 or more (Go to IN_Q3G)
DK, R (Go to IN_C4)

IN_Q3F
INC0_3F

Was the total household income from all sources less than \$30,000 or \$30,000 or more?

- 1 Less than \$30,000
- 2 \$30,000 or more

Go to IN_C4

IN_Q3G
INC0_3G

Was the total household income from all sources:
INTERVIEWER Read categories to respondent

- 1 ... less than \$50,000?
- 2 ... \$50,000 to less than \$60,000?
- 3 ... \$60,000 to less than \$80,000?
- 4 ... \$80,000 or more?

Appendix H. Income (French version)

IN_Q3
INC0_3

Au mieux de vos connaissances, pour les 12 derniers mois à combien estimez-vous le revenu total de tous les membres du ménage provenant de toutes sources, avant impôts et autres retenues?

Revenu
(MIN: 1) (MAX: 500,000; avertissement après 150,000)
0 (Passez à la section suivante)
NSP, R (Passez à IN_Q3A)

Passez à IN_C4

IN_Q3A
INC0_3A

Dans quel groupe parmi ceux que je vais nommer estimez-vous que se situe le revenu de votre ménage? Le revenu total du ménage était-il de moins de 20 000\$ ou de 20 000\$ ou plus?

- 1 De moins de 20 000\$
- 2 De 20 000\$ ou plus (Passez à IN_Q3E)
- 3 Aucun revenu (Passez à la section suivante)
NSP, R (Passez à la section suivante)

IN_Q3B
INC0_3B

Le revenu total du ménage était-il de moins de 10 000\$ ou de 10 000\$ ou plus?

- 1 De moins de 10 000\$
- 2 De 10 000\$ ou plus (Passez à IN_Q3D)
NSP, R (Passez à IN_C4)

IN_Q3C
INC0_3C

Le revenu total du ménage était-il de moins de 5 000\$ ou de 5 000\$ ou plus?

- 1 De moins de 5 000\$
- 2 De 5 000\$ ou plus

Passez à IN_C4

IN_Q3D
INC0_3D

Le revenu total du ménage était-il de moins de 15 000\$ ou de 15 000\$ ou plus?

- 1 De moins de 15 000\$
- 2 De 15 000\$ ou plus

Passez à IN_C4

IN_Q3E
INC0_3E

Le revenu total du ménage était-il de moins de 40 000\$ ou de 40 000\$ ou plus?

- 1 De moins de 40 000\$
- 2 De 40 000\$ ou plus (Passez à IN_Q3G)
NSP, R (Passez à IN_C4)

IN_Q3F
INC0_3F

Le revenu total du ménage était-il de moins de 30 000\$ ou de 30 000\$ ou plus?

- 1 De moins de 30 000\$
- 2 De 30 000\$ ou plus

Passez à IN_C4

IN_Q3G
INC0_3G

Le revenu total du ménage était-il :
INTERVIEWEUR : Lisez les catégories au répondant.

- 1 ... de moins de 50 000\$?
- 2 ... de 50 000\$ à moins de 60 000\$?
- 3 ... de 60 000\$ à moins de 80 000\$?
- 4 ... de 80 000\$ ou plus?

Appendix I. Marital status (English version)

<i>DHCO_MAR</i>	Marital Status
1	Married
2	Living common-law
3	Widowed
4	Separated
5	Divorced
6	Single, never married

Appendix J. Marital status (French version)

<i>DHCO_MAR</i>	État matrimonial
1	Marié(e)
2	En union libre
3	Veuf ou veuve
4	Séparé(e)
5	Divorcé(e)
6	Célibataire (jamais marié(e))

Appendix K. Chronic stressors (English version)

Ongoing Problems

- ST_QINT1A The next part of the questionnaire deals with different kinds of stress. Although the questions may seem repetitive, they are related to various aspects of a person's physical, emotional and mental health.
INTERVIEWER: Press <Enter> to continue.
- ST_QINT1B I'll start by describing situations that sometimes come up in people's lives. As there are no right or wrong answers, the idea is to choose the answer best suited to your personal situation. I'd like you to tell me if these things are true for you at this time by answering 'true' if it applies to you now or 'false' if it does not.
INTERVIEWER: Press <Enter> to continue.
- ST_Q101
~~ST_Q_C1~~ You are trying to take on too many things at once.
- 1 True
2 False
R (Go to ST_QINT2)
- ST_Q102
~~ST_Q_C2~~ There is too much pressure on you to be like other people.
- 1 True
2 False
- ST_Q103
~~ST_Q_C3~~ Too much is expected of you by others.
- 1 True
2 False
- ST_Q104
~~ST_Q_C4~~ You don't have enough money to buy the things you need.
- 1 True
2 False
- ST_C105 If marital status = married or living common-law go to ST_Q105. If marital status = single, widowed, separated or divorced go to ST_Q108. Otherwise (i.e., marital status is unknown) go to ST_Q109.
- ST_Q105
~~ST_Q_C5~~ Your partner doesn't understand you.
- 1 True
2 False
- ST_Q106
~~ST_Q_C6~~ Your partner doesn't show enough affection.
- 1 True
2 False
- ST_Q107
~~ST_Q_C7~~ Your partner is not committed enough to your relationship.
- 1 True
2 False
- Go to ST_Q109
- ST_Q108
~~ST_Q_C8~~ You find it is very difficult to find someone compatible with you.
- 1 True
2 False

- ST_Q109
ST_0_C9 **Do you have any children?**
- 1 Yes
 - 2 No (Go to ST_Q112)
 - DK, R (Go to ST_Q112)
- ST_Q110
ST_0_C10 **Remember I want to know if you feel any of these statements are true for you at this time.**
One of your children seems very unhappy.
- 1 True
 - 2 False
- ST_Q111
ST_0_C11 **A child's behaviour is a source of serious concern to you.**
- 1 True
 - 2 False
- ST_Q112
ST_0_C12 **Your work around the home is not appreciated.**
- 1 True
 - 2 False
- ST_Q113
ST_0_C13 **Your friends are a bad influence.**
- 1 True
 - 2 False
- ST_Q114
ST_0_C14 **You would like to move but you cannot.**
- 1 True
 - 2 False
- ST_Q115
ST_0_C15 **Your neighbourhood or community is too noisy or too polluted.**
- 1 True
 - 2 False
- ST_Q116
ST_0_C16 **You have a parent, a child or a partner who is in very bad health and may die.**
- 1 True
 - 2 False
- ST_Q117
ST_0_C17 **Someone in your family has an alcohol or drug problem.**
- 1 True
 - 2 False
- ST_Q118
ST_0_C18 **People are too critical of you or what you do.**
- 1 True
 - 2 False

Appendix L. Chronic stressors (French version)

Problèmes actuels

ST_QINT1A La partie suivante du questionnaire traite de différentes formes de stress. Bien que les questions puissent sembler répétitives, elles portent sur des aspects différents du bien-être physique, émotif et mental de la personne.

INTERVIEWEUR : Appuyez sur <Enter> pour continuer.

ST_QINT1B Je vais maintenant vous décrire des situations qui surviennent parfois dans la vie des gens. Il n'y a pas de bonnes ou de mauvaises réponses aux questions. Il suffit de choisir la réponse qui correspond le mieux à votre situation. J'aimerais que vous me disiez si ces énoncés s'appliquent à vous actuellement. Vous n'avez qu'à répondre vrai ou faux, selon le cas.

INTERVIEWEUR : Appuyez sur <Enter> pour continuer.

ST_Q101 Vous essayez d'entreprendre trop de choses en même temps.

~~ST_Q101~~
ST_Q_C1

- 1 Vrai
- 2 Faux
- R (Passez à ST_QINT2)

ST_Q102 Vous ressentez trop de pression pour être comme les autres.

~~ST_Q102~~
ST_Q_C2

- 1 Vrai
- 2 Faux

ST_Q103 Les autres attendent trop de votre part.

~~ST_Q103~~
ST_Q_C3

- 1 Vrai
- 2 Faux

ST_Q104 Vous n'avez pas assez d'argent pour acheter les choses dont vous avez besoin.

~~ST_Q104~~
ST_Q_C4

- 1 Vrai
- 2 Faux

ST_Q105 Si l'état matrimonial = marié(e) ou en union libre, passez à ST_Q105. Si l'état matrimonial = célibataire, veuf(ve), séparé(e) ou divorcé(e), passez à ST_Q108. Autrement (c.-à-d. ne sait pas), passez à ST_Q109.

ST_Q105 Votre conjoint(e) ne vous comprend pas.

~~ST_Q105~~
ST_Q_C5

- 1 Vrai
- 2 Faux

ST_Q106 Votre conjoint(e) ne vous témoigne pas assez d'affection.

~~ST_Q106~~
ST_Q_C6

- 1 Vrai
- 2 Faux

ST_Q107 Votre conjoint(e) n'est pas suffisamment engagé(e) dans votre relation.

~~ST_Q107~~
ST_Q_C7

- 1 Vrai
- 2 Faux

Passez à ST_Q109

ST_Q108
ST_0_C8 Vous trouvez qu'il est très difficile de trouver quelqu'un/une avec qui vous êtes compatible.

- 1 Vrai
- 2 Faux

ST_Q109
ST_0_C9 Avez-vous des enfants?

- 1 Oui
- 2 Non (Passez à ST_Q112)
NSP. R (Passez à ST_Q112)

ST_Q110
ST_0_C10 Rappelez-vous que les énoncés qui suivent doivent décrire vos sentiments en ce moment. Un de vos enfants semble être très malheureux.

- 1 Vrai
- 2 Faux

ST_Q111
ST_0_C11 Le comportement d'un de vos enfants vous inquiète sérieusement.

- 1 Vrai
- 2 Faux

ST_Q112
ST_0_C12 Votre travail à la maison n'est pas apprécié.

- 1 Vrai
- 2 Faux

ST_Q113
ST_0_C13 Vos amis ont une mauvaise influence sur vous.

- 1 Vrai
- 2 Faux

ST_Q114
ST_0_C14 Vous aimeriez déménager, mais vous ne le pouvez pas.

- 1 Vrai
- 2 Faux

ST_Q115
ST_0_C15 L'endroit où vous habitez est trop bruyant ou trop pollué.

- 1 Vrai
- 2 Faux

ST_Q116
ST_0_C16 Un de vos parents, un de vos enfants ou votre conjoint(e) est en très mauvaise santé et pourrait mourir.

- 1 Vrai
- 2 Faux

ST_Q117
ST_0_C17 Quelqu'un dans votre famille a un problème d'alcool ou de drogue.

- 1 Vrai
- 2 Faux

ST_Q118
ST_0_C18 Les gens sont trop critiques à votre égard ou critiquent trop ce que vous faites.

- 1 Vrai
- 2 Faux