Abstract

Self-reported health (SRH) tends to decline slower as people age compared to the decline of their objective health. If individuals believe they are in good health but actually are in poor health, their perceived susceptibility to disease may be low. Consequently, those individuals may feel less compelled to improve their health, which would make them a higher risk population. This project aims to examine the association of SRH and Metabolic Syndrome (MetS) in senior women, and whether personal and interpersonal dimensions help explain the degree to which SRH corresponds with MetS.

Data are from the Kingston Senior Women Study (KSWS, n=100, 65 years of age and older). KSWS participants completed a questionnaire on their social background, psychosocial conditions, health behaviours, and SRH. Participants also provided physiological measures and medical information, so that MetS could be assessed, following the harmonized definition. MetS is a cluster of at least three of the following criteria: obesity, elevated blood pressure, low level of HDL cholesterol, raised triglycerides, and fasting plasma glucose. Two categories represented the correspondence between SRH and MetS: those who have a congruent perception of their health and those who overestimated it.

Greater physical activity was associated with higher SRH (OR: 1.10; 95%CI: 1.01 – 1.20) and lower odds of MetS (OR: 0.64, 95%CI: 0.47 – 0.88) among the participants. However, only social network size was associated with lower odds of health overestimation (OR: 0.46, 95%CI: 0.26 – 0.80).

Larger social networks may give access older women to a greater source of information about their own health, leading possibly to more accurate assessments of health. Such
information can be conveyed as feedback from close ties. This information can also be conveyed as a more accurate perception of the health of their reference group when self-assessing their own health. Findings of this study may help identify women who are at greater risk of cardiovascular disease but who may be less likely to participate in health promotion programs.
**Co-Authorship**

This presented thesis stems mainly from the work of Laure Sabatier: the main idea of the research, the review of the literature, data cleaning, some of the variables creation, the data analysis, the interpretation of the results, and the writing. The development and formulation of the research question were produced by the collaboration of Laure Sabatier and Dr. Spencer Moore. The study and the data used for this research project have been respectively designed by Dr. Moore and collected by research assistants previously this thesis project.
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Chapter 1: Introduction

Self-reported health (SRH) has been shown to be a strong predictor of morbidity and mortality (Finch, Hummer, Reindl, & Vega, 2002; Ford, Spallek, & Dobson, 2008; Idler & Benyamini, 1997; Jylhä, 2009; Rohrer, Herman, Merry, Naessens, & Houston, 2009; Snead, 2007), often stronger than other health factors (Idler & Kasl, 1991). SRH has also been shown to predict future physicians' ratings of health (Maddox & Douglass, 1973). Although the strength of the relationship between SRH and mortality may be less in certain social or demographic groups, researchers have maintained that SRH validly captures ‘true’ health within certain parameters (Quesnel-Vallée, 2007, p. 1161). Given its relative ease of measurement and its construct validity as health indicator, SRH is widely used in health studies to assess a person's health status. Despite its strong association with objective health, SRH is considered a subjective health outcome since it involves a cognitive process: people construct and interpret what they know about their health to provide an assessment of their general status (Jylhä, 2009; Manderbacka, 1998).

In contrast to SRH, a diagnosis of metabolic syndrome (MetS) does not rely on an individual's self-assessment. MetS represents a cluster of at least three of the following criteria: obesity, elevated blood pressure, low level of HDL cholesterol, raised triglycerides, and fasting plasma glucose. Unless a person is diagnosed, none of those criteria are immediately apparent to an individual with the possible exception of obesity. MetS is a particularly relevant health condition to contrast with the SRH of older adults since it affects a large proportion of the senior population (Riediger & Clara, 2011). In addition, MetS has been shown to lead to type 2 diabetes and cardiovascular disease—the second leading cause of mortality among Canadians (Statistics Canada, 2011).
Data for this study come from the Kingston Senior Women’s Research Study (KSWS). The KSWS was a pilot study designed to examine the links among socioeconomic status (SES), social networks, health behaviours, and the metabolic health of women 65 years old and older. Although data come from a convenience sample, the data are unique in the breadth of social network, physiological, and health behavioural information available on older women.

Being composed solely of older women, this sample seems well suited to study the relationship between SRH and MetS. Seniors often assess their health differently than youth (Krause & Jay, 1994), and women often assess their health differently than men (Benyamini, Leventhal, & Leventhal, 2000; McCallum, Shadbolt, & Wang, 1994). The homogeneity of the sample eliminates potential confounding by age and gender, and enables analyses to focus specifically on the factors associated with older women’s health self-assessment.

In Canada, a person's SRH has been shown to decrease with age across the entire lifespan (Statistics Canada, 2012b). Declines in perceived health may reflect the decline in objective health generally observed with aging. This explanation for the link between objective and subjective health may be appropriate in samples that include a range of age groups. Yet, when analyses have focused exclusively on older adults, research has shown that seniors’ subjective health remains relatively stable while objective health worsens with age: this phenomenon is known as the paradox of aging (Cheng, Fung, & Chan, 2007; Kunzmann, Little, & Smith, 2000). The paradox is meant to capture the idea that people's expectations concerning health co-evolve with the health norms surrounding one's age. Indeed, elderly people often associate their functional and physical decline with the normal aging process (Idler, 1993; Williamson & Fried, 1996). Consequently, lower physical functionality and the presence or absence of disease do not completely explain a person's subjective assessment of health (Kunzmann et al., 2000). The
elderly do not seem as emotionally affected as younger people are when they suffer from serious illnesses since illness may be considered more normal in old age (Beckie, Fletcher, Beckstead, Schocken, & Evans, 2008). In addition, the elderly may actually enhance their perception of their own health through social comparison (Heckhausen, 1999); for instance, the older people get, the more they may consider themselves in better health than their same-aged peers (Sargent-Cox, Anstey, & Luszcz, 2008). Hence, the older a person becomes and the more their actual health declines, the greater the potential role is for social comparison processes to create a gap between a person's objective and subjective health.

Although men and women have been shown to report very good or excellent health at similar rates (Statistics Canada, 2012b), studies have shown that women tend to have a broader view of their health (Benyamini, Leventhal, et al., 2000; McCallum et al., 1994). In contrast to women, men have been shown to rely more on the presence of life-threatening conditions to evaluate their health, which may help explain the stronger relationship between SRH and mortality among men than women (Wolinsky & Johnson, 1992).

Studying MetS in senior women is also relevant. The elderly have the highest rate of the syndrome in Canada as well as for most of the MetS components (Riediger & Clara, 2011). Research on the relation between MetS and sex has led to mixed results. In samples of predominantly White adults including the elderly, some authors reported that women were more likely to suffer from MetS (La Rosa, Le Clésiau, & Valensi, 2008; Loucks, Magnusson, et al., 2007; Santos, Ebrahim, & Barros, 2008) while others reported no difference in the rate of MetS between men and women (Loucks, Rehkopf, Thurston, & Kawachi, 2007; Riediger & Clara, 2011). Nonetheless, older women are reportedly at a greater risk of MetS because of life events such as menopause (Ebrahimpour et al., 2010; Kaaja, 2008; Riesco et al., 2008) and because
negative feelings such as hostility, anxiety, and even depression seem to have a greater effect on
the metabolic health of women than on men’s (Stewart-Knox, 2007).

This study aims to examine the social and psychosocial variables associated with older
women’s SRH and MetS, the degree to which a person’s SRH reflects their risk of MetS, and
whether there are any social or behavioural patterns in the correspondence between SRH and
MetS. More particularly, this study focuses on the senior women who overestimate their general
health in comparison to their metabolic health, as opposed to the senior women who have a
general health perception in congruence with their metabolic health. The literature review will
discuss research that has shown the importance of social and psychosocial variables on older
women's SRH, their risk for MetS, and the role such variables may play in how older women
self-assess their health. Results should help us to understand the various social and psychological
variables associated with older women's self-assessment of their health, and specifically their
overestimation of their health compared to MetS.

Rationale

The older adult population represents an important and growing demographic for health
promotion programming due to their higher levels of health care use. This population also has a
unique dimension about their self-assessed health since seniors tend to maintain a perception of
good health, even when experiencing poor health. The present study aims to contribute both to
theoretical and empirical literature examining the relationship between subjective and
objective health status in older adults, and the practical development of health promotion
recruitment strategies targeted to higher risk older adults.

Few studies have examined the strength of the relationship between subjective and
objective health among seniors. Most of those studies have examined the alignment between
objective and subjective health in relation to other health indicators used to self-assess general health (e.g., Borawski, Kinney, & Kahana, 1996; Idler, Hudson, & Leventhal, 1999; van Doorn, 1999), life expectancy (e.g., Chipperfield, 1993; Ruthig, Chipperfield, & Payne, 2011), aging (e.g., Kunzmann et al., 2000), mental health (e.g., Hong, Zarit, & Malmberg, 2004; Jobin, Pushkar, & Torok, 2010), physical activity (e.g., Ruthig & Chipperfield, 2007), functionality (e.g., Hong et al., 2004; Ruthig & Allery, 2008; Ruthig et al., 2011), SES (e.g., Delpierre et al., 2012), sense of control (SoC; e.g., Rodin & McAvay, 1992; Ruthig & Chipperfield, 2007), social network (e.g., Eller, Holle, Landgraf, & Mielck, 2008), social engagement (e.g., Ruthig & Allery, 2008), and social comparison (e.g., Cheng et al., 2007). Medication intake in turn is thought to be a reminder of health status (Johnston, Propper, & Shields, 2009; Schulz et al., 1994). Yet, no studies have examined the importance of medication intake on the association between subjective and objective health. In addition, not all studies have directly explored health congruency, that is, an outcome variable describing the relationship between objective and subjective health. Some studies have analyzed possible moderators of the relationship between objective health and subjective health, such as SES (e.g., Delpierre et al., 2012) and SoC (e.g., Rodin & McAvay, 1992). Some others have examined the correlates of SRH, such as social integration, within groups stratified by objective health status in order to compare the results from group to group (e.g., Eller et al., 2008). This thesis will contribute to this limited literature by examining the association between SRH and metabolic health, and the contribution of individual and interpersonal dimensions—age, medication intake, physical activity, SoC, SES, social support, and social comparison—in explaining the degree to which SRH and metabolic health corresponds. Furthermore, in using pilot data and a convenience sample, the present research is exploratory and meant to be hypothesis-generating rather than hypothesis-driven.
On the health promotion side, there are considerable challenges in recruiting and maintaining the participation of older adults in health promotion programs. A number of factors have been shown to influence the potential participation of individuals in health programs. For example, the Health Belief Model (HBM) suggests that a person's perceptions of susceptibility, severity of the condition, barriers, and benefits are determinants of the adoption of health behaviour. Perceived susceptibility refers to a person's assessment of how likely they are of developing the illness or condition. Theoretically, those with low perceived susceptibility may be less likely to participate in health promotion programs. Older women who have a high SRH may not feel susceptible to getting ill (Avis, Smith, & McKinlay, 1989; Kulik & Mahler, 1987). Nevertheless, if those women have a poor metabolic health, they are even more at-risk since they may be unlikely to change their health behaviour. From a health promotion perspective, knowledge of whether there are any social patterns to the correspondence or lack of correspondence between subjective and objective health could inform the development of programs that increase the involvement and participation of these high-risk older adults. Results of this thesis could help clarify the individual and interpersonal characteristics related to concordant or discordant perceptions of subjective compared to physiological health, and provide evidence to guide tailored recruitment strategies toward those at-risk populations. The characteristics related to the overestimation of health as compared to the MetS could help both identify and tailor the message toward the at-risk population. This study is particularly translatable for public health practitioners since the objective health outcome—metabolic health conditions—is modifiable and related to many health concerns of senior Canadians (Statistics Canada, 2012a).
The discordance between objective and subjective health does not only take the form of overestimation. It can also be a health underestimation, that is, the belief to be in poor health while being actually in good health. Those who underestimate their health constitute also a population at risk: they have a higher risk of mortality than those who have a congruent perception of their health or those who overestimate their health (Chipperfield, 1993). However, in the perspective of the HMB and of identifying those with low perceived risk susceptibility, this study focuses only on those who overestimate their health.

**Notes on the Vocabulary**

This study assumes that health is a broad concept rather than a concrete object, and thus the notion of objective health is nonsensical. In the same vein, the expression ‘subjective health’ would be a pleonasm. Yet, both terms are widely used in this thesis. SRH and the MetS could be respectively designated as a cognitive process-based measure of health and a physiologically-measured health. Repeated use of these expressions would be tedious, but they may actually be the most accurate designations for these concepts. However, the expressions of subjective and objective health are used instead of the latter in order to facilitate the understanding of the arguments.

It goes with the same reasoning for the terms of realistic and accuracy, which are used in this thesis to designate the alignment between SRH and MetS. Since there is no objective and true measure of health, a realistic or an accurate health assessment is intrinsically impossible. The most accurate expressions are the congruency and the alignment between SRH and MetS or that individuals assess their health in congruence or in alignment with their metabolic health. However, the terms of realistic and accurate health assessment are also used in order to facilitate the understanding of the arguments.
Chapter 2: Literature Review

General Conceptual Framework

The way in which individuals assess their health varies with age. Current research supports the idea that intra- and interpersonal characteristics may also help explain the differences in assessing one’s health. Figure 1 presents these characteristics. The intrapersonal characteristics include age, gender, medication intake, physical activity, SES, and sense of control; the interpersonal characteristics include social support and social comparison processes.

Figure 1: Conceptual Framework

Intrapersonal factors
- Gender
- Age
- Medication intake
- Physical activity
- Socio-economic status
- Sense of control

Interpersonal factors:
- Social support
- Social comparison

Relation between objective and subjective health

At the intrapersonal level, men and women have been found to have a different prioritization of health dimension when self-assessing their health, resulting in a different association between their SRH and objective health such as mortality (Benyamini, Leventhal, et al., 2000; McCallum et al., 1994). However, the association of gender with health congruency is not explored in this research since it already focuses on women. Then the paradox of aging suggests that senior adults tend to overestimate their general health, and the gap between
objective and subjective health may keep increasing with age even at the senior category (Jylhä, Guralnik, Balfour, & Fried, 2001). However, seniors are often likely to be using prescribed medication (Ramage-Morin, 2009), which may operate as a reminder of their health condition (Johnston et al., 2009; Schulz et al., 1994). Despite the asymptomatic nature of the MetS, senior women might be aware of their metabolic health if they take related medication. Medication may make salient in an everyday sense one’s health condition. Hence, medication intake may help explain a person's self-assessment of their general health (Jylhä, 2009). Physical activity (PA) may in turn increase metabolic health and SRH, but PA has also been shown to relate to one's feeling of being in good health regardless of objective health status (Ruthig & Chipperfield, 2007), potentially leading to a health overestimation.

SES and high SoC may also affect the association between objective and subjective health by altering one's health expectations (Ross & Willigen, 1997). The relationship between SRH and objective health has been shown to be stronger among those with higher education (Delpierre et al., 2011). Since highly educated people have more resources to be in good health (Galobardes, Shaw, Lawlor, Davey Smith, & Lynch, 2006; Kickbusch, 2001; Pampel, Krueger, & Denney, 2010), they are more likely to be, and expect to be, in better health. Objective health has also been shown to have a stronger association with the subjective health of those with higher levels of perceived control (Rodin & McAvay, 1992). Since those who feel in control of their life tend to engage more frequently in health promoting behaviour (Seeman & Seeman, 1983), they may also be more likely to perceive that they should be in good health, similarly to highly educated people (Ross & Willigen, 1997). Individuals with higher expectations about their health are more likely to be dissatisfied by poor health conditions, which may therefore more likely affect their self-rating of health (Ross & Willigen, 1997).
At the interpersonal level, social relational factors may also help to explain the alignment of SRH with metabolic health. Social support provides coping resources (Thoits, 2011) that may buffer the emotional impact of poor physiological health on ones' perceived health. Consequently, it is possible that older adults with greater support give less weight to their physiological health in assessing their overall health. Moreover, social comparison processes may also temper the association between subjective and objective health. Research has shown that the elderly tend to adjust their own perceived health upward by comparing their health status to their same-aged peers (Cheng et al., 2007; Sargent-Cox et al., 2008). Research has shown that the older people get, the more they consider themselves in better health than their same-aged peers (Sargent-Cox et al., 2008).

Health Statuses

Self-Reported Health: A Cognitive Process

SRH is commonly evaluated with the question: “In general, would you say your health is: excellent, very good, good, fair, or poor?” from the SF-36 Health Survey (Ware & Gandek, 1998). Answering this question involves a cognitive process: (1) people must recall what they know of their health, for example through a medical diagnosis or subjective bodily experience, (2) evaluate the meaning of each aspect of their health they recall, and (3) then make an overall evaluation so as to self-assess their general health status (Jylhä, 2009). Answering the SRH question is a subjective calculus involving more than the average or sum of all direct indicators of physical and mental health, such as disease, functionality, medication, physician opinion, feeling ill, etc.

The SRH question is purposely vague so that individuals can evaluate their health in terms of their own definition of health (Snead, 2007). Health is a multidimensional concept that
“belongs to the realm of everyday talk rather than any exact scientific vocabulary” (Jylhä, 2009, p. 309). In an implicit and ongoing manner (Bailis, Segall, & Chipperfield, 2003; Huisman & Deeg, 2010; Jylhä, 2010), people construct and interpret the meaning of their own physical or mental experience (Manderbacka, 1998) according to what they consider relevant aspects of their health. Subjective feelings are also often a part of the personal calculus (Schulz et al., 1994). The general definition of health can take various dimensions according to different individuals, from a physical level to a more transcendent level; nonetheless, each senior adult seems to have a relatively unique definition of their health comprising only one specific dimension (Borawski et al., 1996). In a study on the meaning of SRH, senior adults were interviewed about their health; each participant had a different and unique definition of the concept of health (Borawski et al., 1996).

Variations in the definition of health do not seem random but rather seem to follow different types of profiles: age (Krause & Jay, 1994) and gender (Benyamini, Leventhal, et al., 2000; McCallum et al., 1994) are examples of demographic variables that may explain the variation in the dimensions used to define health. However, although variations in SRH may be partially explained by non-physical or mental health outcomes, physical health remains a strong predictor of SRH, especially for senior adults because physical aspects make them perceive that their life is threatened (Benyamini, Idler, Leventhal, & Leventhal, 2000). Hence, SRH may be related to MetS.

**Metabolic Syndrome**

MetS, also called insulin resistance syndrome, is a relatively new concept that arose in the late 1990’s (S. M. Grundy, 2007) with the aim to improve the identification of those at greater risk for type 2 diabetes and cardiovascular diseases. A recent consensus aims to
harmonize the various definitions of MetS (Alberti et al., 2009). Table 1 shows the harmonized definition of MetS and two former main definitions of MetS, as well as the diagnostic criteria relative to those definitions. All the definitions are consistent in the fact that they are all composed of at least three of the five following criteria: central obesity, raised triglycerides, reduced HDL-cholesterol, elevated blood pressure, and raised fasting glucose.

Table 1: Definitions of Metabolic Syndrome

<table>
<thead>
<tr>
<th>ATPIII criteria</th>
<th>IDF definition</th>
<th>Harmonized Definition</th>
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<tr>
<td>At least three of the following:</td>
<td>Essential component:</td>
<td>At least three of the following:</td>
</tr>
</tbody>
</table>
| • Abdominal obesity: waist circumference >102 cm in males or >88 cm in females | • Central obesity: waist circumference >94 cm in males or >80 cm in females | • Elevated waist circumference: ≥ 102 cm in males or ≥ 88 cm in females 
And at least two of the following |
| • Raised triglycerides: ≥ 150 mg/dL or specific treatment | • Raised triglycerides: ≥ 150 mg/dL or specific treatment | • Raised triglycerides: ≥ 150 mg/dL or drug treatment for elevated triglycerides |
| • Reduced HDL-cholesterol: < 40 mg/dL in males or < 50mg/dL in females or specific treatment | • Reduced HDL-cholesterol: < 40 mg/dL in males or < 50mg/dL in females or specific treatment | • Reduced HDL-cholesterol: < 40 mg/dL in males or < 50mg/dL in females or drug treatment for reduced HDL-cholesterol |
| • Elevated blood pressure: ≥ 130/85 mg or specific treatment | • Elevated blood pressure: systolic blood pressure ≥ 130 or diastolic blood pressure ≥ 85 mg or treatment of previously diagnosed hypertension | • Elevated blood pressure: systolic blood pressure ≥ 130 or diastolic blood pressure ≥ 85 mg or treatment of previously diagnosed hypertension |
| • Raised plasma glucose: ≥ 100 mg/dL or specific treatment | • Raised fasting plasma glucose: ≥ 100 mg/dL or previously diagnosed type 2 diabetes. | • Raised fasting glucose ≥ 100 mg/dL or drug treatment of elevated glucose. |

Source: (Alberti & Zimmet, 2007; Alberti et al., 2009)

a The actual suggestion of Alberti et al. (2009) is to follow the population- and country-specific definitions.

Each component of the MetS is more likely to appear at an older age, and MetS affects 39% of the senior Canadian population, the highest rate across age groups (Riediger & Clara, 2011). Although MetS is a determinant of type 2 diabetes and cardiovascular diseases, it has been shown to have a small to medium effect on all-cause mortality and cardiovascular mortality (Forti et al., 2012; Luksiene et al., 2012). Many risk factors increase MetS such as energy
overload, excess body fat, and family propensity (Alberti & Zimmet, 2007) as well as hormonal changes caused by menopause (Ebrahimpour et al., 2010; Kaaja, 2008; Riesco et al., 2008). Women are also particularly at risk since negative feelings seem to have a greater effect on their metabolic health than on men’s (Stewart-Knox, 2007). We discuss in the following sections the potential effect of other individual factors and interpersonal ones.

**Relationship Between Self-Reported Health & Metabolic Syndrome**

Although MetS and SRH differ since MetS is a physiological outcome based on body, objective measurements while SRH stems from a cognitive process, the two health measures are likely to be associated. MetS is unlikely to be known since it involves several diagnoses and might not be explicitly discussed between patients and physicians; in addition, MetS has to be measured through laboratory tests. SRH, on the opposite, has been demonstrated to be a cognitive process. Other health conditions like hypertension can be found between SRH and MetS on the cognitive scale: they can be known, and their report involves a recall, not a complex cognitive process as for SRH. Thus, there is a sort of cognitive continuum on which various health outcomes could be placed, and SRH and MetS are at the opposite poles of this cognitive continuum. Despite this opposition, SRH and MetS may be related since SRH has been shown strongly associated with objective health (Idler & Benyamini, 1997).

Little research has examined the degree to which SRH corresponds to whether older adults have or do not have metabolic syndrome. However, Otiniano, Du, Maldonado, Ray, & Markides (2005) did show that SRH was associated with MetS among elderly Mexican-Americans, while Gardiner et al. (2011) showed a similar relationship among Australian senior women. Researchers have suggested that the relationship between SRH and MetS may in fact be explained by the relationship between obesity and SRH (Kennedy, Webb, & Chokkalingam,
Obesity is the only MetS criteria of which people may be visually aware, and does not require blood work or a diagnosis from a health care provider.

Despite the asymptomatic nature of MetS, older adults may have an idea of their metabolic condition. Canadian adult women consult their health care professionals more often as they age (Turcotte, 2011). In addition, they may be taking more medication (Ramage-Morin, 2009), and most components of the MetS are medicable. These two factors are known to increase knowledge of health status (Baker, Stabile, & Deri, 2004; Johnston et al., 2009; Schulz et al., 1994). Although medication intake solely for metabolic problems does not make individuals explicitly aware whether they have MetS, it might make them more conscious of their physiological health issues. Obesity, one of the components of MetS, can also be considered as increasing the awareness of a poor health status since obesity in inversely associated with SRH (Prosper, Moczulski, & Qureshi, 2009). In addition, participants spontaneously reported weight and medication when justifying their SRH answer (Idler et al., 1999; Kaplan & Baron-El, 2003). Nevertheless, metabolic health does not seem to correlate with health perception as strongly as other health conditions. For instance, functionality seems to have a greater effect since it may affect their independence and social life (Benyamini, Leventhal, & Leventhal, 2003; Østbye et al., 2006).

Certain health conditions are more or less likely to be known or felt or to affect lifestyle; therefore, their effect on health perception may vary. The effect of health conditions may also vary according to different individual or social characteristics. The dimensions of what constitutes health tend to vary with individual and social characteristics such as age (Krause & Jay, 1994), gender (Benyamini, Leventhal, et al., 2000; McCallum et al., 1994), and also SES. Indeed, when individuals self-assess their general health, they form a reference group according
to individual characteristics such as SES (Jylhä, 2009); it will be explored subsequently. Jylhä (2009) further suggests that a number of other factors influence a person's conceptualization of health, including the cultural and historical context in which people live, the reference group to which one is comparing their health, and the cultural conventions by which people express their assessment. For example, the French have been shown to have a lower SRH than Americans at the same level of objective health (Delpierre et al., 2011). Individual and social characteristics make health definitions vary as well as the alignment between MetS and SRH since the alignment between objective and subjective relates on the different definitions (Idler et al., 1999; van Doorn, 1999).

Correlates of Health Status

There has been little research on the concordance between objective and subjective health, and the factors that may relate to the relationship between the two. The following section covers previous studies on SRH, MetS, and the congruence between both variables in order to identify potential correlates of the concordance between SRH and MetS. Considering the sample composition of senior females, the effect of age and gender are not discussed here.

Intrapersonal Level

Health Behaviour

Health behaviours consist of any conscious or unconscious actions promoting, protecting or maintaining health (World Health Organization, 1998). Health behaviours may manifest as PA, diet, medication intake, and preventive health care. Among the possible health behaviours, only PA has been explored in association with the alignment between objective and subjective health (e.g., Ruthig & Chipperfield, 2007). Medication intake has not been explored in association with
health congruency yet, but this variable seems particularly appropriate for the association between SRH and MetS: medication intake is considered as a reminder of health status (Johnston et al., 2009; Schulz et al., 1994) and drug treatment is frequent for most components of the MetS. Therefore, medication intake and PA are explored in this research as potential correlates of the alignment between SRH and MetS.

Medication Intake

All the components of the MetS, except obesity, can be controlled by medication; individuals are also considered as having one of those components if they are prescribed a drug treatment related to it (Alberti et al., 2009). Indeed, taking medication may control the blood pressure for instance, but individual may still be hypertensive. The non-adherence to medication intake has health cost (Unni, Shiyanbola, & Farris, 2013) and thus the medication intake is considered as a behaviour maintaining health. Nonetheless, individuals’ possible belief that they are in good health because of the medication they are taking would be ill founded; in a medical perspective, drug prescription should be instead considered as an indicator of poor health condition.

As a matter of fact, some diseases are more likely to be accurately reported in questionnaires than others; authors speculate that patients are more likely to recall having certain diseases that involve more frequent communication with one’s physician (Baker et al., 2004) or medication intake (Johnston et al., 2009). In the same vein, medication intake is often related to a poorer report of perceived health among seniors since such health care actions could be a daily reminder of health status (Schulz et al., 1994). Indeed, some senior adults reporting poorer health justify their report by recounting the prescribed drugs that they are taking (Benyamini et al., 2003; Kaplan & Baron-Epel, 2003).
Older adults are more likely to take medication (Ramage-Morin, 2009), and thus may have an idea of their poor metabolic condition despite the asymptomatic nature of MetS. Medication intake is not the only aspect of MetS enabling the awareness of poor physiological health: participants spontaneously reported both weight and medication when justifying their SRH answer (Idler et al., 1999; Kaplan & Baron-Epel, 2003). Thus, both medication intake and obesity may strengthen the association between SRH and MetS. However, since medication intake can be related to any of the other components of MetS, it remains a more general indicator of metabolic health, while obesity is considered to be an anthropometric indicator. Hence, medication seems more of interest to explore the association between SRH and MetS than obesity.

Physical Activity

People may improve or maintain health by being physically active, which increases energy expenditure and improves their cardiovascular system. PA and the addition of basal metabolic rate and digestion constitute the total energy expenditure of a human being, but PA is “the most variable component of … energy expenditure” (Pettee, Storti, Ainsworth, & Kriska, 2008). Like health behaviour in general, PA may be done consciously, or in a structured way (such as exercise), and unconsciously, or in an unstructured way, such as housework or active commuting (Pettee et al., 2008).

PA has been shown to be associated with SRH in both the short and long term (Leinonen, Heikkinen, & Jylhä, 2002). However, individuals may more or less value PA as an important component when self-assessing their health (Perrin, Ferron, Gueguen, & Deschamps, 2002). Physical performance has also been identified as a predictor of SRH in the long term (Leinonen et al., 2002); such performance could be seen more concretely as ease and speed of walking.
(Jylhä et al., 2001). Additionally, the elderly have been shown to evaluate their health according to whether or not they are able to be physically active (Benyamini et al., 2003). The influence of PA on SRH seems to increase with age since PA helps to prevent functional decline (Unger, Johnson, & Marks, 1997). Some authors argue that functionality prevails over other variables as a predictor of SRH among senior adults since functionality may affect their independence and social life (Benyamini et al., 2003; Østbye et al., 2006), but functionality may not be a predictor of MetS—unlike PA, as explained in the following paragraph.

PA includes physical functioning but consists more generally of any bodily movement produced by skeleton muscles and resulting in energy expenditure (Caspersen, Powell, & Christenson, 1985). PA is related to an improved metabolic status among older women: sedentary behaviour has been shown to be associated with a higher rate, whereas leisure-time PA, with a lower rate of MetS (Bianchi, Rossi, Muscari, Magalotti, & Zoli, 2008; Gardiner et al., 2011; Wijndaele et al., 2009).

SRH has been presented earlier as reflecting the objective health status; the positive effect of PA on objective health could then explain its effect on SRH. Yet the association of PA with SRH seems directly tied to people's perception of their health behaviours (good or bad) rather than through an improvement or maintenance of good objective health. Indeed, Ruthig & Chipperfield (2007) showed that, among a sample of senior adults in poor objective health, those who reported being more physically active than their same-age peers were more likely to report good health. Conversely, among a group of senior adults in good objective health, those who reported being less active were more likely to report poor health. Nonetheless, such an association between PA and SRH may be explained by the nature of the measurements themselves. Indeed, a subjective measurement of PA level through social comparison seems
inherently related to SRH since social comparison may be an integral part of the cognitive process underlying the general health self-assessment (Jylhä, 2009). In addition, the use of social comparison may lead to an overestimation of PA since older adults generally believe they have a better fitness than their same-age peers (Heckhausen, 1999). Ruthig & Chipperfield (2007) also showed that a greater objective PA level was related to a higher health perception among senior adults in poor objective health. However, objectively measured PA reflected only twenty-four consecutive hours of movement; the short duration of PA measurement period may not be as representative of PA in senior adults since they may engage in leisure-based PA on a weekly basis. In conclusion, both perceived and actual PA seem to improve people's perception of being in good health despite being in a poor objective health (Ruthig & Chipperfield, 2007). However, a further exploration of the link between PA and health congruency would require a more valid measurement of reported PA and a measurement of objective PA reflecting the weekly habits and activities.

**Socioeconomic Status**

SES indicates the level of advantage that certain groups of people have in a society (Galobardes et al., 2006) in terms of resources such as material means and security, knowledge, and skills. SES is often measured as a function of the level of education, income, or the type of occupation. Research exploring SES among the older population tends to focus on education or income; occupation is a less relevant dimension of the social status since senior adults are mainly retired.

Among older Canadian women, education tends to be positively associated with higher SRH (Wanless, Mitchell, & Wister, 2010). Furthermore, education seems to have a long-lasting effect on health and even to improve the chance of healthy aging: Mirowsky & Ross (2008)
found that education was positively associated with SRH at all ages and the health status discrepancy across educational groups increased as people aged. Income has also been shown to have a strong and positive correlation with SRH among Canadian seniors (Gilmour, 2012). For MetS, however, studies have reported mixed results regarding the relationship of MetS and education or income. High education and income lead to a lower risk of MetS among Canadian adults (Riediger & Clara, 2011) and more specifically among female Canadian adults (Loucks, Magnusson, et al., 2007); higher educational levels lead to a smaller risk of MetS among Portuguese senior women as well (Santos et al., 2008). On the other hand, education and income are found to be unrelated to MetS in Canadian seniors (Loucks, Magnusson, et al., 2007).

Income provides greater material resources, and education tends to lead to better cognitive functioning (Galobardes et al., 2006) and improved health literacy (Kickbusch, 2001). Health literacy represents the cognitive and social skills to access, understand and use information towards good health (World Health Organization, 1998), and thus allows individuals to have a better understanding of health and its determinants. In addition, people with higher SES tend to have better health behaviours: non-smoking, moderate drinking, greater physical activity and a healthier diet (Pampel et al., 2010). However, whether health behaviours play a role in the relationship between SES and MetS is inconclusive (Wamala et al., 1999). SES may also improve health through the coping effects of SoC (Ross & Willigen, 1997) and of adequate social support (von dem Knesebeck & Geyer, 2007).

Finally, it appears that the relationship between objective health and subjective health is stronger among socially-advantaged senior individuals (Lima-Costa et al., 2012). Although some studies reported an inverse relationship between objective and subjective health by SES groups, that is, a weaker relation between the two health outcomes among highly educated individuals
instead of a stronger relation, these differences may have been due to methodological issues (Quesnel-Vallée, 2007). Quesnel-Vallée (2007) concluded as a result that objective and subjective health were indeed more strongly related among socially-advantaged individuals.

Some authors extrapolate from this discrepancy between SES groups that education improves a person's ability to understand health: education may give the cognitive means to assess the ‘true’ implication of health symptoms and conditions (Huisman, van Lenthe, & Mackenbach, 2007). In the same vein, other authors conclude that socially-advantaged individuals have more contact with health services, which would increase their understanding of their health (Dowd & Zajacova, 2007; Lima-Costa et al., 2012). Those two conclusions might be valid if the relation between objective and subjective health among socially-disadvantaged people was less significant or even non-significant. In fact, a lower ability to understand health may imply underestimating the gravity of health symptoms and conditions, as well as exaggerating their gravity. Following this line of thought, socially-disadvantaged people might be expected to report either a lower or a higher SRH compared to more socially-advantaged people of a similar objective health status, with no clear tendency. Thus, only the significance of the relationship between SRH and mortality would be lower among the socially-disadvantaged, not necessarily its magnitude. Yet the results of Dowd & Zajacova (2007) and those of Lima-Costa et al. (2012) showed that: (1) among all the SES groups, the relationship between SRH and mortality had tight 95% confidence intervals, and (2) the hazard ratios for mortality by report of poor SRH were lower among lower SES categories. Therefore, in contradiction with the above argument, it seems that for a given objective health status, socially-disadvantaged people tend to report SRH in a specific direction compared to more socially-advantaged ones, although that direction must still be determined.
Some authors concluded from the stronger tie between SRH and mortality among socially-advantaged individuals that low SES individuals rate their general health lower than high SES individuals would do for the same health condition; socially-disadvantaged individuals may experience a poor health condition more negatively in comparison to high SES individuals because they have fewer resources to overcome their illness (Dowd & Zajacova, 2007). However, the explanation provided by Dowd & Zajacova’s (2007) has also been contradicted: Delpierre et al. (2011) found that ill health was more strongly related to the report of poor general health among highly-educated people than among their low-educated counterparts. Delpierre et al. (2011) inferred that SES increases health expectations. In fact, socially-advantaged individuals may have higher expectations with regard to their health, so a poor health condition would have a larger effect on their cognitive process when assessing their general health (Ross & Willigen, 1997).

**Sense of Control**

SoC reflects the general expectation that outcomes are a consequence either of one’s own choices and actions, or external factors (Mirowsky & Ross, 1991; Ross & Willigen, 1997). High SoC gives people the means to cope actively, to adapt themselves to new situations, and to avoid problems (Ross & Willigen, 1997). Publications often use different wording to express the concept representing a person's feeling of control over one’s life: sense of mastery, self-efficacy, sense of control, and locus of control among others (Mirowsky & Ross, 2003). Regardless of the specific term used, the concept of SoC has been found related to higher levels of perceived health among the elderly (Forbes, 2001; Rodin & McAvay, 1992; Zunzunegui et al., 2004).

Conclusions about the relationship between SoC and MetS are more difficult to draw since findings are inconsistent. On the one hand, women who actively solved their own problems
were less likely to have MetS (Hjellset, Ihlebæk, Bjørge, Eriksen, & Høstmark, 2010), while on the other hand, no significant relationship between coping ability and MetS has been found among middle-aged women (Frisman & Kristenson, 2009). Despite this inconsistent literature, SoC is considered to be associated with better physiological health. SoC tends to reduce stress (Stewart-Knox, 2007) via better coping mechanisms (Mirowsky & Ross, 2003), and thus may improve both perceived health (Kosteniuk & Dickinson, 2003) and metabolic status (Räikkönen, Matthews, & Kuller, 2002; Stewart-Knox, 2007). Furthermore, individuals who feel in control of their life tend to initiate preventive care and have a greater trust in the efficacy of early treatment (Seeman & Seeman, 1983).

For elderly people, feeling in control of their life, including their health, may strengthen the degree to which their subjective assessment of health agrees with physiological health. For example, in a study by Rodin and McAvay (1992), worsening health conditions were associated with a decline in perceived health for the elderly who initially had a higher feeling of control, while that was not the case for subjects who initially had a low SoC. Ross & Willigen (1997) argued that people who feel in control have higher expectations for their health and thus are more likely to be dissatisfied by poor health conditions than individuals with lower SoC. Hence, individuals who feel in control of their life would give more weight to poor health conditions in their cognitive process to answer the SRH question than individuals with lower SoC would do.

**Interpersonal Level**

For more than two centuries, social relationships have been shown to have an effect on health. One of the benefits of social relationships to an individual’s health is the supportive effect of these relationships (Berkman, Glass, Brissette, & Seeman, 2000). Individuals, and especially seniors, may also report better health based on how they compare themselves to their social ties:
seniors are likely to make downward health comparisons with their peers to enhance their own perception of their health. In other words, they tend to believe that they are in better health than their same-aged peers (Cheng et al., 2007; Sargent-Cox et al., 2008).

**Social Network**

A social network designates the connections between individuals along with the composition and structure of those connections (Valente, 2010). A network may represent the system of relationships within a whole organization or the relationships of one individual, that is, ego-network (Valente, 2010). Greater social network size has been shown related to better perceived health in older adults (Litwin, 2006; Minkler, Satariano, & Langhauser, 1983; Singh-Manouxf et al., 2006; White, Philogene, Fine, & Sinha, 2009). Additionally, living with someone at home has been found to be a significant buffer against MetS (Rintamäki et al., 2008), while social isolation tended to increase the rate of MetS in middle-aged women (Horsten, Mittleman, Wamala, Schenck-Gustafsson, & Orth-Gomer, 1999).

Social support refers to the perceived or actual assistance given to a specific person from significant others, or less often, from acquaintances (Berkman & Glass, 2000; Thoits, 2011). Berkman and Glass (2000) describe social support as a key pathway through which social networks affect health. Research has shown that the perceived availability of social support improves well-being directly and indirectly: social support buffers stress and thus lessens its negative impact on health (Thoits, 2011). Lack of general social support has been shown to be associated with poorer SRH in senior women (E. Grundy & Sloggett, 2003; Lindström, 2009; Smith, Young, & Lee, 2004; Wanless et al., 2010). However, the relationship between social integration or social support and MetS is less clear, and no studies were found examining social support and MetS in a sample exclusively of older women. On the one hand, higher rates of
MetS have been observed among the elderly lacking emotional support (Vogelzangs et al., 2007) and women lacking material support, more specifically those having no one at home to take them to shows or to help them out financially (La Rosa et al., 2008). On the other hand, neither social network size among women (Prescott, Godtfredsen, Osler, Schnohr, & Barefoot, 2007) nor social support in the general population were shown to be associated with MetS (Frisman & Kristenson, 2009; Hjellset et al., 2010). Nonetheless, social support seems more important for senior adults’ health (Shor, Roelfs, & Yogev, 2013), and social ties were unrelated to MetS in samples without seniors (e.g., Frisman & Kristenson, 2009; Hjellset et al., 2010) or without a focus on them (e.g., Prescott et al., 2007).

The beneficial effect of social support on SRH may also be limited. Too much social support may actually lower SRH. For example, Sargent-Cox et al. (2008) has shown that while social support from family had a positive effect on SRH, participants who had a more extended social support network perceived their health as being poorer. Social support may also be detrimental when inadequate (e.g., excessive) and/or not provided by adequate people (Thoits, 2011). In the same vein, support from significant others has a powerful effect on people’s health: receiving support from children is often particularly meaningful for elderly (Zunzunegui et al., 2004; Zunzunegui, Béland, & Otero, 2001). In general, the primary network, e.g., relatives, is the most efficient provider of social support and individuals expect emotional, instrumental and informational support from such close ties (Thoits, 2011).

While the size of a person's network is an important component to be studied, another component is the type of activity in which the social ties are involved. In the case of health behaviours, supportive others may encourage, inform, or provide material resources. Among older women, PA social support can help in starting or maintaining a certain level of PA; albeit
with differing effects on both the duration and the intensity of the exercise (Eyler et al., 1999). Acquiring social support increases the chances of adhering to and remaining within a PA group, probably because this social connection associates a sense of pleasure to PA (Gillett, 1988). Social support may not only increase health by promoting better health behaviour, thus improving both SRH and MetS, but also prevents diminishing health by a stress-buffering effect (Thoits, 2011).

Social support may buffer the emotional impact of poor physiological health on perceived health. Consequently, older adults with greater support may give less weight to their physiological health in assessing their overall health. No research has been found relating social support to the alignment of objective and subjective health. Only four studies were found that examined a similar subject in various ways addressing social integration, social support, and social engagement.

First, when comparing the association of social integration with SRH in older diabetic adults and non-diabetic ones, social integration was positively associated to health perception in diabetic adults only (Eller et al., 2008). The authors suggested that social integration was related to social support and that social ties buffered the stress caused by the burden of the chronic disease in older diabetics and thus lessened the negative effect of their health condition on their health perception (Eller et al., 2008). In a second study, neither the lack of contact with friends and family members nor the perceived availability of social support was shown to have an effect on the alignment between SRH and mortality in adults of all ages (Helweg-Larsen, Kjøller, & Thoning, 2003). The lack of focus on the elderly in the sample of Helweg-Larsen et al. (2003) may explain the lack of a relationship between social relationships and objective-subjective
health alignment, in that social relationships, especially social support, seems more important for senior adults’ health (Shor et al., 2013).

Research on social engagement and health congruence has found a more consistent positive relationship between the two outcomes than research on general social network features and health congruence did. In the third study, elderly Native Americans who were socially engaged were more likely to overestimate their health compared to their actual chronic health conditions (Ruthig & Allery, 2008). Social engagement was defined as participation in events and meetings of community organizations. Ruthig & Allery (2008) argued that Native and non-Native elders are similarly likely to over- or underestimate their health, suggesting that their results are extensible to other demographics. In the final study, British older adults who were socially engaged—social engagement being broadly defined as accomplishment of civic duties, participation in community service or organizations, and consumption of mass media, among others—reported for their part a better general health over time; nevertheless, social engagement was unrelated to changes in objective health among the British elderly (Bennett, 2005). Considering that social engagement was related to an improved perception of health but unrelated to objective health, part of the socially engaged would be more likely to overestimate their health.

Although social support and social engagement are key pathways in the link between social networks and health (Berkman & Glass, 2000), the aforementioned results on social engagement cannot justify the prediction that social support increases the chance of health overestimation. Indeed, given the independent effect social engagement has been shown to have from social support on health (Bath & Deeg, 2005), social engagement may impact health differently than that of social support—individuals define their social role according to their
engagement in a social network, thus providing a sense of value, and belonging (Berkman et al., 2000).

Despite inconsistencies in findings on the relationship between social support and overestimation of one’s health, social support may help foster the likelihood of health overestimation. Two processes would possibly explain the link between social support and overestimation. The first explanation is that the stress-buffering effect of social support lessens the negative effects of poor health on health perception as suggested by Eller et al. (2008), whose research methodology was the most comparable to this study. The second explanation is found in the idea of “response shift” as found in rehabilitation science theories. The concept of response shift describes the process through which patients may alter their conceptualization of health-related quality of life, and, in so doing, they rate their health higher despite the lack of change in actual health (Sprangers & Schwartz, 1999). Social support is one of the possible mechanisms leading to a shift in the conceptualization of health-related quality of life (Sprangers & Schwartz, 1999).

Social Comparison

Social comparison has a unique effect on health compared to the previously explored concepts of social ties. Unlike social support, which provides resources to individuals, social comparison involves the modification of a person's health perception compared to other social referents and may be an integral part of the cognitive process underlying SRH (Idler et al., 1999; Jylhä, 2009). Social comparison seems to be a natural method of assessment that people of any age might use when they assess their personal performance or condition in the absence of an objective measure (Festinger, 1954). Thus, social comparison is more likely to be used when the object of assessment is abstract and uncertain (Suls, Marco, & Tobin, 1991).
People usually compare themselves to someone relatively similar to themselves (Fillenbaum, 1979). The referent of comparison is likely someone known or met (Heckhausen, 1999); individuals seem to choose more specifically someone from their network (Kaplan & Baron-Epel, 2003). The closeness of the relationship with the referent tends to have an effect on the direction of the comparison: close ties are used as referents for lateral comparison (i.e., the referent is equal to the comparer), and more distant ties are used as referents for upward (i.e., the referent is superior) and downward comparison (i.e., the referent is inferior; Alicke, Breitenbecher, Yurak, & Vredenburg, 1995; Wheeler & Miyake, 1992).

Lateral comparison facilitates self-evaluation, upward comparison helps setting higher goals, and downward comparison provides self-enhancement (Heckhausen, 1999). Social comparison in all directions can be observed at any age, but downward comparisons are especially observed among senior adults. Aging is one of those situations in which individuals are more prone to make downward comparisons leading to an enhancement of the perception of the self, especially on the matter of health and physical fitness (Heckhausen, 1999). Elderly adults who have declining levels of physical functioning often exhibit enhanced levels of perceived health by comparing themselves against someone of the same age (Cheng et al., 2007), and this tendency of health perception enhancement by social comparison is increasing as people age (Sargent-Cox et al., 2008). Furthermore, social comparison may also affect physical symptoms. Elderly who compared their symptoms to those of their peers improved their subjective well-being, which affected in turn their symptoms positively (Peck & Merighi, 2007).

Assessing one’s own performance or status by social comparison is based on a subjective cognitive process, systematically biased by the common belief that oneself is above the average (Dunning, Heath, & Suls, 2004). The choice of a referent also shows the subjectivity underlying
the social comparison and satisfies this belief. Individuals often choose someone with an inferior performance or status on the matter of comparison as a referent since individuals tend to feel unique in their good performance or status (Dunning et al., 2004). Individuals usually consider someone they know rather than an imagined representation of others (Heckhausen, 1999; Kaplan & Baron-Epel, 2003), but this ‘real’ referent may still become a stereotypical representation. Because of the heuristic bias of considering one instance as a representation of a whole group (Tversky & Kahneman, 1974), older individuals may extrapolate this single, inferior referent as the representation of their whole age group. Consequently, regardless their actual health compared to their age group’s health, seniors tend to consider themselves better than the average due to a subjective perception of others. In fact, perceiving a comparison referent as inferior to oneself seemed related to health overestimation among the elderly; the reverse was also verified since perceiving a referent as equal or superior was related to a realistic health perception (van Doorn, 1999).

**Conclusion**

SRH is a powerful indicator of objective health. However, SRH and MetS are at the opposite poles of the cognitive continuum: while SRH stems from a cognitive process, MetS is based on body, objective measurements. Additionally, the tie between objective and subjective health tends to loosen with age (Kunzmann et al., 2000), with physical functioning (Benyamini et al., 2003) having possibly greater salience than physiological health in the health self-assessment among seniors. Consequently, the association between SRH and MetS remains unclear among the elderly, but it can be inferred from current research that a large part of the elderly may overestimate their general health compared to their metabolic status. In a health promotion perspective, individuals overestimating their health—and especially their risk of
developing type 2 diabetes and cardiovascular disease related to the MetS—represent an at-risk population since, according to the Health Belief Model, they are unlikely to feel susceptible to poor health (Avis et al., 1989; Kulik & Mahler, 1987) and thus to engage in health promoting behaviour.

Although PA improves both objective and subjective health, research suggests that PA may also increase the risk of overestimating one’s health (Ruthig & Chipperfield, 2007). Like PA, medication intake is an indicator of health status and of poorer health (Schulz et al., 1994); taking medications may thus decrease the risk of overestimating one’s health. SES and SoC were also shown to improve both objective and subjective health, and to strengthen the alignment between ill health and the perception of poor general health (Delpierre et al., 2011) probably because they increase the expectation of being in good health and thus the feeling of dissatisfaction when actually being in poor health (Ross & Willigen, 1997). Social relationships also improve both objective (Horsten et al., 1999) and subjective health (Wanless et al., 2010), and it is anticipated that there is a positive correlation between overestimating one’s health and the size of one’s network (Eller et al., 2008; Sprangers & Schwartz, 1999). Finally, assessment by social comparison seems intrinsically related to health overestimation since older individuals generally self-enhance their health perception (Dunning et al., 2004; Heckhausen, 1999).
Chapter 3: Study Objectives, Research Questions

Compared to younger adults, older adults tend to perceive themselves in better health than they objectively are (Kunzmann et al., 2000). This study aims to examine the intra- and interpersonal factors associated with senior women's evaluation of their own general health and the degree to which their assessment corresponds with their objective, metabolic health. Individuals who overestimate their health constitute a high-risk population because they may be less likely to seek to improve their objective health (Avis et al., 1989; Kulik & Mahler, 1987). Consequently, this research study focuses on whether senior women overestimate their health compared to their metabolic status as opposed to possessing a congruent perception of their health.

Three main research questions guide the analyses:

1. What intra- and interpersonal factors are associated with better SRH among older Kingston women?
2. What intra- and interpersonal factors are associated with MetS in older women?
3. To what degree do those same intra- and interpersonal factors increase or decrease the chances of health overestimation in older women?
Chapter 4: Methods

Sample

Data come from the Kingston Senior Women’s Research Study (KSWS) conducted from July 2011 to November 2011. The KSWS consisted of a convenience sample of 100 women over age 65 from a mid-sized Canadian city. The KSWS was advertised in local newspapers and community organizations. Upon initial interest by telephone, participants were scheduled for two study appointments. The first appointment took place in the afternoon. During the first visit, women underwent an informed consent process and completed a structured interview with trained research assistants. Participants were asked questions about their demographic background, social networks, health behaviours, medical history and self-rated health. Participants were also taught the use of accelerometry equipment and how to manage a sleep diary. Participants were asked to wear the ActiGraph for seven consecutive days. During their second visit, which took place the morning after visit one, the participants' anthropometric measures, blood pressure readings, and physiological indicators were taken. Participants were each given a $35 stipend for their time and cover any parking costs incurred. This study was granted clearance according to the recommended principles of Canadian ethics guidelines, and Queen's policies.

Measures

Dependent Variables

Self-Reported Health: Participants' SRH was measured using the SF-36 question: “In general, would you say your health is: excellent, very good, good, fair, or poor?” (Ware &
Gandek, 1998). The SRH variable is an ordinal variable with five categories coded as follows: 1) poor, 2) fair, 3) good, 4) very good, and 5) excellent. This study aims to compare the self-perception of health and an objective measure of a health; the subjective and purposefully vague question of SRH is a valid measure since it requires participant to define health in their own terms and give their own standard to what distinguishes good from poor health (Jylhä, 2009; Snead, 2007). However, responses to the SRH question would be meaningless if it reflected a random evaluation of general health and not a stable perception of a person's present health status. SRH should hence reach a certain level of reliability, or more appropriately in the context of a subjective assessment, a certain “degree of stability” (Damián, 2012, p. 857). Only a ‘certain degree’ should be anticipated: vague items usually have a low stability rate (Lundberg & Manderbacka, 1996). Studies published on the reliability of the SRH question have shown that respondents reported the same general health assessment within a period where their health was unlikely to change (Clarke & Ryan, 2006; Cousins, 1997; Crossley & Kennedy, 2002; Lundberg & Manderbacka, 1996; Zajacova & Dowd, 2011).

**Metabolic Syndrome:** Alberti's (Alberti et al., 2009) harmonized definition was used to assess whether participants had MetS. To be diagnosed with MetS, a person must have at least three of the following criteria:

- Elevated waist circumference: ≥ 88 cm
- Elevated triglycerides: ≥ 150 mg/dL or drug treatment for elevated triglycerides
- Reduced HDL-cholesterol: < 50mg/dL in females or drug treatment for reduced HDL-cholesterol
- Elevated blood pressure: systolic blood pressure ≥ 130 or diastolic blood pressure ≥ 85 mg or treatment of previously diagnosed hypertension
• Elevated fasting glucose $\geq 100$ mg/dL or drug treatment of elevated glucose.

The actual waist circumference thresholds suggested by Alberti et al. (2009) depends on the ethnic background or country of the studied population. Organizations such as the International Diabetes Federation or the World Health Organization have suggested either $\geq 102$ cm for men and $\geq 88$ cm for women or $\geq 94$cm for men and $\geq 80$ cm for women of Caucasian type in North America, which would represent the senior women of Kingston. We chose the threshold of $\geq 88$ cm for our female population, as this threshold is also aligned with the recommendations of Health Canada. Waist circumference, cholesterol, glucose, and blood pressure measures were taken in the SKHS Epidemiology lab by trained researchers. Questions about medication use and doctor-diagnosed health conditions were included in the study questionnaire. Based on lab measures and questionnaire information, participants were classified as either having MetS or not.

Overestimation: A dichotomized SRH was cross-tabulated with whether a participant had or did not have MetS to produce a four-category variable. SRH was dichotomized; the cut-point being between ‘good’ and ‘very good’ was chosen according to the SRH distribution. Next, participants with MetS reporting poorer SRH and participants without MetS reporting higher SRH, were named ‘ill realists’ and ‘healthy realists’ respectively. Participants who reported higher SRH but were diagnosed with MetS were classified as ‘overestimators’. Participants who reported poor SRH but did not have MetS were classified as ‘underestimators’. Table 2 illustrates the creation of those categories. The ‘realists’ categories were merged to oppose the ‘overestimator’ category. The ‘underestimator’ category was later excluded from the equation. The health congruence variable was binary with ‘realist’ opposed to ‘overestimator’ categories.
Table 2: Creation of the Health Congruence Variable

<table>
<thead>
<tr>
<th>SRH</th>
<th>Presence of MetS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Poorer</td>
<td>Ill Realist</td>
</tr>
<tr>
<td>Better</td>
<td>Underestimator</td>
</tr>
</tbody>
</table>

**Independent Variables**

**Intrapersonal Level**

*Age*: Participant age was calculated based on their reported date of birth.

*Medication Intake*: Participants reported any medications that they were currently taking under physicians' orders. The medication intake variable was based on the number of different prescriptions that a participant took for hypertension, cholesterol, or diabetes.

*Physical Activity*: For this study, objective and subjective measures of physical activity were used. The subjective PA is based on a recall of various activities, or in other words what participants know of their physical activities; thus the recalled elements used to answer the subjective PA question may also be included in the cognitive process of health assessment. However, since individuals tend to overestimate their performance (Dunning et al., 2004), an objective PA variable was also used to measure a person's actual PA on senior women’s health and health perception. *Objective PA* was measured with a tri-axial accelerometer, the ActiGraph GT3X. This small device worn on the hip captured the acceleration forces and changes of direction of body movement for a given observation period (Bassett & Fitzhugh, 2008; Pettee et al., 2008). The counts of accelerations in all three axes were recorded minute by minute; the more counts the device recorded per minute, the higher the intensity of the PA was (ActiGraph Corp, 2011). On the matter of body movement, the intensity level referred to the effort invested...
in the activity (Kohl III & Kimsey Jr., 2008). Table 3 provides the cut-points of counts per minute, appropriate for older adults, corresponding to each level of PA intensity. The threshold of moderately intense PA was chosen to distinguish physical active participants, so as to follow the suggestion of the Canadian Society for Exercise Physiology: a minimum of moderate intensity level in PA for a certain weekly amount of time to effectively improve health outcomes among seniors (Canadian Society for Exercise Physiology, 2012). A minimum level of intensity in PA was required to have an effect on health outcomes (Lee, 2008). Additionally, the accelerometer measured the duration for each intensity level of PA. The objective PA variable consists of the percentage of time in a week when individuals were physically active with at least moderate intensity while they were wearing the device. Participants were asked to wear the accelerometer for seven consecutive days, but they could remove the device to sleep and had to remove it to shower or swim. A day was considered valid if counts were recorded for at least 600 consecutive minutes, and the device would recognize non-wear time when it recorded 0 count for 60 consecutive minutes. Although accelerometers may under- or overestimate light or moderate activity depending on the chosen cut-points to differentiate intensities (Strath, Bassett, & Swartz, 2003), the validity and reliability of such devices have been supported in research involving older populations by comparing numerous tests (Kochersberger, McConnell, Kuchibhatla, & Pieper, 1996).

Table 3: Cut-points of counts according to the level of intensity of PA

<table>
<thead>
<tr>
<th>Intensity name</th>
<th>Counts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedentary</td>
<td>0 to 99</td>
</tr>
<tr>
<td>Light</td>
<td>100 to 759</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>760 to 1951</td>
</tr>
<tr>
<td>Moderate</td>
<td>1952 to 5724</td>
</tr>
<tr>
<td>Vigorous</td>
<td>5725 to 9498</td>
</tr>
<tr>
<td>Very vigorous</td>
<td>9499 and over</td>
</tr>
</tbody>
</table>
Subjective PA was measured using the Community Healthy Activities Model Program for Seniors (CHAMPS) questionnaire. The questions addressed the intensity, weekly frequency and duration of activities of daily living and exercises. Final scores were converted into caloric expenditure per week for at least moderately intense activities. This subjective PA variable is continuous and expresses a caloric expenditure. This questionnaire was specifically developed for seniors as questions have been formulated to correspond to their everyday life. The tool takes into account appropriate amounts and types of PA as well as seniors’ limited ability to recall accurately their activities with time, which increases its reliability and validity (Stewart et al., 2001). Table 4 provides the averages of caloric expenditure per week in at least moderate intensity PA that Stewart et al. (2001) found in their studied sample of senior adults according to their PA level.

Table 4: Caloric Expenditure Per Week in at Least Moderate Intensity PA by PA level

<table>
<thead>
<tr>
<th>PA level</th>
<th>Caloric Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initially Sedentary</td>
<td>1057</td>
</tr>
<tr>
<td>Somewhat Active</td>
<td>1163</td>
</tr>
<tr>
<td>Already Active</td>
<td>2328</td>
</tr>
</tbody>
</table>

Socioeconomic Status: Women typically had less access to and lower levels of education than men (Galobardes et al., 2006), but they might potentially benefit from the advantages of high education through their spouse. Consequently, the highest educational level of the couple (if applicable) constituted the participant’s SES; for example, if a participant obtained a university certificate and her spouse obtained a trade certificate, the educational level of the participant was recorded as a university certificate. Educational attainment was grouped into the following seven ordered categories: 1) no degree, certificate, or diploma; 2) secondary (high) school diploma or equivalent; 3) trades certificate or diploma; 4) college certificate or diploma below bachelor’s
degree level; 5) university certificate or diploma at bachelor level; 6) master’s degree; and 7) earned doctorate degree. Income was not used as a SES indicator since 9% of the sample did not answer the question.

**Sense of Control:** SoC was measured using Mirowsky and Ross's eight items SoC scale (Mirowsky & Ross, 1991). Participants responded according to five-item Likert response categories (2 = strongly agree; 1 = agree; 0 = do not know; -1 = disagree; -2 = strongly disagree). The eight items were: 1) I am responsible for my own successes; 2) The really good things that happen to me are mostly luck; 3) I can do just about anything I set my mind to; 4) There's no sense planning a lot – if something good is going to happen it will; 5) My misfortunes are the results of mistakes I have made; 6) Most of my problems are due to bad breaks; 7) I am responsible for my failures; 8) I have little control over the bad things that happen to me. The Mirowsky and Ross SoC scale aims to reduce agreement and defence biases of respondents often found in control and mastery scales (Mirowsky & Ross, 1991); less educated individuals tend to agree to fatalistic statements while the more educated tend to adopt a defensive position when it comes to negative outcomes, rejecting responsibility (Mirowsky & Ross, 1991). The items of the Mirowsky and Ross SoC scale covered external and internal control over good and bad outcomes so that the agreement and defence bias could be eliminated. Items 2, 4, 6, and 8, measuring external control, were reverse coded, and final answers were summed to create a total control score. Participants who answered ‘I don’t know’ were not excluded from the analysis. Positive final scores represent a higher internal SoC with negative scores reflecting higher external SoC.

**Interpersonal Level**

Participants' social relationships, or personal (ego) networks, were measured through a name generator/interpreter instrument. Such instruments ask individuals to name people they
know along different dimensions, and to describe different characteristics of their network members. Two name generator questions were used. First, participants were asked to report up to three people with whom they had discussed important matters in the last six months and, secondly, to nominate up to three people with whom they had spent time on a regular basis in the last six months. Participants could report the same or different people in both generator questions. Providing two social domain areas reduced the constraint imposed on the selection of names by the participants and increased the chances of reporting at least some of the most meaningful relationships (Berkman & Glass, 2000). The name interpreter asked questions about alters’ demographic, social background, health behaviours, and whether they did any activities with them.

Social Support: Using information from the name generator and interpreter, three measures of social support were constructed: (1) social network size, (2) family support network, and (3) physical activity network. Social Network Size: Social network size was based on the number of different persons that participants nominated in the name generator. This value represents the size of the participants’ network of close ties. Family Support Network: For the family support network, the concentration, as expressed in percentage, of relatives within participants’ networks was calculated. Family support network was meant to capture the stronger ties and increased likelihood that a participant would be able to mobilize their support network if in need. Physical Activity Network: The PA network was based on the concentration, as expressed in percentage, of network members with whom participants were physically active.

Presence of Similar-Aged Others: The concentration, as expressed in percentage, of network members who were within five years of age to the participant was calculated. The
variable indicates the proportion of exposure of similarly-aged others in the participants’ close network.

**Analysis Plan**

To explore the first research question, an ordered logistic regression was used to examine the intra- and interpersonal correlates of SRH. The proportional odds test was conducted and confirmed that the relationship between the independent and the dependent variables was the same between all categories of SRH, which is an assumption of the ordered logistic regression (StataCorp., 2011). To explore the second and third research questions, logistic regression analyses were used to examine the intra- and interpersonal factors that might increase the odds of MetS and health overestimation. For each analysis of the correlates of SRH, MetS and health overestimation, three models were built. Model 1 consisted of the bivariate associations between the health outcome and an independent variable. Model 2 consisted of the multivariate association between the health outcome and all the individual variables, whereas Model 3 added the interpersonal variables to Model 2. Analyses were conducted using Stata 12 statistical software.
Chapter 5: Results

Descriptive Statistics

Table 5 presents the descriptive information of the different study variables. Kingston senior women tended to perceive themselves in very good health (44%); the majority of the sample (62%) also had MetS. As a result, many participants overestimated their health compared to their metabolic status: 36% of the sample considered being in at least very good health while having the MetS.

The average age of participants was 74 years old. A large part took no medication related to MetS (42%). Half of the participants—or their husbands—earned a university degree (50%) and 92% of the sample had an internal SoC. Considering that participants wore the accelerometer for 54% of the total time in average, they had to involve in moderate or vigorous PA for 2.8% of their wear-time to reach the recommended 150 minutes of the Canadian Guideline; yet 77% of the participants fell under this threshold. According to participants’ report of PA, more than the half had a caloric expenditure inferior or equal to the mean corresponding to a sedentary state, that is, 51% of the sample spent 1057 calories or less per week by engaging in moderately intensive PA.

Very few (1%) had 2 core ties or less, and those with 3-4 ties (51%) or 5-6 ties (48%) were in equal proportion. The majority (58%) had relatives compose at least 50% of their social network; a minority (20%) reported having a social network in which at least 50% of members were their regular PA partners. Finally, the majority of participants (61%) reported having a network of which less than the half was composed by alters within 5 years of their own age.
Table 5: Frequency of Health Outcome Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean (SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>74 (0.6)</td>
</tr>
<tr>
<td>Number of prescription drugs</td>
<td>1.09 (0.12)</td>
</tr>
<tr>
<td>Objective PA</td>
<td>1.93 (0.20)</td>
</tr>
<tr>
<td>Subjective PA</td>
<td>1122.90 (108.77)</td>
</tr>
<tr>
<td>SoC</td>
<td>5.86 (0.38)</td>
</tr>
<tr>
<td>Social network size</td>
<td>4.52 (0.11)</td>
</tr>
<tr>
<td>Family Support Network</td>
<td>49.65 (2.87)</td>
</tr>
<tr>
<td>Physical Activity Network</td>
<td>25.14 (2.59)</td>
</tr>
<tr>
<td>Presence of Similar-Aged Others</td>
<td>38.06 (2.65)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Categories</th>
<th>Percentage % (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Couple’s Education</td>
<td></td>
</tr>
<tr>
<td>No degree, certificate, or diploma</td>
<td>1% (1)</td>
</tr>
<tr>
<td>Secondary (high) school diploma</td>
<td>13% (13)</td>
</tr>
<tr>
<td>Trades Certificate or Diploma</td>
<td>11% (11)</td>
</tr>
<tr>
<td>College certificate</td>
<td>25% (24)</td>
</tr>
<tr>
<td>University certificate</td>
<td>26% (25)</td>
</tr>
<tr>
<td>Masteris degree</td>
<td>11% (11)</td>
</tr>
<tr>
<td>Doctorate Degree</td>
<td>13% (13)</td>
</tr>
<tr>
<td>SRH</td>
<td></td>
</tr>
<tr>
<td>Excellent</td>
<td>17% (17)</td>
</tr>
<tr>
<td>Very Good</td>
<td>44% (44)</td>
</tr>
<tr>
<td>Good</td>
<td>29% (29)</td>
</tr>
<tr>
<td>Fair</td>
<td>10% (10)</td>
</tr>
<tr>
<td>Poor</td>
<td>0% (0)</td>
</tr>
<tr>
<td>MetS</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>38% (38)</td>
</tr>
<tr>
<td>No</td>
<td>62% (62)</td>
</tr>
<tr>
<td>Health Congruence</td>
<td></td>
</tr>
<tr>
<td>Underestimator</td>
<td>13% (13)</td>
</tr>
<tr>
<td>Healthy Realist</td>
<td>25% (25)</td>
</tr>
<tr>
<td>Ill Realist</td>
<td>26% (26)</td>
</tr>
<tr>
<td>Overestimator</td>
<td>36% (36)</td>
</tr>
</tbody>
</table>

Correlates of Self-Reported Health

Tests of the proportional odds assumption showed that the assumption was not violated across the SRH categories ($p > 0.05$), so the ordered logistic regression was appropriate for analysing the correlates of SRH. Table 6 provides the odds of reporting a better SRH according to the intrapersonal and interpersonal variables. Age was not associated with SRH in bivariate analyses (OR: 1.00; 95%CI: 0.94 – 1.07). However, after adjustment for the intra- and
interpersonal variables, age was associated with SRH. With each additional year of age, participants were 10% more likely to report a better perceived health (model 2 = OR: 1.10; 95%CI: 1.02 – 1.19; model 3 = OR: 1.10; 95%CI: 1.01 – 1.20). In bivariate analyses, for each additional level of the SoC scale, participants were 15% more likely to report a better SRH (OR: 1.15; 95%CI: 1.04 – 1.27). However, in multivariate analyses, SoC lost its significance after adjustment for intra- and interpersonal correlates (model 2 = OR: 1.10; 95%CI: 0.98 – 1.22; model 3 = OR: 1.07; 95%CI: 0.95 – 1.20). Across all models, objective physical activity was shown associated with SRH. In multivariate analyses, for each 1% increase in wear-time spent being physically active at a moderate intensity or higher, older women were about 33% more likely to report a higher level of SRH when all intra- and interpersonal correlates were adjusted (OR: 1.33, 95%CI: 1.03 – 1.70). The other intrapersonal correlates were not associated with SRH. Interpersonal variables were also non-significant.
Table 6: Multivariate Ordinal Regression of Better Self-Reported Health

<table>
<thead>
<tr>
<th></th>
<th>Model 1, OR (95%CI)</th>
<th>Model 2, OR (95%CI)</th>
<th>Model 3, OR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intrapersonal level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>1.00 (0.94 – 1.07)</td>
<td>1.10* (1.02 – 1.19)</td>
<td>1.10* (1.01 – 1.20)</td>
</tr>
<tr>
<td>Medication Intake</td>
<td>0.82 (0.62 – 1.10)</td>
<td>0.97 (0.68 – 1.36)</td>
<td>0.99 (0.70 – 1.43)</td>
</tr>
<tr>
<td>Objective Physical Activity</td>
<td>1.39** (1.13 – 1.71)</td>
<td>1.33* (1.03 – 1.70)</td>
<td>1.33* (1.03 – 1.70)</td>
</tr>
<tr>
<td>Subjective Physical Activity</td>
<td>1.00** (1.00 – 1.00)</td>
<td>1.00* (1.00 – 1.00)</td>
<td>1.00** (1.00 – 1.00)</td>
</tr>
<tr>
<td>Education</td>
<td>1.25 (0.98 – 1.59)</td>
<td>1.15 (0.88 – 1.51)</td>
<td>1.18 (0.89 – 1.56)</td>
</tr>
<tr>
<td>Sense of Control</td>
<td>1.15** (1.04 – 1.27)</td>
<td>1.10 (0.98 – 1.22)</td>
<td>1.07 (0.95 – 1.20)</td>
</tr>
<tr>
<td><strong>Interpersonal level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network Size</td>
<td>0.84 (0.60 – 1.19)</td>
<td>-</td>
<td>0.94 (0.63 – 1.40)</td>
</tr>
<tr>
<td>Presence of Relatives</td>
<td>1.01 (0.99 – 1.03)</td>
<td>-</td>
<td>1.01 (0.99 – 1.03)</td>
</tr>
<tr>
<td>Physical Activity Network</td>
<td>0.99 (0.98 – 1.01)</td>
<td>-</td>
<td>0.99 (0.98 – 1.01)</td>
</tr>
<tr>
<td>Presence of Similar-Aged Others</td>
<td>1.00 (0.99 – 1.01)</td>
<td>-</td>
<td>1.00 (0.98 – 1.02)</td>
</tr>
</tbody>
</table>

Note: OR = odds ratio; CI = confidence interval

* p < 0.05, ** p < 0.01

**Correlates of Metabolic Syndrome**

Table 7 provides the findings for the analysis of metabolic syndrome. Objective physical activity was also shown associated with MetS in this sample of senior women in unadjusted and adjusted analyses. For each 1% increase in wear-time spent being physically active with a minimum of moderate intensity, older women were approximately 56% less likely to have MetS (model 3 = OR: 0.64, 95%CI: 0.47 – 0.88). No other intrapersonal or interpersonal variables were associated with MetS.
### Table 7: Multivariate Logistic Regression of Metabolic Syndrome

<table>
<thead>
<tr>
<th></th>
<th>Model 1, OR (95%CI)</th>
<th>Model 2, OR (95%CI)</th>
<th>Model 3, OR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intrapersonal level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>1.07 (0.99 – 1.15)</td>
<td>1.03 (0.95 – 1.12)</td>
<td>1.03 (0.94 – 1.13)</td>
</tr>
<tr>
<td>Objective Physical Activity</td>
<td>0.63** (0.49 – 0.82)</td>
<td>0.65** (0.48 – 0.88)</td>
<td>0.64** (0.47 – 0.88)</td>
</tr>
<tr>
<td>Subjective Physical Activity</td>
<td>0.99 (0.99 – 1.00)</td>
<td>1.00 (0.99 – 1.00)</td>
<td>1.00 (0.99 – 1.00)</td>
</tr>
<tr>
<td>Education</td>
<td>0.80 (0.61 – 1.05)</td>
<td>0.86 (0.63 – 1.17)</td>
<td>0.87 (0.63 – 1.20)</td>
</tr>
<tr>
<td>Sense of Control</td>
<td>0.99 (0.89 – 1.10)</td>
<td>1.05 (0.93 – 1.20)</td>
<td>1.04 (0.89 – 1.20)</td>
</tr>
<tr>
<td><strong>Interpersonal level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network Size</td>
<td>1.09 (0.75 – 1.58)</td>
<td>-</td>
<td>1.18 (0.76 – 1.85)</td>
</tr>
<tr>
<td>Presence of Relatives</td>
<td>1.01 (0.99 – 1.02)</td>
<td>-</td>
<td>1.01 (0.99 – 1.03)</td>
</tr>
<tr>
<td>Physical Activity Network</td>
<td>1.00 (0.98 – 1.02)</td>
<td>-</td>
<td>1.00 (0.98 – 1.02)</td>
</tr>
<tr>
<td>Presence of Similar-Aged Others</td>
<td>0.99 (0.98 – 1.01)</td>
<td>-</td>
<td>1.01 (0.99 – 1.03)</td>
</tr>
</tbody>
</table>

Note: OR = odds ratio; CI = confidence interval

* *p* < 0.05, ** *p* < 0.01

### Correlates of Congruent Health Assessment

While only PA was consistently related to SRH and MetS, only social network size was associated with the general-health overestimation compared to the metabolic health. Table 8 provides the results of the analysis of overestimation. Social network size was inversely associated with one's chances of overestimating one’s health. In multivariate models, for each additional close tie reported in the name generator, participants were 54% less likely to overestimate their health (OR: 0.46, 95%CI: 0.26 – 0.80). Inasmuch as network size was unrelated to SRH and MetS, the association of network size with overestimation does not seem to be explained by the association of network size with the health outcomes; network size was associated with overestimation exclusively.
Table 8: Multivariate Logistic Regression of Health Overestimation

<table>
<thead>
<tr>
<th></th>
<th>Model 1, OR (95%CI)</th>
<th>Model 2, OR (95%CI)</th>
<th>Model 3, OR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intrapersonal level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>1.04 (0.97 – 1.12)</td>
<td>1.04 (0.95 – 1.13)</td>
<td>1.06 (0.96 – 1.18)</td>
</tr>
<tr>
<td>Medication Intake</td>
<td>1.31 (0.93 – 1.85)</td>
<td>1.23 (0.82 – 1.86)</td>
<td>1.42 (0.89 – 2.24)</td>
</tr>
<tr>
<td>Objective Physical Activity</td>
<td>0.77 (0.60 – 1.01)</td>
<td>0.74 (0.53 – 1.02)</td>
<td>0.69 (0.47 – 1.00)</td>
</tr>
<tr>
<td>Subjective Physical Activity</td>
<td>0.99 (0.99 – 1.00)</td>
<td>1.00 (0.99 – 1.00)</td>
<td>1.00 (0.99 – 1.00)</td>
</tr>
<tr>
<td>Education</td>
<td>1.00 (0.75 – 1.34)</td>
<td>1.20 (0.83 – 1.74)</td>
<td>1.33 (0.88 – 2.01)</td>
</tr>
<tr>
<td>Sense of Control</td>
<td>1.08 (0.96 – 1.22)</td>
<td>1.05 (0.92 – 1.20)</td>
<td>0.99 (0.85 – 1.17)</td>
</tr>
<tr>
<td><strong>Interpersonal level</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network Size</td>
<td>0.62* (0.41 – 0.93)</td>
<td>-</td>
<td>0.46** (0.26 – 0.80)</td>
</tr>
<tr>
<td>Presence of Relatives</td>
<td>1.01 (0.99 – 1.03)</td>
<td>-</td>
<td>1.01 (0.99 – 1.03)</td>
</tr>
<tr>
<td>Physical Activity Network</td>
<td>1.01 (0.99 – 1.02)</td>
<td>-</td>
<td>1.01 (0.99 – 1.03)</td>
</tr>
<tr>
<td>Presence of Similar-Aged Others</td>
<td>1.01 (0.99 – 1.02)</td>
<td>-</td>
<td>1.01 (0.97 – 1.03)</td>
</tr>
</tbody>
</table>

Note: OR = odds ratio; CI = confidence interval

* p < 0.05, ** p < 0.01
Chapter 6: General Discussion

Research has suggested that the relationship between objective and subjective health is weaker in women than men (Benyamini, Leventhal, et al., 2000; McCallum et al., 1994). In addition, given that the relationship between objective and subjective health is also likely to weaken with age (i.e., the paradox of aging; Kunzmann et al., 2000), senior women represent a group who may be more likely to overestimate their health than other demographic groups. According to the Health Belief Model, people who feel less susceptible to poor health and disease may be less likely to engage in behaviours that would improve their health (Glanz & Bishop, 2010). Therefore, from a health promotion perspective, senior women who overestimate may represent an at-risk population given lower proclivities to engage in health promoting behaviour. In this study, we examined possible intra- and interpersonal correlates that could help identify women who overestimate their general health compared to their metabolic health. To do so, we first compared SRH and MetS and then created an overestimator group from of this comparison. Finally, we examined the association of intra- and interpersonal correlates with the risk of health overestimation as opposed to an accurate perception of health. The following sections discuss the results of the analyses and the value of research in this field.

Discussion of the Key Findings

This sample was distinctive for its high prevalence of good subjective health and its high prevalence of MetS. The prevalence of MetS in our sample was higher than the Riediger & Clara’s (2011) results (in which 39% of the 60-79 year-old individuals have MetS), which is
particularly remarkable given our sample's high average educational level\textsuperscript{1}. Few participants underestimated their health compared to their metabolic health (13%), but many did overestimate it (36%).

\textbf{Interpersonal Relationships}

None of the participants was socially isolated in that they all identified at least one person with whom they could talk or spend time on a regular basis. While we inferred from the literature that social network dimensions, such as social network size and social support, would relate to higher SRH and lower MetS, our results did not show an association between the social-relational variables and the health outcomes. Yet, findings did show that the greater an older woman's social network size was, the less likely she was to overestimate her objective health. In other words, older women with larger core networks tended to provide a more congruent assessment of their general health in comparison to their metabolic health. There are two possible interpretations for the association shown between core network size and health congruency. The first interpretation concerns health-related communication and feedback from a person's close ties, while the second involves social comparison.

For those women with the largest networks, there was little or no overlap in alters across the different network dimensions. In other words, among those participants with the largest networks, the three individuals with whom they may have spent time on a regular basis were not the same three individuals with whom they spoke about important matters. This implies that older women with larger networks also tended to have different social circles in which they might move. Having different social circles may be indicative of greater network diversity.

\textsuperscript{1} When calculating the prevalence of MetS in our sample with the same method of Riediger \& Clara (2011), our prevalence drops from 62\% to 44\%, which is still higher than Riediger \& Clara’s results.
Granovetter's (1973) strength of weak ties theory suggests that individuals with more diverse networks have greater access to a range of information. In this instance, network diversity may give individuals more diverse feedback from social ties about their health. Since feedback makes up a significant part of individuals’ recollections about their health when answering the SRH question (Suls et al., 1991), social relationship may thus have an effect on individual’s ability to perceive their health in congruence with their objective health. As a matter of fact, feedback seems to have a positive effect on the congruency between self-assessment and actual health: middle-aged adults who were given feedback about their high risk factors for colorectal cancer were more aware about them and were more inclined to get screening tests (Lipkus & Klein, 2006).

Social comparison processes may also help explain the mechanisms linking network size and congruent health assessment among senior women. A larger social network may improve a person's chances of having a wide range of referents, leading senior women to have a broader perception of what constitutes normal health for their age. The fact that senior people are more likely to make downward comparison (Heckhausen, 1999) is intrinsically related to their choice of a less healthy referent (Dunning et al., 2004). This choice of an inferior referent may bias the SRH since individuals often assess their health against a particular reference group (Jylhä, 2009). Nonetheless, according to Granovetter's (1973) strength of weak ties theory, a diverse network may more likely include referents with a large spectrum of health conditions, possibly giving individuals access to a wider representation of what constitutes health at an older age. With a more representative perception of peers’ health, seniors may use a more appropriate comparison referent when assessing their general health, leading to a more realistic health self-assessment. In conclusion, a larger social network seems to bring more knowledge to senior women about their
own health. This information could be conveyed in two manners: 1) more feedback on health condition from core ties, or 2) a more representative perception of the reference group for social comparison.

Previous research on social ties and health congruency has not addressed the question of network size and health overestimation directly, but some studies have examined related issues. Our analysis did not find social support measures to be associated with overestimation, which is aligned with the study of Helweg-Larsen et al. (2003) who did not find the perceived availability of social support to be related to health congruence in Danish adults. However, the significant negative relationship between core network size and overestimation which arises from this study contrasts with what was found in the literature. Helweg-Larsen et al. (2003) found that the frequency of social contact did not moderate the SRH-mortality relationship, whereas Eller et al. (2008) reported that social integration was related to better subjective health among ill individuals. Methodological differences, especially for the measures of social ties and health outcomes, may explain the inconsistent results. These differences are further explained in the limitations section.

Finally, these early findings on social networks and health overestimation suggest that SRH may be a less appropriate indicator of physiological health risks for older women with small networks. Future research with representative samples is warranted. However, if the results were to hold, it suggests that research on social networks and health, which uses SRH as an outcome measure, may be underestimating the strength of the association between social networks and health, specifically among those groups with fewer connections.
Physical Activity

The study participants had low levels of both self-reported and objective PA. The association between PA and higher SRH and lower odds of MetS supported our initial expectations based on the literature. The participants’ experience of health was exclusively associated with this behavioural variable. The predominance of PA measured by an accelerometer over the other correlates of MetS was not surprising since both PA and MetS were objectively measured and PA is a strong factor of MetS (Bianchi et al., 2008). Since SRH is a cognitive process, it was anticipated that self-reported PA would be strongly associated with SRH, yet only objective PA was related to SRH. Inasmuch as older adults give attention to their ability to be active when assessing their health (Benyamini et al., 2003), the cognitive process may have included less their recall of daily activities or exercises than their actual functional abilities. Finally, while Ruthig and Chipperfield (2007) reported that a subjective measure of PA using a social comparison question was related to health overestimation, our subjective measure of PA using participants' self-report of weekly activities was actually unrelated to health overestimation. Although Ruthig and Chipperfield (2007) reported that an objective measure of PA was related to health overestimation (Ruthig & Chipperfield, 2007), we did not find similar results in our sample of older women.

Awareness & Expectations of Health

Contrary to what might be inferred from the literature, the results showed that age was related to higher, rather than lower, SRH. Jylhä et al. (2001) reported a positive correlation between age and SRH after adjusting for chronic conditions, mental health, and education. A comparison of our results to those of Jylhä et al. (2001) is limited because of methodological differences: no objective health outcomes were controlled in the multivariate analyses. However,
in the model including all individual variables, age was significantly associated with SRH. Individual factors may hide the fact that age, in the case of our sample, may actually be related to a better perception of health. Additionally, our results were in line with the paradox of aging: SRH tends to remain unchanged across age in our sample of older women, and even increases when the analysis is adjusted for variables that usually decrease with aging (Kunzmann et al., 2000), such as SoC (Mirowsky, 1995; Wolinsky & Stump, 1996) and PA (Stewart et al., 2001).

Medication intake was expected to decrease SRH and reduce the chances of general health overestimation compared to the metabolic health because medication intake has been shown to increase people's awareness of their health conditions (Schulz et al., 1994). Nevertheless, this study was one of the first to examine the association between medication intake and health congruence, demonstrating neither an association between health congruency and medication intake nor between SRH and medication intake. Among our particular sample, medication intake did not seem to make a difference in women's report of general health or health congruency. Schulz et al. (1994) suggest that medication use may increase awareness of health status (Schulz et al., 1994). Individuals may know that they have specific health conditions, such as cholesterol or hypertension, through medication intake but medication intake does not seem to play a role in how they rate their health or the agreement between subjective and objective health status. People who tend to overestimate their health have been shown in previous research to acknowledge their poor physical health, but tend to perceive their psychological well-being as more important than their physical health (Borawski et al., 1996; Idler et al., 1999).

Education and SoC were also not associated with any outcome: SRH, MetS, and overestimation. The sample had high educational and SoC levels; the small spread of those
variables may explain the lack of association between them and the outcome variables. The lack of association between both SES and overestimation as well as SoC and overestimation may also be explained by the asymptomatic nature of MetS, the objective health outcome used to design the overestimation variable. Researchers have compared SRH to functional limitation (Delpierre et al., 2011), mortality (Dowd & Zajacova, 2007; Huisman et al., 2007; Lima-Costa et al., 2012), or any diagnosed illness or medical condition (Rodin & McAvay, 1992). The health conditions often shown to be strongly associated with older adults’ perception of health are either life-threatening or related to the ability to be active (Benyamini, Idler, et al., 2000; Benyamini et al., 2003); MetS is neither life-threatening nor a functional limitation and thus may play a weaker role in older adults’ general definition of health. SES and SoC may not alter seniors' expectations involving metabolic health since they may have little interest in this type of health condition.

**Limitations**

This study project had several limitations. The first limitation was the general lack of literature on the relationship between objective and subjective health, limiting knowledge on this particular subject, and less information to guide the development of hypotheses. The association between intra- and interpersonal variables and congruent health assessment has not been extensively explored. In addition, when the subject has been examined, objective health conditions have been represented by various health conditions—mortality, functional limitation, an agglomerate of chronic conditions—but no research has examined MetS as an outcome. Although MetS benefits from greater coverage in the literature than health congruency does, some correlates have not been examined extensively, such as SoC. As a result, few conclusions can be drawn about the correlates of health overestimation compared to the metabolic status among older adults.
The second limitation relates to the fact that this thesis project was developed after data acquisition was completed. KSWS was not designed specifically to assess the cognitive processes associated with SRH. The survey lacks certain variables that might better address the cognitive processes in health self-assessment. For example, following the SRH question, participants could have been asked to explain the basis of their rating. Moreover, interpersonal dimensions could have been measured more directly. For instance, social comparison could have been measured using a question such as “Do you compare yourself to others when assessing your own health, and if so, to whom?” Also, our measure of social support was not equivalent to social support measures used in previous publications, thereby reducing the comparability of this study's finding on support with others. Several studies on social support from family members and SRH among the elderly have measured the perceived social support from children by the satisfaction with the relationship (e.g. Sargent-Cox et al., 2008; Vogelzangs et al., 2007; Zunzunegui et al., 2004, 2001) or the objective social support by the helpful actions received (e.g. Smith et al., 2004). Instead, our study measured the presence of relatives in core ties; yet contact with relatives, more precisely with children, was found unrelated to SRH among the elderly (Litwin, 2006). Thus, a more direct measure of the social support may have been more valid and the results could have been more easily compared to the previous literature.

In addition, because the KSWS was cross sectional, causal relationships between independent and dependent variables could not be assessed. Measuring social network size and health congruency across time could have indicated whether changes in those two variables were related. Finally, the KSWS sample was a convenience sample and findings may not be generalizable to other older women. Results reveal that participants of KSWS tended to have higher SRH scores and MetS rates than average Canadian seniors and a higher level of education
and SoC for people of senior age. The KSWS might have attracted a large proportion of participants with sleeping problems, because it had a focus on sleep activities. Given that sleep problems have been shown to be associated with MetS (Coughlin, Mawdsley, Mugarza, Calverley, & Wilding, 2004), this property of the sample may help explain the higher rate of MetS in the KSWS women compared to the Canadian average. The household-level of education of study participants was also higher than the average: half of the sample earned a university degree (49%), compared to studies that have shown only 12% of Canadians seniors have earned a university degree (Statistics Canada, n.d.). The fact that Kingston is a mid-sized city yet holds three post-graduate schools may explain the high educational level of the sample. A similar observation can be made about SoC. The large proportion of high SoC within our sample contrasts with the tendency of SoC to decrease with age (Mirowsky, 1995). Finally, the general perception of good health among the sample caused a dichotomization of the SRH with a cut-point at a higher level than the usual, that is, the chosen cut-point for this study was between ‘good’ and ‘very good’. Consequently, people reporting being in good health were considered in the ‘poor health’ category; the health congruence group of ill realistic might have included individual reporting a good general health while having the MetS.

**Strengths**

Despite its limitations, the study also has several strengths. First, the study is original in that there is little research that examined the degree to which SRH aligns with physiological or metabolic health conditions. Studies exploring subjective-objective health congruency are limited, and even fewer have explored the moderators of the subjective-objective relationship. Among those studies, physiological health was never used as an objective health outcome or included in composites of objective health conditions (e.g., Ruthig & Allery, 2008; Ruthig &
Our research sheds light on the literature of health congruency by exploring a distinctively physiological health outcome: the MetS. Not only in the use of MetS, but also the measurements of social network size and PA constitute a novelty in the literature of health congruency. The actual number of core ties has not been explored in relation to health congruency among seniors; other studies have examined social integration (e.g., Eller et al., 2008) and social engagement (e.g., Ruthig & Allery, 2008). This study is the first, as far as we are aware, to suggest that social networks may be a source of health information leading to a more congruent general health assessment with metabolic health. Furthermore, although subjectively and objectively measured PA have been investigated with health congruency typology among seniors (e.g., Ruthig & Chipperfield, 2007), our study explored more valid measures of PA. The objective PA used by Ruthig & Chipperfield (2007) represented only 24 hours of bodily movement, which might not have captured the weekly leisure-based PA in which seniors tend to engage (Stewart et al., 2001). Thus, there were certain benefits to using a more representative measurement of PA weekly habits of the elderly. Also, their subjective PA was measured by social comparison, which contains two biases: (1) their measure was susceptible to be overestimated due to the belief of being above the average (Dunning et al., 2004), and (2) their measure was intrinsically related to SRH since social comparison is an integral part of the cognitive process underlying SRH (Jylhä, 2009). Thus a more accurate report of PA by participants was also required, such as the CHAMPS questionnaire (Stewart et al., 2001). This is also the first research, to the extent of our knowledge, to explore the link between weekly habits of reported or objective PA and health congruency among senior adults.

The SRH question was strategically located at the beginning of the General Health and Well-being section of our questionnaire in order to prevent any bias in the cognitive process. If
participants were asked to recall their specific health status before the SRH question, they would be more likely to report lower health than if the SRH question was at the beginning of the questionnaire (Clark & Vicard, 2007). Specific questions on health status may bias participants’ recall of their own health and their definition of what constitutes health.

Additionally, many studies using a typology of objective and subjective health used a composite objective health indicator (e.g., Idler et al., 1999; Ruthig & Chipperfield, 2007) and did not make the distinction between health conditions according to whether they could be modifiable. However, MetS might potentially be controlled, and being an overestimator in the case of MetS may actually pose a risk because older women may be less likely to modify unhealthy behaviours. Unlike previous studies on health congruency typology, the present one has direct implications for health promotion practice.

Although the KSWS study uses a convenience sample, there are two benefits to this aspect for the present study. Firstly, our sample was homogeneous: the sample consisted solely of women who were at least 65 years old and included few immigrants. Participants’ answers to the open-ended question on the self-identification to an ethnic or cultural group revealed that the sample was composed in great majority of Caucasians, more specifically Anglo-Saxons. Having a homogeneous sample is particularly important in comparing objective and subjective health because people of different gender (Benyamini, Leventhal, et al., 2000; McCallum et al., 1994) and of different age (Cheng et al., 2007; Kunzmann et al., 2000) may assess their health differently. Secondly, our sample's older age makes our study relevant for comparison against the previous research on health congruency since numerous studies have examined health congruency among senior adults.
Contributions & Implications

Health Promotion

This research explores the individual and interpersonal patterns associated with whether older women are more likely to overestimate their subjective health compared to their actual metabolic health. Findings from the research may help generate program recruitment strategies that could help identify women who are at greater risk of cardiovascular disease but who may be less likely to participate in health promotion programs. Results suggest that senior women with a high SRH score and a small social network size may be more likely to overestimate their health. Potential explanations of the relationship between larger network size and overestimation were related to the potential higher levels of information about one’s own health. A tailored program could adapt its recruitment strategy to the senior women overestimating their health. The pre-evaluation of participants in the tailoring process would include the SRH question and similar name-generator questions. Individual with high SRH and few reports of names would be identified as having low perceived risk susceptibility of metabolic problems, cardiovascular disease, and type 2 diabetes. The SRH and name-generator questions are in smaller number than questions asking directly their perceived risk susceptibility since the latter must directly address the health conditions and all their composing dimensions to be a valid measure (Champion & Skinner, 2008).

Research on Health Assessment as a Cognitive Process

To date, the limited research on health congruency has reported mixed results. Helweg-Larsen et al. (2003) showed that social relations were unrelated to the variation in the SRH-mortality relationship in an sample comprising participants of all ages; Eller et al. (2008) suggested that social integration may help older adults perceive themselves to have better health
despite suffering from diabetes; and Ruthig and Allery (2008) suggested that social engagement was related to health overestimation among elder Native Americans. In sum, the association between social ties and health congruence have shown mixed results depending in part on the type of relationship measured and the method used to compare objective and subjective health. To add to the subtlety of the relationship between social ties and health congruence, we suggested that larger social networks may bring more diverse information into a network, thereby improving individuals’ ability to self-assess their own health.

**Future Research Direction**

The present research brings new knowledge to improve health promotion practice and augment the research on the cognitive processes underlying older women's SRH assessment. However, some aspects remain unclear and need to be further explored to understand the tie between social networks and health self-assessment in greater depth.

The importance of social network size for health overestimation compared to metabolic health represents an important finding of this research. Following Granovetter’s (1973) strength of weak ties theory, two possible mechanisms were suggested as possible explanations for the association between larger network size and health congruence. We suggested that senior women with larger networks may have a more realistic perception of health for people of their age group, possibly leading to a more realistic health self-assessment in comparison to their objective health. We also suggested that senior women with a more accurate perception of their health may have more accurate feedback from their alters than overestimators because of their larger social network. However, conclusions must remain speculative due to the nature of the sample and because they were not examined directly but inferred from the literature. The fact that the representative perception of the health of a reference group and feedback from core ties was
suggested as explanations for the relationship between social network size on health congruency. Future research could include a measure of how accurately individuals perceive their comparison referents. Additionally, it could also include a measure of the amount of feedback they receive from their peers regarding their physiological health. Finally, with such measures, the hypothesis that these two variables are mediators of the effect of social network size on health congruency could be tested. Testing such a hypothesis gets its relevance in the fact that our speculated explanations of the results—a more realistic representation of peers and feedback may lead to a more congruent health assessment—are limited. Indeed, the need to protect a positive view of the self may lead individuals to subjectively select, interpret, or recall feedback from peers and purposely select an inferior comparison referent (Bailis et al., 2003).
Chapter 7: Conclusion

Although SRH is a powerful predictor of mortality (Idler & Benyamini, 1997), answering this question requires a cognitive process: a recall of what individuals know about their health, according to their definition of health (Borawski et al., 1996; Jylhä, 2009). Health is a broad concept that people define differently according to their age or gender. Older adults tend to diminish the gravity of their condition by attributing their ill-health to normal aging (Kunzmann et al., 2000). Women tend to have a broader conceptualization of their health than men do (Benyamini, Leventhal, et al., 2000; McCallum et al., 1994). Unlike SRH, having or not having MetS is not based on a cognitive process; this health outcome is measured through waist circumference, blood pressure, and using tests on blood samples. MetS is an objective measurement of physiological health and thus contrasts with SRH.

Research has shown the strength of the association between SRH and objective health to vary with people's expectations for their health, physical activity levels, and their social relationships. Our results showed that SoC and SES were unrelated to the overestimation of general health when compared to metabolic status in a sample of older women, probably because health expectations related to MetS are low at an older age. Older adults seem more concerned by life-threatening conditions or their ability to remain active (Benyamini, Idler, et al., 2000; Benyamini et al., 2003). Finally, our results suggested that the SRH of older women with smaller social networks may be a less accurate indicator of physiological health risk. Larger social networks may give access older women to a greater source of information or feedback from close social ties, leading possibly to more accurate assessments of health.
Summary of my M.Sc. Experience

During my Master of Science studies in Health Promotion in the School of Kinesiology and Health Studies, I developed my knowledge and research skills in public health, health promotion, and more specifically about the socio-determinants of health. Through my thesis work and research assistantship, I conducted both quantitative and qualitative research on the social determinants of health among older adults. For my thesis, I used already-existing data collected as part of the Kingston Senior Women study. Nevertheless, I used these data to create measures for my thesis research, and analyzed these data quantitatively to address my research questions. In addition, as a research assistant, I prepared an ethics application to conduct follow-up interviews with women in the KSW study, prepared the interview script, and conducted the follow-up interviews myself over the phone to assess changes in the health and social network status of the original KSW participants. Furthermore, as part of my professional training, I prepared and presented a research poster on my thesis research at the Canadian Public Health Association conference in June 2013 and gave an oral presentation on the same subject at the Aging and Society conference in November 2013.

In addition to my training as a researcher, I gained much from the courses that I took as a student in the Health Promotion program. Through my course work and thesis work, I acquired theoretical knowledge leading to skills in the health promotion practice. More particularly, I gained knowledge on the social inequalities underlying the differences in health statuses in populations and on the best strategies to improve the health determinants and to implement health promotion programs. Having a background in communication sciences, I found opportunities to apply concepts and practices of health promotion into those of communication sciences. The links between the two fields could concern the need of action at each level of
society, the importance of empowering individuals, and the respect of the meaning of well-being for each individual.
References


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Appendices

Appendix A: SWKS Ethic Approval

QUEEN'S UNIVERSITY HEALTH SCIENCES & AFFILIATED TEACHING HOSPITALS RESEARCH ETHICS BOARD

June 14, 2011

Dr. Spencer Moore
School of Kinesiology and Health Studies
28 Division Street, Room 301-F
Queen's University

Dear Dr. Moore,

Study Title: Kingston Senior Women's Research Study on Sleep Patterns and Cardiovascular Health: A Pilot Study
Co-Investigators: Dr. Kyna Pyke and Dr. Brendon Gurd

I am writing to acknowledge receipt of your recent ethics submission. We have examined the protocol, revised advertisements and brochure and the revised consent form for your project (as stated above) and consider it to be ethically acceptable. This approval is valid for one year from the date of the Chair's signature below. This approval will be reported to the Research Ethics Board. Please attend carefully to the following list of ethics requirements you must fulfill over the course of your study:

➤ Reporting of Amendments: If there are any changes to your study (e.g. consent, protocol, study procedures, etc.), you must submit an amendment to the Research Ethics Board for approval. (see https://www.queensu.ca/vpr/voh.htm).

➤ Reporting of Serious Adverse Events: Any unexpected serious adverse event occurring locally must be reported within 2 working days or earlier if required by the study sponsor. All other serious adverse events must be reported within 15 days after becoming aware of the information.

➤ Reporting of Complaints: Any complaints made by participants or persons acting on behalf of participants must be reported to the Research Ethics Board within 7 days of becoming aware of the complaint. Note: All documents supplied to participants must have the contact information for the Research Ethics Board.

➤ Annual Renewal: Prior to the expiration of your approval (which is one year from the date of the Chair's signature below), you will be reminded to submit your renewal form along with any new changes or amendments you wish to make to your study. If there have been no major changes to your protocol, your approval may be renewed for another year.

Yours sincerely,

[Signature]
Chair, Research Ethics Board

Study Code: PHE-114-11

➤ Investigators please note that if your trial is registered by the sponsor, you must take responsibility to ensure that the registration information is accurate and complete.
QUEEN'S UNIVERSITY HEALTH SCIENCES & AFFILIATED TEACHING HOSPITALS RESEARCH ETHICS BOARD

The membership of this Research Ethics Board complies with the membership requirements for Research Ethics Boards as defined by the Tri-Council Policy Statement: Part C Division 5 of the Food and Drug Regulations, OHIP, and U.S. DHHS Code of Federal Regulations Title 45, Part 46 and carries out its functions in a manner consistent with Good Clinical Practices.

Federalwide Assurance Number: #FWA0004184
#IRB00001173

Current 2011 membership of the Queen's University Health Sciences & Affiliated Teaching Hospitals Research Ethics Board

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Emeritus Professor, Department of Biochemistry, Faculty of Health Sciences, Queen's University (Chair)

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Professor, Department of Medicine, Queen's University

Dr. R. Brison
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Director & Chief of Psychiatry, Academic Unit, Quinte Health Care, Belleville General Hospital

Dr. E. Tsai
Associate Professor, Department of Paediatrics and Office of Bioethics, Queen's University

Rev. J. Warren
Community Member

Ms. K. Weisbaum
LL.B. and Adjunct Instructor, Department of Family Medicine (Bioethics)
Appendix B: SWKS In House Questionnaire

KINGSTON SENIOR WOMEN’S

STUDY QUESTIONNAIRE

1. Introduction

2. Social network module: 14-60 items

3. Neighbourhood Life: 11 items

4. General Health and Well-being: 21

5. Health Behaviours/Risk Factors: 34 items
   I. Alcohol Consumption: 5 items
   II. Smoking: 2-3 items
   III. Physical Activity: 8 items
   IV. 24-Hour Dietary Recall: 4 items

6. About yourself (Socio-demographic): 8-11 items

TOTAL ITEM COUNT: 107-157 items
INTRODUCTION
Hi, My name is __________. I am a student assistant in the Queen’s University School of Kinesiology and Health Studies. Before we begin, I would like to confirm that you have read the study information and consent form. Have you completed and signed the consent form?

O Yes
O No

First, because this study focuses on senior women older than 65 year of age, can you tell me when you were born?

YEAR _____          MONTH _____

(Interviewer Note): If Yes, go to “1a”.

If No, interviewer says: “I’m sorry, according to the study’s guidelines you are not eligible to participate in this study. Thank you for your time”.

Completing this questionnaire may take approximately 45 minutes. I will be asking you a series of questions about your social networks, health, and lifestyle. Please answer the questions as accurately as possible. Do you have any questions before we begin? _______ We can get started then. If you have any questions throughout, or need to pause for a break at any time, please let me know.
SOCIAL NETWORK

SECTION 1: GENERAL SC & PARTICIPATION: 3 ITEMS

SECTION 2: NAME GENERATOR: 1-27 ITEMS

SOCIAL CAPITAL MODULE: RANGE OF ITEMS: 14-60 ITEMS
The following questions ask about your social relationships.

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

<table>
<thead>
<tr>
<th>Most people can be trusted</th>
<th>Can’t be too careful</th>
<th>Depends</th>
<th>Most people CANNOT be trusted</th>
<th>I Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

2a. During the past five years, have you been active in a neighbourhood group or association as a volunteer or an officer?

- Yes  O
- No   O
- Don’t know  O
- No response  O

2b) During the past five years, have you been active in any other voluntary associations as a volunteer or an officer?

- Yes  O
- No   O
- Don’t know  O
- No response  O
The following questions ask about people with whom you discuss important personal matters such as health, family, work, and money issues. These people may live in your household, may be relatives, friends, work colleagues, neighbours or other persons living outside your household. You can give a fake name rather than the real name if you prefer.

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

   Person 1 _____________
   Person 2 _____________
   Person 3 _____________
   No one _____________

   * Don’t want to name anyone (probe)

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

4. Can you tell me up to three people with whom you have spent time on a regular basis in the last six months?

   Person 4 _____________
   Person 5 _____________
   Person 6 _____________
   No one _____________

   * Don’t want to name anyone (probe)
<table>
<thead>
<tr>
<th>Name 1:</th>
<th>Name 2:</th>
<th>Name 3:</th>
<th>Name 4:</th>
<th>Name 5:</th>
<th>Name 6:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is (person)</td>
<td>M</td>
<td>O</td>
<td>M</td>
<td>O</td>
<td>M</td>
</tr>
<tr>
<td>male/female?</td>
<td>F</td>
<td>O</td>
<td>F</td>
<td>O</td>
<td>F</td>
</tr>
</tbody>
</table>

What is (person’s) age? (roughly)

<table>
<thead>
<tr>
<th>How much formal education does (person) have?</th>
</tr>
</thead>
</table>

Is (person) your:

| a) Relative | a) O | a) O | a) O |
| b) Friend | b) O | b) O | b) O |
| c) Acquaintance | c) O | c) O | c) O |

Does (person) live:

| 1) In your household | 1. O | 1. O | 1. O |
| 2) In your neighbourhood | 2. O | 2. O | 2. O |

Is (person) physically active regularly? (ie. Walks, swims, bikes)

| Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| No | No | No | No | No | No | No | No |
| DK | DK | DK | DK | DK | DK | DK | DK |

Do you walk, bike, etc. with (person)

<p>| Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| No | No | No | No | No | No | No | No |</p>
<table>
<thead>
<tr>
<th>Question</th>
<th>More</th>
<th>Less</th>
<th>Same</th>
<th>More</th>
<th>Less</th>
<th>Same</th>
<th>More</th>
<th>Less</th>
<th>Same</th>
<th>More</th>
<th>Less</th>
<th>Same</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would you say that (person) eats more healthy, less healthy, or about the same as you?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MORE/LESS/SAME</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you and (person) share meals/eat together regularly?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>YES/NO</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Does (person) smoke?</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>YES/NO</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
Social Connections:

These next questions ask if the people who you know one another (as far as you are know).

<table>
<thead>
<tr>
<th>Alter Person 1:</th>
<th>Person 2:</th>
<th>Person 3:</th>
<th>Person 4:</th>
<th>Person 5:</th>
<th>Person 6:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes O</td>
<td>Yes O</td>
<td>Yes O</td>
<td>Yes O</td>
<td>Yes O</td>
<td>Yes O</td>
</tr>
<tr>
<td>No O</td>
<td>No O</td>
<td>No O</td>
<td>No O</td>
<td>No O</td>
<td>No O</td>
</tr>
<tr>
<td>DK O</td>
<td>DK O</td>
<td>DK O</td>
<td>DK O</td>
<td>DK O</td>
<td>DK O</td>
</tr>
</tbody>
</table>

Person 2:

| Yes O         | Yes O     | Yes O     | Yes O     | Yes O     | Yes O     |
| No O          | No O      | No O      | No O      | No O      | No O      |
| DK O          | DK O      | DK O      | DK O      | DK O      | DK O      |

Person 3:

| Yes O         | Yes O     | Yes O     | Yes O     | Yes O     | Yes O     |
| No O          | No O      | No O      | No O      | No O      | No O      |
| DK O          | DK O      | DK O      | DK O      | DK O      | DK O      |

Person 4:

| Yes O         | Yes O     | Yes O     | Yes O     | Yes O     | Yes O     |
| No O          | No O      | No O      | No O      | No O      | No O      |
| DK O          | DK O      | DK O      | DK O      | DK O      | DK O      |

Person 5:

| Yes O         | Yes O     | Yes O     | Yes O     | Yes O     | Yes O     |
| No O          | No O      | No O      | No O      | No O      | No O      |
| DK O          | DK O      | DK O      | DK O      | DK O      | DK O      |

Person 6:

| Yes O         | Yes O     | Yes O     | Yes O     | Yes O     | Yes O     |
| No O          | No O      | No O      | No O      | No O      | No O      |
| DK O          | DK O      | DK O      | DK O      | DK O      | DK O      |
The following are questions about different aspects of your neighbourhood and your relationships with neighbours. Would you say:

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Your neighbourhood is clean?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2) You have trouble with your neighbours</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>3) People in your neighbourhood are willing to help each other</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>4) People in your neighbourhood can be trusted</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>5) If there is a problem in your neighbourhood, people in your neighbourhood can get it solved</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>6) Most people in your neighbourhood know you</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>
YOUR HEALTH & WELL-BEING
AND HEALTH BEHAVIOURAL RISK FACTORS

- SF-12v2: 4 items
- Chronic Illness: 6 items
- Alcohol consumption: 5 items
- Smoking frequency: 2-3 items
- CHAMPS physical activity questionnaire (revised): 8 items
- 24-hour dietary recall: 4 items

Total items: items
HEALTH AND WELL-BEING QUESTIONS:

This section of the survey asks for your views about your health.

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

<table>
<thead>
<tr>
<th>Excellent</th>
<th>Very good</th>
<th>Good</th>
<th>Fair</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>All of the time</th>
<th>Most of the time</th>
<th>Some of the time</th>
<th>A little of the time</th>
<th>None of the time</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

3. How well are you able to get around?

<table>
<thead>
<tr>
<th>Very Good</th>
<th>Good</th>
<th>Neither good nor poor</th>
<th>Poor</th>
<th>Very Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

4. How would you rate your memory?

<table>
<thead>
<tr>
<th>Very Good</th>
<th>Good</th>
<th>Neither good nor poor</th>
<th>Poor</th>
<th>Very poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
5. Has a doctor ever told you whether or not you suffer from any of the following symptoms or conditions?

a) Diabetes

   Yes  O  
   No   O  

b) Hypertension (high blood pressure)

   Yes  O  
   No   O  

c) High cholesterol

   Yes  O  
   No   O  

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

   Yes  O  
   No   O  

e) Osteoporosis?

   Yes  O  
   No   O  

f) Arthritis/or rheumatism?

   Yes  O  
   No   O  

6. Could you tell me what prescriptions you are taking at present?
Alcohol consumption

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

____ Days per week

____ Days in past 30 (month)

O No drinks in past 30 days. GO TO Question 9.
O Don’t know/not sure
O Refused GO TO Question 9.

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

____

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

____

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

____ Number of drinks

O Don’t know/not sure
O Refused

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

____ Number of times

O None
O Don’t know/not sure
O Refused
**Smoking**

1. Have you ever smoked cigarettes?
   - O Yes
   - O No (IF NO, GO TO 2)
   - O Refuse to answer

1b. If YES, how old were you when you started smoking?
   ____

1c. If YES, was there a period when you stopped smoking?
   - O Yes
   - O No (IF NO, GO TO 2)
   1c1. If YES (1c), for how long did you stop? ____ years

1d. If YES, at the present time, do you smoke cigarettes?
   - O Yes
   - O No (IF NO, GO TO 2)

   1d1. If YES (1c), how many cigarettes do you usually smoke per day?
       ____ (number per day)
       ____ (Don’t smoke every day)

2. At the present time, does anyone in your household smoke?
CHAMPS Physical Activity Questionnaire (Revised)

Now I will ask you about activities that you may have done in the past 4 weeks. For each activity that you did, I will ask you how many times a week as well as how many hours a week you spent doing that activity.

In a typical week during the past 4 weeks, did you...

1. Do heavy work around the house or heavy gardening (such as washing windows, cleaning gutters, spading, or raking)

   YES  O
   NO   O

   How many TIMES a week? ______

   How many TOTAL hours a week did you usually do it?
   Less than 1 – 2½ 3 – 4½ 5 – 6½ 7 – 8½ 9 or more
   1 hour hours hours hours hours

   O  O  O  O  O

2. Do light work around the house or light gardening (such as sweeping, vacuuming, or watering plants)

   Yes  O
   No   O

   How many TIMES a week? ______

   How many TOTAL hours a week did you usually do it?
   Less than 1 – 2½ 3 – 4½ 5 – 6½ 7 – 8½ 9 or more
   1 hour hours hours hours hours
3. Jog, run, or walk briskly for exercise?

   YES  
   NO  

   How many TIMES a week? ______

   How many TOTAL hours a week did you usually do it?
   Less than 1 hour 1 – 2 ½ hours 3 – 4 ½ hours 5 – 6 ½ hours 7 – 8 ½ hours 9 or more hours

   4. Walk to do errands?

   YES  
   NO  

   How many TIMES a week? ______

   How many TOTAL hours a week did you usually do it?
   Less than 1 hour 1 – 2 ½ hours 3 – 4 ½ hours 5 – 6 ½ hours 7 – 8 ½ hours 9 or more hours

   5. Walk leisurely for exercise or pleasure

   YES  
   NO  

   How many TIMES a week? ______

   How many TOTAL hours a week did you usually do it?
   Less than 1 hour 1 – 2 ½ hours 3 – 4 ½ hours 5 – 6 ½ hours 7 – 8 ½ hours 9 or more hours
6. Ride a bicycle or stationary cycle

YES  O
NO   O

How many TIMES a week? ______

How many TOTAL hours a week did you usually do it?
Less than 1 hour 1 – 2 ½ hours 3 – 4 ½ hours 5 – 6 ½ hours 7 – 8 ½ hours 9 or more hours
O    O    O    O    O    O

7. Swim

YES  O
NO   O

How many TIMES a week? ______

How many TOTAL hours a week did you usually do it?
Less than 1 hour 1 – 2 ½ hours 3 – 4 ½ hours 5 – 6 ½ hours 7 – 8 ½ hours 9 or more hours
O    O    O    O    O    O

8. Do any other physical activity not already discussed?

YES  O
NO   O

How many TIMES a week? ______

How many TOTAL hours a week did you usually do it?
Less than 1 hour 1 – 2 ½ hours 3 – 4 ½ hours 5 – 6 ½ hours 7 – 8 ½ hours 9 or more hours
O    O    O    O    O    O
Nutrition Questionnaire: Based on Canada’s Food Guide

Now we are going to discuss everything you had to eat and drink yesterday. I will go through every meal with you and ask you to recall the foods you ate as well as estimates of portion sizes for each item. Here are some examples of foods from each food group. On this page, there are also some examples of serving sizes for each food group. This will help us to determine an estimate of the amount of food you ate yesterday. (Give them food group/ serving size sheet).

Notes to RA:
• Record serving sizes in each space in the table below. If unsure, make note of the type and general amount of the food item consumed so that you can review serving size later.
<table>
<thead>
<tr>
<th></th>
<th>Breakfast</th>
<th>Morning Snack</th>
<th>Lunch</th>
<th>Afternoon Snack</th>
<th>Dinner</th>
<th>Bedtime Snack</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vegetables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grains</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Milk/Dairy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meats/Alternatives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anything else not mentioned? (coffee/pop /tea/etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any oils/fats used to cook this meal?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
1. Did you eat at a restaurant in the past 24 hours?
   Yes  O
   No   O
   o If yes, where? ________________

2. Is there anything else that you had to eat or drink yesterday that we did not discuss? _______________________________________
   • How many servings? _________________________________

2. Was yesterday typical of your daily diet?
   YES  O
   NO   O

If no, how was it different?

To score: tally food servings for each food group. Compare to Canada’s Food Guide recommendations for women over age 51.
ABOUT YOURSELF

• Socio-demographic questions: 8 items
These last questions ask a little about you. Your answers will be used for general comparison purposes only and your responses will remain strictly confidential.

1. Do you have any children?
   Yes O
   No O

1b. If Yes, How many? ________

2. Including yourself, how many people live in your household?

3. Where were you born? __________________________ (City, Country)

4. To which ethnic or cultural group do you identify? ________________

5. What is the primary language spoken in your household?
   _______________________

6. Are you currently employed or retired?
   Employed O
   Retired O
   No response O

7. If employed, what is your present occupation? ________________

8. Could you please confirm/provide me with your address?
Thank you for your time to complete this questionnaire.

We may look to extend this study in the future to examine changes in the health of the women who were in this initial study.

Would it be okay for us to contact you again in about 1 year, if necessary, to ask if you might be interested in participating again?

Yes  O

No   O
Appendix C: SWKS Take Home Questionnaire

Kingston Senior Women’s Study

Take-Home Questionnaire

Please complete this questionnaire before the final visit

SIN NUMBER: ____________________________________________

ADDRESS: ____________________________________________

_____________________________________________________

(This information is needed in order for us to send you a $30 stipend in the mail)

Thank you for taking the time to complete this questionnaire. In this package, there are questions that ask you about personal characteristics as well as some general questions. Please remember that this questionnaire is entirely voluntary. If you should have any questions about the questionnaire, or any other questions regarding the Kingston Senior Women’s Study, please call (613) 533-6000 extension: 78423.
If you agree to fill out this questionnaire, please have it completed before the final visit. Please have it ready along with the actiwatch, actigraph, and sleep diaries.

Thanks again!

Contents

Table 1 ................................................................. Pg. 3

Table 2 ................................................................. Pg. 4

Table 3 ................................................................. Pg. 5

Table 4 ................................................................. Pg. 6

General Questions ................................................ Pg. 7

Final Remarks ..................................................... Pg. 10
**TABLE 1**

Below is a list of 8 statements. Please fill in the circle that represents how strongly you feel about each statement.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) I am responsible for my own successes</td>
<td>O</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>2) The really good things that happen to me are mostly luck</td>
<td>O</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>3) I can do just about anything I set my mind to</td>
<td>O</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>4) There's no sense planning a lot - if something good is going to happen it will</td>
<td>O</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>5) My misfortunes are the results of mistakes I have made</td>
<td>O</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>6) Most of my problems are due to bad breaks</td>
<td>O</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>7) I am responsible for my failures</td>
<td>O</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>8) I have little control over the bad things that happen to me</td>
<td>O</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>
TABLE 2

The next 10 questions ask you about your feelings and thoughts **during the last month**. In each case, please fill in the circle that indicates *how often* you felt or thought a certain way.

<table>
<thead>
<tr>
<th>Question</th>
<th>Never</th>
<th>Almost Never</th>
<th>Sometimes</th>
<th>Fairly Often</th>
<th>Very Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) In the last month, how often have you been upset because of something that happened unexpectedly?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2) In the last month, how often have you felt that you were unable to control the important things in your life?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>3) In the last month, how often have you felt nervous and “stressed”?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>4) In the last month, how often have you felt confident about your ability to handle your personal problems?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>5) In the last month, how often have you felt that things were going your way?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>6) In the last month, how often have you found that you could not cope with all the things that you had to do?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>7) In the last month, how often have you been able to control irritations in your life?</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>
8) In the last month, how often have you felt that you were on top of things?  

9) In the last month, how often have you been angered because of things that were outside of your control?  

10) In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?  

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>times</th>
<th>Often</th>
<th>Often</th>
</tr>
</thead>
<tbody>
<tr>
<td>8)</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>9)</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>10)</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

**TABLE 3**

Below is a list of 12 statements. Please indicate if you strongly agree, agree, disagree, or strongly disagree with each statement by filling in the appropriate circle.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) If I think something unpleasant is going to happen I usually get pretty “worked up“.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2) I worry about making mistakes.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>3) Criticism or scolding hurts me quite a bit.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>4) I feel pretty worried or upset when I think or know somebody is angry at me.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>5) Even if something bad is about to happen to me, I rarely experience fear or nervousness.</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>
6) I feel worried when I think I have done poorly at something.  
<table>
<thead>
<tr>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

7) I have very few fears compared to my friends.  
<table>
<thead>
<tr>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

8) When I get something I want, I feel excited and energized.  
<table>
<thead>
<tr>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

9) When I’m doing well at something, I love to keep at it.  
<table>
<thead>
<tr>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

10) When good things happen to me, it affects me strongly.  
    | Agree | Disagree |
    |-------|---------|
    | O     | O       | O     | O |

11) It would excite me to win a contest.  
    | Agree | Disagree |
    |-------|---------|
    | O     | O       | O     | O |

12) When I see an opportunity for something I like, I get excited right away.  
    | Agree | Disagree |
    |-------|---------|
    | O     | O       | O     | O |

**TABLE 4**

Below is a list of 10 statements. For each statement, please indicate how often during the **PAST WEEK** you may have felt this way.

<table>
<thead>
<tr>
<th></th>
<th>Rarely or none of the time (less than 1 day)</th>
<th>Some or a little of the time (1-2 days)</th>
<th>Occasionally or a moderate amount of the time (3-4 days)</th>
<th>Most or all of the time (5-7 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) I felt that everything I did was an effort</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>2) My sleep was restless</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>3) I was happy</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
</tbody>
</table>

Rarely or | Some or a | Occasionally | Most or all
<table>
<thead>
<tr>
<th>Question</th>
<th>none of the time (less than 1 day)</th>
<th>little of the time (1-2 days)</th>
<th>or a moderate amount of the time (3-4 days)</th>
<th>of the time (5-7 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4) I felt lonely</td>
<td>O</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5) People were unfriendly</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6) I enjoyed life</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7) I felt sad</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8) I felt that people disliked me</td>
<td>O</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9) I could not get “going”</td>
<td>O</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10) I felt depressed</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
These last questions ask a little about you. Your answers will be used for general comparison purposes only and your responses will remain strictly confidential. Please fill in the circle beside the appropriate answer for each question.

1) **Which situation best describes your marital status?**

<table>
<thead>
<tr>
<th>Situation</th>
<th>Circle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married/Common law relationship</td>
<td>O</td>
</tr>
<tr>
<td>Single, never married</td>
<td>O</td>
</tr>
<tr>
<td>Separated</td>
<td>O</td>
</tr>
<tr>
<td>Divorced</td>
<td>O</td>
</tr>
<tr>
<td>Widowed</td>
<td>O</td>
</tr>
</tbody>
</table>
1b) **If you are married or formerly married, what was the highest level of education of YOUR SPOUSE?**

<table>
<thead>
<tr>
<th>Level of Education</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No degree, certificate, or diploma</td>
<td>O</td>
</tr>
<tr>
<td>Secondary (high) school diploma or equivalent</td>
<td>O</td>
</tr>
<tr>
<td>Trades Certificate or Diploma</td>
<td>O</td>
</tr>
<tr>
<td>College certificate or diploma below Bachelor’s degree level</td>
<td>O</td>
</tr>
<tr>
<td>University certificate or diploma at bachelor level</td>
<td>O</td>
</tr>
<tr>
<td>Master’s degree</td>
<td>O</td>
</tr>
<tr>
<td>Earned Doctorate Degree</td>
<td>O</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>O</td>
</tr>
</tbody>
</table>
2) **What is the highest level of education YOU have completed?**

<table>
<thead>
<tr>
<th>Option</th>
<th>Choice</th>
</tr>
</thead>
<tbody>
<tr>
<td>No degree, certificate, or diploma</td>
<td>O</td>
</tr>
<tr>
<td>Secondary (high) school diploma or equivalent</td>
<td>O</td>
</tr>
<tr>
<td>Trades Certificate or Diploma</td>
<td>O</td>
</tr>
<tr>
<td>College certificate or diploma below Bachelor’s degree level</td>
<td>O</td>
</tr>
<tr>
<td>University certificate or diploma at bachelor level</td>
<td>O</td>
</tr>
<tr>
<td>Master’s degree</td>
<td>O</td>
</tr>
<tr>
<td>Earned Doctorate Degree</td>
<td>O</td>
</tr>
<tr>
<td>Don’t Know</td>
<td>O</td>
</tr>
</tbody>
</table>
3) Please check the box that includes your total monthly household income. Please include income such as retirement benefits.

- $0 - $500
- $500 - $1,000
- $1,000 - $2,000
- $2,000 - $4,000
- $4,000 - $7,000
- $7,000 or more

4) Do you rent or own your current place of residence? Please fill in the circle of the answer below.

- Rent
- Own

Thank you for taking the time to complete this questionnaire!