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The mediatlional role of perceived control between health status and life satisfaction in an elderly population

By

Loring P. Chuchmach

**A Thesis
Submitted to the Faculty of Graduate Studies
In Partial Fulfillment of the Requirements
For the Degree of**

MASTER OF SCIENCE

**Department of Physical Education
University of Manitoba, Winnipeg, Manitoba
September 2002**

THE UNIVERSITY OF MANITOBA
FACULTY OF GRADUATE STUDIES

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**THE MEDIATIONAL ROLE OF PERCEIVED CONTROL BETWEEN HEALTH STATUS
AND LIFE SATISFACTION IN AN ELDERLY POPULATION**

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**A Thesis/Practicum submitted to the Faculty of Graduate Studies of The University
of Manitoba in partial fulfillment of the requirements of the degree
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Acknowledgements

The process of completing a thesis is a long and difficult process which is characterized by many 'ups' and 'downs'. I would like to express my sincere appreciation to all those people in my life who have supported and assisted me in the process of completing this thesis. Without all of you, this undertaking would not have been possible.

~ Dr. Laurel Strain and Dr. Yoshi Iwasaki, my committee members; for all of your input and effort in assisting me to complete this thesis.

~ Dr. Judy Chipperfield, my advisor; your patience, guidance, friendship and support throughout the years will not be forgotten

~ My mom and dad, everyone in my family, and all my friends who supported me through the many years spent as a student

~ My wife Tina; without your love and support, none of this would have been possible

Thank you all very much.

Table of Contents

	Page
Abstract	1
Introduction	2
Conceptualization and Measurement Issues	5
Conceptualization/measurement of life satisfaction	5
Conceptualization/measurement of health: objective vs. subjective measures	6
Health and Life Satisfaction	9
Life satisfaction and problem-specific health measures	10
Sources of variation within the health/life satisfaction relationship	11
Modelling approaches to the study of life satisfaction	14
Future directions in the study of health and life satisfaction	15
Perceived Control and Health Status	15
Conceptualization and measurement of perceived control	16
The influence of perceived control on health	19
Perceived control and specific health problems/events	25
Perceived Control and Life Satisfaction	28
Perceived control and life satisfaction in an elderly population	28
The Mediational Role of Perceived Control	35
The distinction between "moderating" and "mediating" effects	35
Evidence of the mediating/moderating power of perceived control	37
The Present Study	42
Summary of relevant literature	43
The mediating role of perceived control	44
Summary of hypothesis and research questions	45

Table of Contents

	Page
Method	50
Dataset	50
The Aging in Manitoba (AIM) project	50
The issue of secondary analysis	50
Variables	51
Sociodemographic variables	51
Physical functioning, religion and cognitive variables	52
Independent variables	53
Mediating variables	54
Dependent measure: life satisfaction	55
Paradox group variable	55
Analytic approach	56
Results	58
Pre-conditions of Mediation	59
PC as a Mediator of the Health-LS Relationships in the Overall Sample	59
Global versus domain-specific PC measure	61
Objective versus subjective health measures	62
PC as a Mediator of the Health-LS Relationship: The Role of Participant Characteristics	63
The role of age in the mediational effect of PC	63
The role of leisure in the mediational effect of PC	65
Examination of Counter-Intuitive Health/Life Satisfaction Relationships	67
The health/life satisfaction paradox	67

Table of Contents

	Page
Discussion	69
Perceived control and 'At-Risk' Individuals	70
The role of leisure participation	71
The role of age	72
PC as a Mediator of the Health-LS Relationships in the Overall Sample	74
Global versus domain-specific perceived control	74
Objective versus subjective health	75
The Health/Life Satisfaction Paradox	76
Shortcomings of the Present Study	77
Strengths of the Present Study	78
Conclusions	79
References	81
Tables/Figures	89
Table 1 - Summary of Major Variables	89
Table 2 - Correlations between life satisfaction measures and health status measures	90
Table 3 - Complete regression results for tests of mediational models for entire sample	91
Table 4 - Mediational models for young-old subjects	92
Table 5 - Mediational models for old-old subjects	93
Table 6 - Mediational models for participants with low leisure participation	94
Table 7 - Mediational models for participants with high leisure	95
Table 8 - Summary of Means and Percentages: Health-Life Satisfaction Paradox Groups	96
Table 9 - One-way ANOVA's for paradox/non-paradox health-life satisfaction groups	97
Figure 3 - Overview of key measures included in each regression model	98

Table of Contents

	Page
Appendix A	99
Table A1 - Regression results for tests of mediational models for entire sample	100
Table A2 - Regression results for tests of mediational models for young-old subjects	101
Table A3 - Regression results for tests of mediational models for old-old subjects	102
Table A4 - Regression results for mediational models for participants with low leisure	103
Table A5 - Regression results for mediational models for participants with high leisure	104
Appendix B	105
Ethical approval for research	106
LSIA Items from AIM 1996	107

ABSTRACT

Life satisfaction is a very important aspect in later life, and it can greatly influence an individual's overall quality of life, including both psychological and physical well-being. Numerous studies have examined the factors that can determine an individual's level of life satisfaction, including for example, social integration, leisure activity, and locus of control. In many studies, health is found to predict life satisfaction, although there are many paradoxical examples of seniors who have poor physical health status, and yet, still report a high level of life satisfaction. This suggests that other factors are also important in determining life satisfaction. The present study focused upon one particular factor, perceived control (PC), that may be important in understanding the relationship between health and life satisfaction. In particular, this study examined the mediational role of perceived control in the health - life satisfaction relationship using data from the Aging in Manitoba Study 1996 ($n = 1868$). As was hypothesized, perceived control *did* act as a mediator between health status and level of life satisfaction. Two-step regression analyses indicated that this mediational relationship varied depending upon the nature of the PC measure, age of participants, and level of leisure activity reported. Findings regarding health-life satisfaction paradox groups (healthy and unsatisfied, unhealthy and satisfied) were also examined through the use of ANOVA's, which uncovered differences based upon years of formal education.

Introduction

Life satisfaction is very important in later life, and it can greatly influence an individual's overall quality of life, including both psychological and physical well-being. Numerous studies have examined what factors influence an individual's level of life satisfaction, including social integration and leisure activity (Ragheb & Griffith, 1982; Steinkamp & Kelly, 1987), marital status (Barrett, 1999; Chipperfield & Havens, 2001), personal levels of control (Reid, Haas & Hawkins, 1992), locus of control (Lachman, 1986), change in life satisfaction over time (Strain, Chappell, & Blandford, 1987), and health (Girzadas et al 1993; Hendricks, 1995; Jacob & Guarnaccia, 1997; Morris, 1997). In spite of the obvious wealth of knowledge within the field, there still exists some debate as to what factors may or may not contribute to, or take away from, a person's level of life satisfaction.

While some relationships appear straightforward, many are likely complicated. For example, some seniors who have problems such as poor physical health status, relatively few social supports, or low socio-economic status may still report a high level of life satisfaction. Similarly, there are healthy people with many social supports and high socio-economic status who report very low levels of life satisfaction. Why do some studies that examine life satisfaction in the elderly report such counterintuitive or paradoxical findings? The problem may be that researchers tend to take a somewhat 'unidimensional' approach (see Figure 1) in assessing the determinants of life satisfaction. Attempting to simply link factors A, B, and C to life satisfaction may not be the best way to examine this topic.

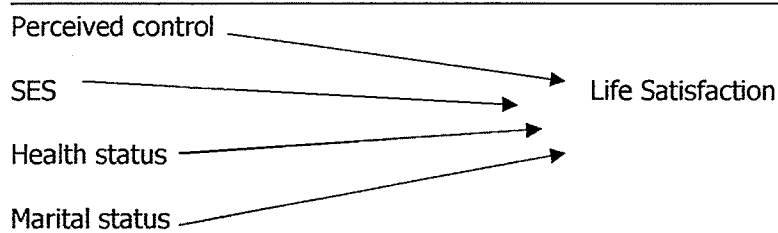


Figure 1 – Unidimensional examination of life satisfaction

What tends to be overlooked in such unidimensional examinations are possible mediating effects that any number of variables may have. All too often, researchers do not uncover the expected results, such as, for example, poor health predicting low life satisfaction. Such counterintuitive findings have typically been attributed to sampling problems, characteristics of the research populations, or poor and incomplete measures of health status (Wolinsky & Stump, 1996). What, in fact, may be the case is that some overlooked variables are contributing to or distorting the hypothesized relationships. In order to more fully examine the factors that influence life satisfaction, a mediational model should be employed (Baron & Kenny, 1986). Rather than relying on a simple linear model (Figure 1), a mediational model (Figure 2) would take into account the role some mediating variable may be playing in predicting life satisfaction.

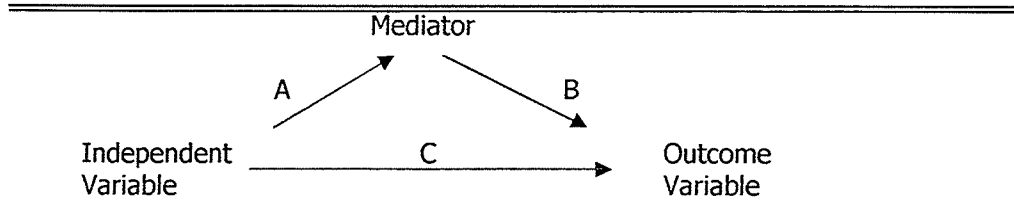


Figure 2 – Mediational Model (Baron and Kenny, 1986)

Most research that has examined life satisfaction as an outcome has focused upon the 'C' path in Figure 2. However, more recently, research has begun to examine the roles that paths 'A' and 'B' may be playing in such relationships. Many studies reveal the significant influence that perceived control exerts on health and well-being, including life satisfaction. Schultz and Heckhausen (1999) point out, "hundreds of studies have shown that control is related not only to a variety of mental and physical health outcomes, but also to many other psychological outcomes, such as achievement...optimism...and personal adjustment" (p. 139). Thus, it stands to reason that perceived control would have a significant influence on life satisfaction, and many studies have found the existence of this relationship between perceived control and life satisfaction (Bisconti & Bergeman, 1999; Cohen, 1990; Purcell & Keller, 1989; Revicki & Mitchell, 1985; Wallhagen, 1993). What is less understood is the possible mediational role perceived control may play in a model of life satisfaction similar to the example in Figure 2. With the exception of Bisconti and Bergeman (1999), very few studies have considered the mediational role that perceived control might play in relationships between other variables.

The purpose of the present study was to examine, in detail, the relationship between health and life satisfaction and how perceived control might function as a

mediator in this relationship. In order to lay the foundation for this study, it is important to first review studies that have assessed the relationship between health status and level of life satisfaction.

The health-life satisfaction linkage will be discussed in relation to several broad areas, specifically, the link between life satisfaction and both general and problem-specific health measures, the sources of variation in this linkage, the paradoxical findings that occasionally emerge from studies in this area, and, finally, some possible future directions in the study of the linkage between life satisfaction and health. Prior to this however, several conceptualization and measurement issues relating to life satisfaction and health will be discussed.

Conceptualization and Measurement Issues

Conceptualization/measurement of life satisfaction. There are numerous methods by which life satisfaction is both conceptualized and measured. For the present purposes, life satisfaction is conceptualized as "...the individual's own evaluations of his present or past life, his satisfaction or his happiness" (Neugarten, Havinghurst, & Tobin, 1961, p. 134). This includes a self-evaluation of many social and psychological factors that could potentially influence this happiness or satisfaction. It should be pointed out that in many studies, 'quality of life' has been equated with, or at least considered to be indicated by, life satisfaction (Fisher, 1992; Lawton, 1996; Neugarten et al, 1961). Thus, for the present illustrative purposes, 'quality of life' is considered comparable to 'life satisfaction'.

Likewise, it is common in the literature to equate 'successful aging' with 'life satisfaction' (Baltes, Wahl, & Reichert, 1989). Both life satisfaction and successful aging take into account components such as subjective psychological factors, social

comparison, and adaptation to a new environment. Thus, although these terms are different, they both include similar components.

Life satisfaction has been measured in many different ways, including countless single item questions (e.g., How satisfied are you with your life right now?) and multiple question instruments such as the Life Satisfaction Index (Neugarten & Havinghurst, 1969) the Life Satisfaction in the Elderly Scale (Salamon & Conte, 1982; 1992), and the Life Satisfaction Index Form Z (Wood, 1969). These have proven to be useful and valid indicators of life satisfaction, particularly with older individuals.

The present study will use the Life Satisfaction Index A (Neugarten et al, 1961), which takes into account many components, for example, zest vs. apathy, congruence between desired and achieved goals, etc. Its multi-faceted content makes it very useful in studying life satisfaction among elderly individuals, and it has been shown to be reliable and valid. For example, Neugarten et al (1961) had an experienced clinical psychologist interview 80 of the 177 respondents' who participated in the pilot study and then make his own ratings of levels of life satisfaction. The clinicians' ratings were then correlated to the respondents' LSIA scores resulting in a coefficient of .64. This coefficient reflects correlations in all five domains (Zest, Resolution, Congruence, Self-concept, and Mood tone).

Conceptualization/measurement of health: objective vs. subjective measures.

Many methods have been used to determine the health status of subjects, including, for example, subjective self-ratings, chronic condition/health problem checklists, (activities of daily living) ADL functioning scales, and physician ratings. The diversity of methods to measure both health and life satisfaction suggests there is no universal 'standard' from which to compare results. Nevertheless, the majority of existing studies (Bowling &

Browne, 1991; D'Amato, 1987; Ghush, Hyde, Stevens, Hyde & Teasdale, 1996; Ho, Woo, Lua & Chan, 1995; Willits & Crider, 1988) have found some degree of relationship between health status and life satisfaction, regardless of the method of assessment.

Most of the research that has uncovered a positive relationship between health and life satisfaction (Gizadas, Counte, Glandon, & Tancredi, 1993; Jacob & Guarnaccia, 1997; Moore, 1993; Morris, 1997; Stolar, MacEntee, & Hill, 1992; Willits & Crider, 1988) has conceptualized and assessed health in a highly subjective nature. Few studies have examined the relationship between *objective* health status and life satisfaction. Objective health status refers to so-called "hard" health indicators, such as a list of specific health problems or records of physician usage versus more subjective perceived health measures. Stolar and MacEntee (1992) reviewed seven journals over a five-year period (1987-1991) in order to analyze "the research focus, theoretical bases, research designs, statistical methods and research findings...on the relationship between quality of life and perceived health in the elderly" (p. 8). Based upon this review, it was found that only 17 articles discussed the relationship between objective health status and quality of life or life satisfaction. In the articles that were reviewed, it was generally found that "self-perceived health is significantly related to quality of life for older persons" (p. 14); specifically, higher levels of perceived health tended to be related to a higher quality of life reported by seniors.

Because both *subjective* health status and life satisfaction involve subjective evaluations, they may be more closely aligned with psychological well being or life satisfaction than physical health status. Thus, simply asking an individual to rate his or her own health as excellent, very good, poor, and so forth, is more likely to relate to life satisfaction than objectively-defined health status because both subjective ratings tend to

be influenced by such extraneous factors as levels of social support and psychological state. For example, if two seniors' actual objective health status is held constant, it is plausible that one may report higher subjective health status than the other. Therefore, because objective health status and subjective health status are different constructs, it is important to treat them as such when exploring various relationships.

This is clearly illustrated in Chipperfield's (1993) study which examined the congruence/incongruence between subjective health ratings and health problems reported by older adults. The sample in this study was comprised of 4,303 individuals between the ages of 65 and 111 years. Comparisons were made between subjective ratings of health status and objective health status of the subjects. It was found that "over half of the respondents rated their health more favourably than it appeared on the objective measure". Although the percentage of congruency between objective and subjective health was relatively high, 61% of subjects' health ratings were incongruent with the objective health measures. If a senior overrates his or her health, that is, believes that he or she is healthier than an objective health measure indicates, a benefit may be derived from this incongruence. Strain, Chappell and Blandford (1987) state, "numerous studies now exist that indicate a better subjective rating of health than would be assumed from the more objective measures of disease and disability". Likewise, Stolar, et al (1992) note that when seniors were asked to self-assess the health status of their mouth and teeth, "generally the participants who considered that their teeth and mouths were in good condition, 78.1%, whereas a dentist estimated that only 13.4% of the mouths were healthy" (p. 309). Essentially, this implies that many individuals' subjective self-health ratings do not mirror their health status as measured by objective indicators. As long as there is no confusion over these two conceptualizations of health,

they both have merit in the study of older populations and this calls for research that examines how objective health status is related to life satisfaction.

Health and Life Satisfaction

Prior research has documented a relationship between health and life satisfaction, implying that good health leads to greater satisfaction with life. Two studies which have measured both subjective and objective health are worth highlighting. Gfellner (1989) surveyed 40 adults aged 80-96 (with a mean age of 85.4 years) and assessed health by having the subjects complete health problem checklist (objective health status) and rate their perceived functional abilities. Objective functional abilities were also indexed using the Instrumental and Physical Activities of Daily Living Scales. While correlations between objective health status and life satisfaction approached significance, it was found that only self-perceived health significantly correlated with life satisfaction. This finding underscores the fact that, although related, self-rated health and objective health ratings differ in their association with life satisfaction.

Using data from the Augmented Duke Second Longitudinal Study, including 203 subjects aged 65-87, Hooker and Siegler (1992) examined correlations between health, as measured by self-ratings, objective physician-ratings, and life satisfaction. Self-ratings and objective physician-ratings of health were highly correlated; however, they were differentially related to life satisfaction. A significant positive relationship was found only between life satisfaction and the self-rated health measure. Specifically, the analyses suggest, "...life satisfaction and self-rated health were likely to become increasingly intertwined over the lifespan" (p. 81). This finding that only the subjective measure of health status was significantly associated with life satisfaction calls into question the relationship between objective health and life satisfaction

Life satisfaction and problem-specific health measures. Another area that has been studied is the linkage between *specific* health problems and life satisfaction (e.g., heart attack, arthritis, etc.) that many seniors experience. This highlights how various problems that individuals may encounter as they age could influence life satisfaction thereby contributing significantly to the understanding of this relationship. For example, Stolar, MacEntee, and Hill (1992) examined the relationship between seniors' health assessments of specific health problems and life satisfaction in a stratified random sample of 520 seniors (70-99 years of age) who were living independently in the community. The sample included 51.9 % males, 48.1 % females, and the mean age was 77.1 years old. Life satisfaction was measured both with single-item instruments, along with the widely used Life Satisfaction Index A (Neugarten, Havinghurst & Tobin, 1969). Health was measured with general health self-rating questions (e.g., "How would you describe your health right now? Is it excellent, good, fair or poor?). In addition, information was gathered on ADL functioning and specific health problems (e.g., diabetes, hearing problems, arthritis, high blood pressure) in order to obtain a more objective measure of health status.

In general, Stolar, MacEntee, and Hill (1992) found that seniors' self-assessments of health status were significantly related to life satisfaction. With regard to specific health problems, it was found that functional disorders and/or problems with social interaction and daily functioning had the greatest negative relationship with life satisfaction. Generally, seniors who reported more health problems were more likely to rate their life to be 'not satisfactory'. The authors note, "this study supports the contention that health is related to life satisfaction *and* to an interpretation of the world" (p. 316), which can include such things as perceived social support and social

integration, or perceived control over ones' surroundings. The researchers also stated that "This study indicates that *specific* events, happenings, and/or problems are not reliable indices of self-evaluation of health nor life satisfaction" (p. 316), suggesting that the relationship between health and life satisfaction is not a perfect one, and that there must be other factors influencing life satisfaction. As such, this study suggests that health may not influence life satisfaction directly, and that there are a myriad of other factors that can exert a significant influence on this relationship.

Sources of variation within the health/life satisfaction relationship. It should be pointed out that not all studies investigating the relationship between health status and life satisfaction have uncovered consistent results. This is likely due to factors such as the use of different measurement tools for both life satisfaction and health status and the statistical approaches. For example, Willits and Crider (1988) found some variation in the relationship between health and life satisfaction depended upon the type of measure utilized to assess life satisfaction. In their sample of 1,650 men and women aged 50-55, life satisfaction was examined using several one-item ratings of overall satisfaction, community satisfaction, job satisfaction, and marital satisfaction. Health was assessed using a subjective rating of health from very good (5) to poor (1).

Although their regression analyses revealed that health status was significantly related to all four measures of satisfaction, there was variation in the significance of health rating depending on the satisfaction measure. Specifically, the subjective health rating was found to be most strongly related to overall life satisfaction ($B=.296$, $p<.001$) and most weakly related to marital satisfaction ($B=.070$, $p<.05$). Willits and Crider (1988) state, "the finding of a relatively important relationship between health rating and individuals' life satisfaction leaves unanswered the question of the extent to which

objective health status related to personal feelings of well-being" (p. S176). Factors such as health status, economic status, and social involvement have also been shown to correlate with high levels of life satisfaction and well-being (Markides & Martin, 1979; Meyers & Diener, 1995), although other studies have reported only a very moderate relationship between these variables (Larson, Zuzanek & Mannell, 1985). This suggests that other variables influence seniors' levels of life satisfaction.

Jacob and Guarnaccia (1997) examined a number of other factors that may significantly influence life satisfaction considering both motivation and behavioural correlates of life satisfaction in the elderly. They point out that the relationship between various factors in seniors' lives and level of life satisfaction is not clear-cut. The sample included 97 seniors (75 women and 22 men) between the ages of 60 and 89 with a mean age of 74.43 years. Life satisfaction was measured using the Life Satisfaction in the Elderly Scale (Salamon & Conte, 1982, 1992), a 40-item instrument, and health status was examined with the Rand Health Survey (Ware & Sherbourne, 1992), which is a 36-item instrument that provides information about several aspects of an individual's health (e.g., physical functioning, general mental health, energy/fatigue). It is important to highlight the fact that this health measure is less subjective than health measures utilized in most other studies and, therefore, may be a more accurate measure of a senior's health status. In addition to these two variables, Jacob and Guarnaccia assessed subjects' achievement, affiliation, exercise, number of friends, and number of mastery activities. Intercorrelations between these variables were examined to determine which factors related to level of life satisfaction. Relative to other variables, health status showed the strongest relation to life satisfaction ($r=.45$, $p=.001$), highlighting the importance of this relationship.

Moore, Newsome, Payne and Tiansawad (1993) also examined the topic of health perceptions and life satisfaction from the perspective of gerontological nursing care. Specifically, the researchers were interested in the "theory-research linkage" and they conducted an extensive review of the literature on the relationship between perceived health and quality of life in a senior population 1987-1991. They found that variations across studies in the strength of relationships between health and life satisfaction. While some studies indicated a strong positive relationship between health and life satisfaction (e.g., Simon, 1990; Reed, 1989), other studies failed to find the hypothesized relationships (e.g., Terpstra, 1989). Reasons for these discrepant results may include the instruments utilized to measure life satisfaction and /or health status, the sample utilized, and, most importantly, the influence of unmeasured variables on an individual's level of life satisfaction.

Taken together, the research provides strong evidence that health status is correlated to level of life satisfaction. The expected results have arisen in most studies in the area of health and life satisfaction, regardless of the objectivity of the health measure or of the type of life satisfaction measure utilized (e.g., Bowling & Browne, 1991; Ghushn, Hyde, Stevens, Hyde & Teasdale, 1996; Ho, Lau & Chan, 1995; D'Amato, 1987). That is, the healthier an individual is, or perceives himself/herself to be, the higher the expected level of life satisfaction; conversely, the unhealthier an individual is, the lower is the expected level of life satisfaction.

Less clear, however, is the influence other factors have on life satisfaction, and this can only be adequately addressed using more advanced statistical techniques, such as partial correlation, multiple regression, or model construction. Correlational analyses, although very useful in establishing a degree of association between these variables,

tend to provide oversimplified depictions of the relationship between health and life satisfaction in the elderly.

Modelling approaches to the study of life satisfaction. While zero-order correlations can give an indication of the nature of the association between variables of interest, examining the same variables through the use of regression analyses provides much more detailed information on the interrelationships between a set of variables. One of the relatively few studies that have dealt with the relationship between health and life satisfaction from a model perspective was carried out by George, Okun and Landerman (1985). These researchers utilized a path model to determine the structural determinants of life satisfaction in a sample of adults 18-65+ years of age, which was comprised of 4,254 subjects; 1,500 were 18-54, 154 were 55-64, and 2,600 were 65 years of age and older. Although the primary purpose of this research was to examine the moderating effects of age on life satisfaction, some of the findings are relevant to the present discussion. With regard to health and life satisfaction, the path model indicated that health could be used to predict level of life satisfaction and that the relationship between these variables grew stronger with increasing age. This suggests that as we grow older, our health status has a stronger influence on our level of life satisfaction.

Coke (1991) examined a number of correlates of life satisfaction among a sample of African-American elderly; this sample included 166 seniors aged 65-88 with a mean age of 72.2 years. These subjects were asked a number of open-ended and closed-ended questions assessing life satisfaction, self-rated health, and personal religiosity, along with many sociodemographic items. It was found that self-rated adequacy of income, years of formal education, personal religiosity, sex, and marital status significantly predicted life satisfaction. A notable non-significant finding that emerged was that self-rated health

was *not* significantly related to level of life satisfaction. There are many possible reasons for not finding a significant relationship between self-rated health and life satisfaction; this could be due to an inferior health measure, the sample that was employed, or the measure of life satisfaction that was utilized. A more intriguing possibility is that some other variable that was not assessed in this study was playing a role in the subjects' levels of life satisfaction.

Future directions in the study of health and life satisfaction. One of the most obvious questions that has arisen out of research in this area is, has health and life satisfaction been dealt with too simplistically? Relatively few studies have considered other variables that may influence the relationship between health and life satisfaction. One such variable is the perception of control, or the sense that one can influence and predict outcomes. In fact, an enormous body of literature has examined the influence that perceived control could have upon life satisfaction (Cohen, 1990; Kleinschmidt, 1995; Menec & Chipperfield, 1997; Purcell & Keller, 1989). However, perceived control may predictably react with health status to influence a senior's level of life satisfaction.

Perceived Control and Health Status

A well-established body of literature has arisen in the area of perceived control and health status (Chipperfield, 1993; Kutner & Brogan, 1987; Menec, Chipperfield, & Perry, 1999; Menec & Chipperfield, 1997; Revicki & Mitchell, 1985; Rodin, 1986; Rodin & Langer, 1977; Schulz & Hanusa, 1978). Some studies find support that perceived control influences health (Rodin and Langer, 1977, Suls, 1982) and mortality (Chipperfield, 1993). Other studies, however, find that perception of health may influence levels of perceived control (Menec, Chipperfield, & Perry, 1999). Given the evidence that supports

both views, it is reasonable to assume that this relationship may be bi-directional in nature.

The subsequent review of the perceived control-health link will focus upon several specific areas: the influence of perceived control on health, and the link between perceived control and specific health problems and types of health problems (i.e., crisis and chronic). Prior to this, however, conceptualization and measurement issues will be addressed.

Conceptualization and measurement of perceived control. The concept of perceived control has been closely examined since 1975, and the result of almost three decades of work is an enormous body of literature that encompasses many definitions and conceptualizations of perceived control. Skinner (1996) summarized the many existing constructs of control, and, based upon this work, it becomes clear that "control" means different things to different researchers. For example, researchers have conceptualized the notion of "control" as: "personal control, sense of control, locus of control, cognitive control, agenda control, vicarious control, illusory control, outcome control, primary control, secondary control, action control, predictive control, informational control and proxy control" (p. 549). Although a discussion of each of these conceptualizations is beyond the scope of this thesis, it is worth highlighting those that are relevant to the proposed work.

First, it is critical to differentiate between *objective* and *subjective* control. Skinner (1996) suggests, "the most fundamental distinction in the literature on control is between actual control, or the objective control conditions present in the context and the person, and perceived control, or an individual's beliefs about how much control is

available" (p.551). It is evident that most of the research within the field of control has focused upon the latter definition of control, that is, perceived control.

"Perceived control" is much easier to study than is "actual control" because it is very difficult, if not impossible, to ascertain how much actual control a person has in his or her life. On the other hand, it is very easy to ask people how much control they *think* they have in various areas of their lives. Thus, it is not surprising that perceived control has received a great deal of attention within the field of health and aging. Although actual control is thought to be a significant component of any individual's life, the *perception* of control is viewed as just as important, if not more important, than actual control (Averill, 1973; Burger, 1989; Baltes & Baltes, 1986; Rodin, Timko & Harris, 1990; Skinner, 1996). As Skinner (1996) points out, "many researchers are convinced that perceived control is a more powerful predictor of functioning than actual control" (p. 551), implying that whether or not a person thinks he or she has control over a situation may be more powerful than that person actually having control but not realizing it. This may be particularly true among older individuals because, as we age, we can expect a loss of actual control in several aspects of our lives (Rodin, 1996; Thompson, 1996; Wolinsky & Stump, 1996). Therefore, an individual who can retain a strong belief that he or she has control of a situation may be at an advantage.

Second, it is important to distinguish the concepts of *external* control and *internal* control. The first, and perhaps best, definition of these two constructs comes from Rotter's (1966) learning theory approach. An internal locus of control exists "when people perceive events as contingent upon their own behavior or their own personal characteristics", and external control exists when "...events are perceived as resulting from chance, or the control of powerful others, or as unpredictable" (p.7). Internal locus

of control, for example, could be represented by a belief that physical health is determined, to a large extent, by one's own actions such as eating healthy foods or exercising. External locus of control, in the same situations, could be represented by a belief that one's physical health is determined primarily by a physician. The fundamental difference between these two types of control revolves around the agent by which an individual perceives control to be gained.

A third critical distinction that is relevant to the present study is the one between *domain-specific* and *global* perceived control. An example of a global or general measure of perceived control is Rotter's (1966) global locus of control which distinguishes between internality-externality. By contrast, a *domain-specific* measure of control attempts to measure perceived control *specifically* within some domain or area of an individual's life, such as health. The Multidimensional Health Locus of Control (MHLC) scale (Wallston & Wallston, 1981) is a good example of a domain-specific measure.

Rotter (1975) noted that some research topics may require a domain-specific measure of perceived control, particularly those that predict outcomes in certain domains. In addition, the use of a domain-specific measure is particularly important when the sample being studied is comprised of seniors because older adults encounter many changes, particularly in the areas of health and intellectual function. Rodin et al (1990) note that "...health and intellectual functioning are two areas in which expectancies of personal efficacy may change with old age" (p. 12).

Finally, Shapiro, Schwartz, and Austin (1996) point out that several studies (Steptoe & Appels, 1989; Wallston, 1989) have established that, in some cases, domain-specific measures of control show higher validity than global measures of control, particularly in disease – specific situations (e.g., cancer, diabetes, general pain).

Domain-specific measures have also been found to better predict certain outcomes relative to more global measures. For example, Lachman (1984) determined that domain-specific measures accounted for additional variance being explained when the domain-specific measure was entered in the equation after the general control measure. In spite of the advantage of domain-specific control measures, there may be times when global measures are appropriate. For example, when studying the relationship between perceived control and global life satisfaction, it may be important to assess global perceived control.

The influence of perceived control on health. From initial studies examining the effects of unavoidable shock on laboratory animals (Sklar & Anisman, 1979) to studies of perceived control in humans (Rodin & Langer, 1977), it is clear that control can and does have a striking influence on our health status. It has been established that "...uncontrollability can affect neuroendocrine and immune responses and disease in subjects of all ages" (Baltes & Baltes, 1986, p. 140). In addition to influencing various involuntary biological processes, perceived control has also been found to play a significant role in the face of life threatening diseases such as cancer (Osowiecki & Compas, 1999; Schmale & Iker, 1971) and cardiovascular disease (Fowers, 1994; Steptoe & Appels, 1989). Baltes and Baltes (1986) point out that a lack of control may, in fact, be the root of the development of illnesses of all types, for example, chronic fatigue syndrome (Ray, Jeffries, & Weir, 1997). This is not to say that a lack of control causes diseases; however, it does suggest that a lack of control, including a lack of perceived control, may be one of the many factors that lead to health problems. Similarly, this lack of control has the potential to influence how well, or how poorly, we deal with these various health problems.

Overall, this association between perceived control and health is well established. For example, Mancini (1980) and Brothen and Detzner (1983) both found that individuals with high levels of internal control were, on the whole, healthier than those subjects identified to have higher levels of external control. Although it appears that high perceived control will always result in positive consequences, some contradictory findings have arisen, and a small number of researchers have found no relationship between perceived control and overall health (Hunter, 1979; Wolk, 1976). For a review of these studies, the reader is referred to Rodin, Timko and Harris's (1990) summary of literature on perceived control and health.

A classic control-intervention study by Langer and Rodin (1977) involved the comparison of two groups of elderly subjects in a nursing home. Subjects included 91 residents of a nursing home who had resided there for an average of 3.9 years. These subjects were divided into two experimental groups, a responsibility-induced group which included 47 subjects, and a comparison group which included 44 subjects. The responsibility-induced group was given more control and responsibility in their day-to-day activities, while the comparison group received no such intervention. Among the dependent variables assessed at an 18-month follow-up, the researchers examined health status and mortality rates for the two groups.

The results of this study showed that the seniors who received the enhanced-control intervention were healthier; the intervention group showed a mean increase of .55 on a five-point scale of health rating done by staff, while the control group showed a mean decrease of -.29. In addition to these findings, nurses' reports indicated that "...residents in the control-induced condition showed higher health and activity patterns,

...(and) mood and sociability patterns did not decline as greatly" as those in the comparison group (p. 901).

In an 18-month follow up, it was found that only 7 of the 47 (15%) subjects in the responsibility-induced group (intervention group) had died, while 13 of 44 (30%) seniors in the control group had died. While it is difficult to assume that the control-intervention reduced the mortality rate, it is noteworthy that the mortality rate was double for the control group compared to the intervention group. From these findings, it cannot be concluded that a lack of control will lead to an earlier death, but Rodin (1986) points out that this earlier study suggests that increasing personal control can positively influence psychological and physical health of elderly individuals, particularly those residing in long-term care facilities. Moreover, this control-survival linkage has been supported by subsequent research (Chipperfield, 1993; Menec, Chipperfield & Perry, 1999). Rodin's observation is not at all surprising, given that long-term care facilities are characterized by routine and the elderly residents are faced with a significant loss of control. As a result, perceived or personal control may become much more important to an individual living in such a facility than to an elderly individual who resides independently in the community.

Other studies have also manipulated control to determine the effects on elderly persons (Banzinger & Roush, 1983; Rodin, 1983). For example, in another study conducted by Langer, Rodin, Beck, Weinman, and Spitzer (1979), residents in a long-term care facility were divided into three experimental conditions that provided different levels of control to the residents. Experimenters visited the subjects in the three conditions, informing them about various aspects of the nursing home. If residents correctly remembered this information, they were given tokens that could be redeemed

for gifts. Not surprisingly, the group that was given the most control showed the greatest increases in both memory and overall health status as assessed by the nursing staff.

In another classic study, Schulz and Hanusa (1978) examined elderly individuals residing in a long-term care facility, manipulating the amount of control that these seniors would have over visits from college students. Subjects in this study included forty residents of a retirement home who had health and psychological data collected from them 24, 30 and 42 months after termination of the study. The subjects were divided into four groups; one group had complete control over the frequency and duration of the student visits, two other groups had some control over the predictability of the visits, and a fourth group had no control over visits and essentially served as a baseline comparison.

The group which had complete control over the visits from the university students showed the greatest increases in happiness, activity level, and physical health when compared to baseline measures of these variables. In addition to this major finding, it was discovered that upon termination of the study, those subjects who had the greatest control showed the greatest *decline* in physical health status (as assessed by health-care professionals on a rating scale) as well.

The researchers offer two plausible explanations for this counterintuitive finding. First, the increased control was attributed to unstable, external factors. Therefore, the influence of this intervention would only be temporary. A second explanation suggested that subjects' expectations for a controllable environment were violated when the study was terminated. Schulz and Hanusa point out, "subjects' expectations for controlling important events in their lives may have been raised by interventions and abruptly

violated when the study terminated" (p. 1199). This finding may indicate that sudden and dramatic loss of control will have a negative influence on the physical health of older adults, particularly those seniors who have initially relinquished a significant amount of control.

Although results generally indicate the benefits of increased perceived control, it should be pointed out that once the control intervention has been removed, subjects can experience significantly negative effects. Schultz and Hanusa (1978) comment on this negative influence of the loss of control; "...the loss of control may be more aversive than the initial lack of control". In addition, the ethics of manipulating the amount of control another human being is able to experience must also be questioned. Finally, all of these studies have taken place in long-term care facilities and, therefore, should not be generalized to the elderly adults living independently in the community. Nonetheless, this body of research has provided strong evidence of the *potential* positive influences that increased perceived control can provide to an elderly individual residing in a long-term care facility.

It appears as though an increased level of perceived control can have positive effects on both subjective and objective health status, but, as mentioned earlier, and as Rodin (1986) points out, "...people's preferences for control become increasingly more variable in old age" (p. 1273). Moreover, this relationship between perceived control and health status may become even more significant in an older population because aging is characterized by loss of control (Rodin, 1996; Thompson, 1996; Wolinsky & Stump, 1996). Rodin (1986) points out that, as we age, we will encounter many situations in which our control will be compromised: retirement, bereavement, and reduced physical strength and vigor (p. 150), just to name a few. Any influence that

perceived control may have upon future health problems or recovery periods may, therefore, have an even stronger influence on an elderly person who has already relinquished control in other areas of his or her life. Rodin (1986) also suggests that as we grow older, the relationship between sense of control and health may get stronger. Specifically, Rodin believes that various forms of assistance we may receive in old age (financial, social, emotional, etc) all undermine our feelings of control because having to rely on others to get various tasks completed takes away some degree of control. As a result, the notion of control becomes much more salient to us as we get older. Based on the research done in this area, it is pointed out, "...the health of older people is strongly affected by control-enhancing interventions and control-restricting life circumstances" (p. 1272).

There are countless factors that may influence perceived control, including, for example, age, marital status, and socio-economic status. Moreover, these factors may in turn influence how perceived control affects health. According to Rodin, the additional mediating effects of other variables can also play a role in how control influences the health of an older adult. Personality type, for example, Type A behavior, number of health problems, nature of health problems, and even where an older individual resides can have implications for the relationship between control and health status.

The research interpretations are further complicated because health and perceived control may influence each other in a reciprocal relationship (Lachman & Leff, 1989; Mirowsky, 1997). While not explicitly stated, these studies do present some results that suggest some degree of circularity in this relationship. While higher levels of perceived control have been associated with improved health status, it is possible that having a relatively good health status leads to increased perceived control. For example,

Lachman and Leff (1989) conclude, "health was a significant antecedent of...intellectual control" (p. 722). Thus, it is very difficult to state, with any confidence, the true nature of the direction and strength of the relationship between perceived control and health.

Perceived control and specific health problems/events. The majority of work within the area of perceived control and health has tended to focus upon the role of perceived control in dealing with a pre-existing specific health problem, such as arthritis, or major negative health events, such as heart attack and stroke (Affleck, Tennen, Croog, & Levine, 1987; Chipperfield & Greenslade, 1999; Partridge & Johnston, 1989). For example, Partridge and Johnston (1989) examined the recovery rates of forty subjects, aged 50-85 years, with hemiplegia resulting from a stroke. These subjects were administered a recovery locus of control scale and a disability scale to assess level of disability. It was found that greater internality was associated with a faster rate of recovery, reinforcing the notion that the study of perceived control within specific domains can provide valuable information regarding proposed relationships. For example, specifically assessing an individual's perceived control within his or her health domain may provide greater detail about the relationship between perceived control and health than would an assessment of global perceived control.

Researchers have also examined perceived control as it relates to chronic health conditions common in an elderly population such as rheumatoid arthritis, hypertension, or chronic pain. Affleck, et al (1987) examined how perceived control influences health and adaptation to chronic disease, specifically, rheumatoid arthritis. Although this study does not examine overall health status of the subjects, it does provide useful information on how elderly individuals adapt to a chronic disease. Based upon previous research in this area, Affleck et al hypothesized that subjects who perceived greater personal control

over the arthritis treatment would also show the most positive adaptations to their illness. The sample consisted of 92 adults with a mean age of 50.40 years with a mean illness duration of 9.91 years. Subjects were administered questionnaires that assessed adaption to their illness, control over symptoms and treatment, and general questions about their arthritis. Personal control (e.g., "how much personal control do you have over your symptoms"; "how much personal control do you have over the medical care and treatment of your illness") was measured on a scale from 0 (absolutely no control) to 10 (extreme amount of control). The amount of control of health care providers was also assessed by asking subjects to rate how much control physicians/nurses potentially had over the disease course.

As was hypothesized, researchers found that patients who expressed the most perceived control over symptoms and disease course saw their illness as much more predictable. This finding emerged after controlling for a number of other factors, such as illness severity, income, education, age and gender. In addition, perceiving control over the course of the arthritis was associated with positive mood when compared to patients who perceived low control over their disease course. Affleck and associates concluded, "...patients who reported greater personal control over medical care and treatment expressed more positive mood, and exhibited a more positive adjustment to their illness"(p. 273). It is suggested that this positive adjustment to the rheumatoid arthritis could potentially lead to these individuals taking a more active stance in dealing with disease progression and symptom management by increasing exercise, modifying diet, or taking more steps to involve professional care to help deal with the disease. These findings suggest that when dealing with a pre-existing health condition, an increased level of perceived control regarding the illness can promote adaption. Perceived control

may directly influence overall health status of the individual, or it may indirectly improve the individual's health status as a result of the positive adaption to the given health problem.

In addition to the study carried out by Affleck et al, several other researchers have examined the benefits (or detriments) of increased perceived control over some type of illness or major health event. These studies have examined the effects of perceived control in relation to post-heart attack (Affleck, et al 1987), hip fractures (Furstenberg, 1988), mortality and rates of hospitalization (Menec & Chipperfield, 1997), recurrent cancer (Newsom, Knapp, & Schultz, 1996), and psychological problems such as depression (Brown & Siegel, 1988; Pagel, Becker, & Coppel, 1985). Generally, these studies have found that increased perceived control has a positive influence on physical or psychological problems.

In summary, there are countless studies that point to the importance of perceived control in determining an individual's overall health status. Not only has perceived control been shown to have a positive influence on health, it has also been shown that higher perceived control in the face of some illness or debilitating injury can actually improve an otherwise severe situation. The improvement through high-perceived control can come in the form of reduced recovery time (Furstenberg, 1988; Partridge & Johnston, 1989), shorter hospital stays (Chipperfield & Greenslade, 1999), or an increased perception of the ability to deal with a potentially serious health problem (Boyd, Yeager & McMillan, 1973; Newsome & Knapp, 1996). These studies illustrate how important perceived control can be to the health status of older adults. Specifically, they reinforce the finding that having high-perceived control within the specific area of health and well-being can positively influence some health related domains of a senior's life.

Perceived Control and Life Satisfaction

There is a great deal of variation in the methods employed to study the proposed relationship between perceived control and life satisfaction. In spite of this variation across studies, the results provide support for the relationship between perceived control and life satisfaction (Kleinschmidt, 1995; Knipa, 1980; Purcell & Keller, 1989; Menec & Chipperfield, 1997), fostering an understanding of some of the subtleties that exist in this relationship.

Perceived control and life satisfaction in an elderly population. Before specific studies in the area of perceived control and life satisfaction are discussed, it is important to outline the rationale for a link between these two variables, particularly within an elderly population. As discussed earlier, as an individual grows older, life will become characterized by losses of control in many facets of his or her life. As a result of this loss of *actual* control, having an increased level of perceived control can significantly improve the life situation of an older adult. Life satisfaction is a complex phenomenon that takes into account many aspects of an individual's life. Perceived control is also complex in that we can perceive to have control in many aspects of our lives, such as over our health (Chipperfield, 1993) and social lives (Langer & Rodin, 1976). Thus, many researchers have assessed how perceived control in a specific domain of an individual's life is related to life satisfaction.

The most common type of problems that many of us will encounter as we age will be chronic health conditions. An example of one of the most common problems associated with old age is a loss and/or deterioration of our vision. How we deal with this problem could have a significant impact on many factors of our lives, including life satisfaction. Kleinschmidt (1995) examined this topic in her study of the various impacts

that vision loss would have on an elderly population. Interviews were carried out with 80 relatively healthy (no major debilitating disease or physical problems aside from vision problems) Caucasian adults residing independently in the community. The mean age of the subjects was 78.85 years and the range of ages was from 65 to 91 years. In order to be included in the study, subjects had to have a diagnosis of macular degeneration ranging from minimal (visual acuity in both eyes adding to no greater than 20/100) to severe (visual acuity no better than 20/100 in the better eye). The questionnaires that the subjects were administered evaluated a number of variables, including various sociodemographic information, depression, life satisfaction, overall locus of control, and a domain-specific health locus of control. Two groups were utilized for comparison purposes, a severely impaired group and a moderately impaired group.

Kleinschmidt found that the subjects' locus of control was significantly correlated with life satisfaction. Specifically, she found that the higher the score on the internal locus measure, the greater the corresponding level of life satisfaction. In addition, results indicated that perceived control explained the most variance in the life satisfaction scores of all the subjects, regardless of the level of vision impairment. Kleinschmidt's results suggest that "...having an internal locus of perceived control influences psychosocial responses to vision loss in elders" (p. 65), and that an increased amount of internal perceived control can increase a senior's level of life satisfaction. This is a significant finding, particularly within a sample of older adults who have impairment in such an important facet of life as vision.

Kutner and Brogan (1987) also examined the relationship between perceived control and life satisfaction among elderly individuals undergoing regular blood dialysis. Subjects in this particular study included 42 renal disease patients aged 60 years or

older. They were asked questions regarding details of their renal disease (progression, severeness, etc), treatment preferences, treatment experiences, and a number of sociodemographic questions (e.g., income, sex, etc). In order to assess quality of life, the subjects were measured on life satisfaction, psychological affect, well-being, self-esteem, perceived control, and depressive symptomology.

Interestingly, the results of this study closely mirror the results that were uncovered in the study conducted by Kleinschmidt (1995); an increased level of perceived control was associated with higher levels of life satisfaction. Specifically, it was found that those subjects who indicated the highest level of life satisfaction were those who were able to receive dialysis at home rather than at some medical facility. Kleinschmidt argued that receiving dialysis at home would afford subjects more control over their treatment versus having to leave the home to receive treatment. Receiving the dialysis treatment at home allowed subjects to set their own hours and control the environment surrounding their dialysis treatments. Presumably, this increased perceived control over their illnesses enhanced level of life satisfaction. Because of this, it could be argued that these subjects were better suited to deal with the renal disease. The authors suggest, "...among those who survive and cope with the demands of life on dialysis, satisfaction with life was generally high, and that if the number of older patients able to dialyze at home could be increased, life satisfaction would be enhanced". This study provides suggestive evidence that, in the face of serious illness, an increase in perceived control over the illness can have the potential to exert a positive influence on life satisfaction.

Other studies have examined the relationship between perceived control and life satisfaction in a relatively healthy, non-institutionalized population. This is an important population to examine because unhealthy elderly adults residing in a long-term care

facility may place more emphasis on perceived control than would a non-institutionalized population. Finding a positive relationship between perceived control and life satisfaction in a relatively healthy, independently-living sample of older adults would lend strong support to the generalizability of this relationship to many older adults.

One significant event that occurs in many people's lives is retirement, and the perception of control over this major event has the potential to have a significant influence upon level of life satisfaction. Knippa (1980) examined this very topic in a study involving retired military officers. Knippa sent self-administered surveys to 265 retired military officers whose ages ranged from 40 to 88 years. Among the numerous variables measured in this survey (e.g., sociodemographic variables, skills, service status), subjects were asked whether their retirement was forced or voluntary. Personal control over life events was measured along with subjects' levels of single-item life satisfaction at several points in time over a six-year period to assess any effect that proximity to retirement could have upon other variables of interest.

For approximately the first year after retirement, no significant relationship was found between mode of retirement (i.e., forced versus voluntary) and life satisfaction. However, it was found that two to three years after retirement, a significant relationship emerged between mode of retirement and subjects' levels of life satisfaction. Those officers who had been forced into retirement reported significantly less life satisfaction than those officers who voluntarily retired two to three years earlier. This finding suggests that the amount of perceived control over a significant event, such as retirement, may have a long-term influence on level of life satisfaction. The fact that this relationship was discovered two to three years after the retirement of the officers is interesting in that it took a significant amount of time to pass before this relationship

emerged. In addition, the fact that perceived control over an event that occurred two years previously is a compelling indicator of the powerful influence that perceived control may be able to exert on level of life satisfaction.

It is not only the perceived control over major events that has the potential to influence level of life satisfaction. Some research in this area has indicated that perceived control over 'everyday' happenings can also have an influence on our level of life satisfaction. Purcell and Keller (1989) examined how the level of perceived control over older adults' leisure activities influenced their level of life satisfaction. These researchers reviewed the literature to determine what aspects of leisure activity contributed most strongly to life satisfaction. In the majority of the studies, it was found that the components of leisure that most strongly influenced level of life satisfaction were reciprocity and perceived control. Leisure permeates many aspects of our lives and, undoubtedly, plays an important role in our enjoyment of life on a daily basis. Thus, it is not surprising that the amount of control perceived over leisure can influence overall level of life satisfaction.

There are other researchers who have examined the relationship between perceived control and life satisfaction as they relate to leisure activity. Menec and Chipperfield (1997) examined whether perceived control affects life satisfaction both directly and indirectly (through the interaction with functional status). Subjects in this study consisted of 1,258 seniors (713 women and 545 men) with a mean age of 69.6 years and a range of ages from 67 to 102 (713 women and 545 men). Among the variables that were considered were sociodemographic measures, health status, activity level, perceived control, and life satisfaction.

Through the use of structural equation modelling, it was determined that a high internal locus of control (or high perceived control) was related to a higher activity level, which was, in turn, significantly related to a higher level of life satisfaction. Based on this finding, the researchers state, with some confidence, that perceived control indirectly contributed to the seniors' levels of life satisfaction. In addition to the indirect influence of perceived control, their results also indicated that general locus of control *directly* influenced life satisfaction. This study provides yet another illustration of the potential influence that perceived control can have upon life satisfaction, both directly and indirectly, through the mediating role of exercise and activity. Menec and Chipperfield relay the importance of perceived control in stating, "...the appeal of perceived control is that it can be modified relatively easily, with consequent benefits to physical health, psychological adjustment, and life satisfaction" (p.122).

Both the studies by Purcell and Keller (1989) and Menec and Chipperfield (1997), although differing in approach, indicate the significance of the relationship between perceived control and life satisfaction. Purcell and Keller's review of the literature indicated that the amount of control perceived in relation to leisure activity had a positive influence on level of life satisfaction. The work by Menec and Chipperfield takes this information a few steps further by developing models that provide statistical detail on the relationships between perceived control, activity level, and life satisfaction. The fact that perceived control influences level of life satisfaction both directly and indirectly through other areas of an individual's life underscores the notion that perceived control does not act alone in the relationship with life satisfaction.

In addition to the literature outlined previously, there have been other studies that have examined the relationship between perceived control and life satisfaction

within numerous contexts and situations. For example, this relationship has emerged in studies of newly relocated Chinese immigrants now residing in Canada (Lai & McDonald, 1995) and in lifespan studies using a cross-sectional methodology (Morganti, Nehrke, Hulicka & Cataldo, 1988). In spite of the diversity in methods to measure both perceived control and life satisfaction across these studies, higher levels of perceived control appear to be related to higher levels of life satisfaction.

Exceptions, however, do exist. For example, Kasper and Pearson (1995) found that older people living alone had lower life satisfaction than those older adults who lived with a spouse, regardless of the level of perceived control. As a result, these researchers conclude that marital status or living arrangements explained variation found in levels of life satisfaction. In this situation, it would be entirely plausible for a married senior to report less perceived control than another senior who lives alone, yet the married individual may report higher life satisfaction. Similarly, some researchers have found that age can change the expected relationship between perceived control and life satisfaction. For example, Morganti, Nehrke, Hulika and Cataldo (1988) found that the type of desired control changes with age. Generally, this change is hypothesized to shift from an internal to an external control, and this shift has an influence on life satisfaction. Specifically, perceived control still predicts life satisfaction, but only if external control is considered.

Most of the work that has examined the relationship between perceived control and life satisfaction lends support to the hypothesized relationship between these two concepts. The studies that have found seemingly conflicting results suggest that potentially important variables can influence this relationship. Age, marital status, living arrangements, leisure activity, and health are only a few variables that have been shown

to influence the relationship between perceived control and life satisfaction. Examining this relationship with a broad approach will help to uncover the 'true' nature of this relationship and, as a result, to further refine research within this field of gerontology. One potential way to foster an enhanced understanding of this relationship is to examine the interrelations that may exist between health, perceived control, and life satisfaction.

The Mediational Role of Perceived Control

A relatively recent topic of study within the field of health and aging is the hypothesized mediational role that perceived control may play in explaining relationships. Of particular interest in the present study is the mediating role that perceived control may play in the relationship between health status and life satisfaction. Although this particular mediational role of perceived control has not been explicitly examined, some interesting results have emerged from research that has studied the mediational or buffering role of perceived control within different contexts or models. These studies do not address the possible mediational role that perceived control may have upon life satisfaction; however, they do provide useful knowledge on how perceived control can moderate or buffer other relationships. This information can, in turn, be used to formulate testable hypotheses for the present study. Before discussing the proposed mediational relationship, it is important to define and differentiate between 'mediating' effects and 'moderating' effects.

The distinction between "moderating" and "mediating" effects. The terms "moderator" and "mediator" should not be used interchangeably because they have very different meanings. Essentially, the difference between a moderating variable and a mediating variable revolves around how the variable in question is proposed to influence the dependent measure. Bisconti and Bergeman (1999) point out, "...the mediator

variable functions as the driving force between the focal independent variable and the dependent variable...in essence, mediators explain how or why the effects of interest occur" (p.95). Moderating variables, on the other hand, are much less specific when it comes to describing the relationship between variables. The examination of a moderating relationship will not provide detailed information about the nature of the relationship between the variables in question. A "moderator hypothesis tests the significance of an interaction between (the moderating variable and the independent variable)" (Bisconti & Bergeman, 1999, p.95). The key information that can be derived from the examination of a moderating relationship is the direction and/or strength of the relationship, much like the information that a correlational analysis or an ANOVA will provide (Baron & Kenny, 1986). The examination of a mediational relationship, on the other hand, takes the analysis to a more complex and descriptive level. Rather than just providing an indication of the direction and/or strength of the relationship, a mediational model results in a clear indication of *the degree* to which a proposed mediating variable may influence the relationship between an independent variable and a given dependent measure.

The difference between moderating and mediating variables or relationships becomes more clear when observing a mediational figure (see Figure 2). This representation, formulated by Baron and Kenny (1986), clearly illustrates how the researcher, when examining paths 'c' and 'b' in the mediational model (Figure 2), can observe the strength of the mediating variable between the independent and dependent variables. This is not to discount a moderating variable approach; it just brings to light the different type of information each type of approach will provide the researcher.

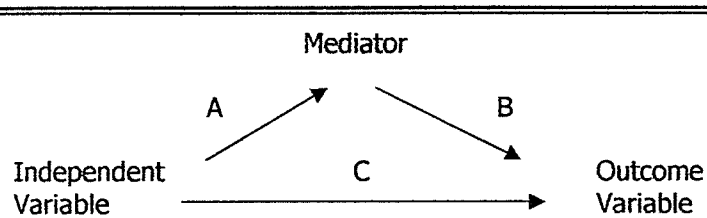


Figure 2 – Mediation Model (Baron and Kenny, 1986)

Evidence of the mediating/moderating power of perceived control. Bisconti and Bergeman's (1999) work lends support to the notion that perceived control exerts a mediating effect on other variables. They examined the relationship between social support and health and well-being outcomes, using the assumption that perceived control would mediate the social support-well-being connection. Although these researchers did not examine life satisfaction, their results are relevant to this discussion because perceived control was a significant mediator in three models that examined the mediating role of perceived control between three types of social supports (friends, family, and perceived support) and level of depression. The authors suggest, "...perceived control in isolation partially enhance(s) successful aging, but examining the process between this (and other independent variables) might pave the way to a better understanding of how they may foster the resilience to a more complete adaptation of the aging process" (p.101). They go on to point out that there is still the need to understand how this mediating role may influence other well-being outcomes. Their documentation of the mediational role of perceived control begins to "illuminate the

necessary process that enables older adults to exhibit resilience, allowing successful adaptation to occur" (p.102).

Chipperfield and Greenslade (1999) examined the possible buffering or moderating role that perceived control may play in seniors' use of health care services. Data on seniors who reported having arthritis was gathered from surveys and from a health registry. After various criteria were examined, a final sample of 240 (82 men and 158 women) was included in the analysis. Subjects had a mean age of 75.34 years and ages ranged from 66 to 98. Among the variables considered for analyses were various demographic variables, health status, level of perceived control, the level of restriction caused by the subject's arthritis, and health care utilization. Of particular interest to the researchers was the possible buffering role that perceived control may play between the amount of restriction caused by the arthritis and the participants' corresponding level of health care utilization.

The results of the study confirmed the buffer hypothesis. Specifically, it was found that seniors reporting relatively low levels of perceived control had higher corresponding levels of formal health care utilization indicated by physician visits, number of lab tests conducted, and hospital stays. However, this relationship was found only for those seniors who reported having high levels of restriction due to their arthritis. There was no significant effect of perceived control on health care utilization for those seniors who reported low levels of restriction. This suggests that the power of perceived control may be stronger under certain conditions, in this case, when a high level of restriction due to arthritis was present. Although there are several explanations for this finding, it suggests that individuals who appear to be in the worse shape (i.e., report the most restriction) are the ones who benefit most from a higher level of perceived control.

Lachman and Weaver (1998) also studied the possible moderating role of perceived control in three large samples of men and women between the ages of 25 and 75 years. The sample included 1,014 (51% men and 49% women), 1,195 (53% men and 47% women), and 3,485 subjects (51% men and 49% women), respectively. Among the numerous variables considered in this study were psychological well-being measures (depression and life satisfaction), health measures (self-rated health, functional limitations), sense of control, and total income. These researchers focused upon the possible buffering effects that perceived control might play in the lives of individuals who come from different social strata. Specifically, high-income versus low-income groupings of subjects were examined.

Based on hierarchical regression analyses, Lachman and Weaver found that the lower income grouping of seniors benefited most from a higher reported level of perceived control. In particular, they found that perceived control acted as a buffer for the negative effects of social class on life satisfaction, perceived health, and depression. Although this study focuses upon the buffering role that perceived control plays in relation to socio-economic status, and is, therefore, not directly relevant to the present study, the demonstrated buffering role of perceived control reinforces the fact that high-perceived control does not have a universally positive influence on all people. As more research is conducted that examines the role of perceived control within a broader 'real-life' context, it will become more and more evident that perceived control benefits some individuals more than others.

Bisconti and Bergeman's (1999) work in the area of the mediational role of perceived control is perhaps the most relevant to the present study. As previously indicated, these researchers examined the mediational role that perceived control played

between social support and two areas in older subjects' lives, psychological well-being (i.e., depression) and perceived health. The sample utilized in this study was comprised of 232 seniors (36.6 % males and 63.4 % females) ranging in age from 65 to 96, with a mean age of 76.22 years. Using a survey, information was collected on social support, perceived social control, depression, life satisfaction, perceived health, and a number of socio-economic variables.

Perceived control did, indeed, play a mediating role between three forms of social support (i.e., friend support, family support, and perceived support) and level of depression. In three regression models, prior to the introduction of perceived control, each type of support significantly predicted depression with beta weights of $-.15$ ($p < .05$) for friend support, $-.16$ ($p < .05$) for family support, and $-.28$ ($p < .001$) for perceived support. However, when perceived control was entered into these regression models, all of these beta weights dropped markedly, two of which became non-significant at $p < .05$. The beta weights after perceived control was added were: friend support $-.01$ (not significant at $p < .05$); family support $-.04$ (not significant at $p < .05$); perceived support $-.17$ ($p < .01$). These findings lend support to the hypothesized mediating role of perceived control.

Although Bisconti and Bergeman's results supported their hypotheses, their findings raise even more questions about the mediational role of perceived control. Bisconti and Bergeman note, "Although the mediational effect was strong, it is not clear how this relationship might promote long-term health and well-being outcomes" (p.101). This is due, in part, to the many additional factors that may influence the strength and direction of the mediational role of perceived control, and there are countless relationships that may be mediated by perceived control in a similar fashion. For

example, perceived control may be a mediator between marital status and depression, health status and depression, or between health status and life satisfaction.

Bisconti and Bergeman (1999), along with other researchers (e.g., Baron & Kenny, 1986; Lachman & Weaver, 1998; Chipperfield & Greenslade, 1999), recognize the implications of establishing useful models to examine moderators and mediators of perceived control. Uncovering significant findings does not simply mean that one researcher's proposed model has statistical validation. Rather, every significant finding in this area adds another piece to the puzzle. As Bisconti and Bergeman (1999) state, "the implications of the mediating effect of perceived control are far reaching" (p.101). This means that identifying and understanding the mediating effects of perceived control has the potential to improve the lives of seniors and society as a whole. That is, demonstrating significant mediating effect(s) of perceived control lays the foundation for future research to examine and uncover other important relationships that are mediated by perceived control.

Several studies indicate that perceived control (Baltes & Baltes, 1986; Menec & Chipperfield, 1997; Rodin, 1986) and control behaviors (Chipperfield, Perry, & Menec, 1999) are complex phenomenon which can have differing results on different people. For example, with regard to control behaviors, Chipperfield et al (1999) found that primary-control strategies such as trying harder/exerting more effort were more adaptive to adults 80 years of age and younger compared to those over 80 years of age. They go on to suggest, "...primary control strategies, although valuable as individuals enter old age, can become detrimental in late life" (p.533).

Chipperfield and Greenslade (1999) also found that only 2-3 % of the variance observed was explained by the control-restriction interaction. Although the authors note that *statistically* this is a rather small percentage, from a practical point of view, this finding has far-reaching ramifications. The authors point out that the estimated cost of a hospital stay for an individual with low perceived control is approximately \$5,348.00, while an individual with a high level of perceived control would cost approximately \$2,175.00. Based upon this difference, it is plausible that having a high level of perceived control (relative to low perceived control) could save more than \$3,000.00 for a senior's stay in the hospital. In the case of Manitoba, which has one of the oldest populations in Canada, this savings to the health care system could total hundreds of millions of dollars a year. This, in turn, would manifest itself with tax reductions and an overall improved economic prosperity for the entire province. Although this is speculative, it does illustrate Bisconti and Bergeman's point with regard to the far-reaching effects of the mediating effects of perceived control.

This body of research does suggest that perceived control can play a significant mediating role between many aspects of a senior's life. A more complete understanding of this role could then translate into savings on our overstressed health care system, increased independence for seniors residing in the community, and most important of all, improving life satisfaction and quality of life for all seniors in our country. It is the primary focus of the present study to examine the mediating role that perceived control may exert between health status and life satisfaction.

The Present Study

The central objective of the present study was to examine the mediating role of perceived control between health status and life satisfaction. Although this *particular*

model has not been examined, there has been a great deal of research that lends support to various components of this model. In particular, the foundation for the present study comes from the previously reviewed research in the areas of health and life satisfaction; health and perceived control; perceived control on other outcomes relevant to and including life satisfaction; and the mediational test of the role of perceived control.

Summary of relevant literature. There are three major points that are most relevant to the proposed work. First, the literature generally suggests there is a positive relationship between overall health status and life satisfaction (Bowling & Browne, 1991; D'Amato, 1987; Gfellner, 1989; Ghush, Hyde, Stevens, Hyde & Teasdale, 1996; Jacob & Guarnaccia, 1997; Moore, Newsome, Payne, & Tiansawad, 1993; Stolar, MacEntee & Hill, 1992; Willits & Crider, 1988). These associations are typically indicated by partial or zero-order correlation matrices, and this does *not* allow for an inference for a causal relationship. Second, in the majority of studies, the association between perceived control and health status has also been found to be positive in nature (Affleck, Tennen, Pfeiffer & Fifield, 1987; Chipperfield, Perry & Menec, 1999; Rodin, 1986; Rodin, 1983; Rodin & Langer, 1977; Schulz, 1976).

Third, the relationship between perceived control and life satisfaction has been established in the literature (Eizenman, Nesselroade, Featherman & Rowe, 1997; Langer & Rodin, 1976; Menec & Chipperfield, 1997; Stirling & Reid, 1992). The classic study by Schulz and Hanusa (1978) in which an increased level of perceived control (in this case, control over visits from university students) translated into a higher level of life satisfaction is perhaps the most illustrative of the potential influence that perceived control can exert upon well-being or life satisfaction. Although a causal relationship has

not been established in this area, it is generally accepted that higher levels of perceived control lead to higher levels of life satisfaction.

The mediating role of perceived control. The existing research provides a foundation for studying the relationship between health status, life satisfaction, and perceived control. As discussed earlier, the terms 'moderating' and 'mediating' have very different connotations, and there is evidence that perceived control plays both roles. For example, Bisconti and Bergeman's (1999) study provided evidence that perceived control mediated the relationship between social support and depression. Other studies which have examined the interactive or *moderating* role of perceived control, although not directly related to the present study, nonetheless provide evidence that perceived control interacts with other variables to significantly influence dependent variables, such as health and mortality (Menec & Chipperfield, 1997) and the use of formal health care services (Chipperfield & Greenslade, 1999). Examining these studies from a broad point of view, regardless of approach (i.e., mediating vs. moderating), suggests that perceived control has the potential to influence many relationships.

In addition to examining the central research question regarding how perceived control mediates the relationship between health status and life satisfaction, several other issues were considered. This served to assess whether this proposed mediational role of perceived control differs depending upon: how perceived control is measured (global versus domain-specific measure of perceived control), how health status is measured (objective versus subjective measures), age (young-old versus old-old), and level of reported leisure activity (low versus high). All of these issues were expected to influence the mediational relationship. Finally, various health/life satisfaction paradoxical relationships were considered in order to consider why some people with good health do

not report relatively high levels of life satisfaction, whereas why some with poor health may report high levels of life satisfaction. In summary, four hypotheses and two research questions were addressed.

Summary of hypothesis and research questions. The first, and most general hypothesis in this study involved the role of perceived control between health status and life satisfaction. There have been several studies which indicate that an increased level of perceived control can help an older adult better deal with specific health problems or disabilities by reducing recovery time and enhancing life satisfaction (Kleinschmidt, 1995; Kutner and Brogan, 1987). In addition, there have been several other studies that have found perceived control to be a significant mediator or buffer in a given relationship (Bisconti & Bergeman, 1999; Chipperfield & Greenslade, 1999; Lachman & Weaver, 1998; Baron & Kenny, 1986). Although none of these studies examined the mediational relationship upon which the present study is focused, Bisconti & Bergeman (1999) did find that perceived control acted as a mediator between social support and depression, social status and well-being, and level of restriction and formal health care usage. Based upon the findings, it was expected that perceived control would act as a significant mediator between health status and level of life satisfaction.

The second hypothesis tested in the present study involved the distinction between general and domain-specific measures of perceived control. It was expected that the domain-specific indicator of perceived control (i.e., perceived control over the health domain) would prove to be a more powerful mediator of the health-life satisfaction relationship than the global indicator of perceived control. The rationale behind this hypothesis is derived from the type of study being conducted and the population utilized for the present study. In particular, Rodin et al (1990) point out,

"domain-specific measures of perceived control may be more appropriate for use with the aged than generalized measures" (p.11), and other researchers (Lachman, 1984; Rodin, 1996; Shapiro et al, 1996) suggest that domain-specific measures of perceived control will elicit more valid results. In addition, Lachman (1994) suggests that when the goal of research is to predict the nature of some relationship, domain-specific measures may provide more accurate results, assuming that the appropriate domain of control is being assessed. Because a health domain-specific measure is available in the data, it is reasonable to expect a stronger mediating role of perceived control when this domain-specific measure is used to examine this relationship.

Third, the question of whether this mediational relationship exists regardless of the type of health measure was addressed. As outlined in previous sections, there exists some debate as to what type of health measure most accurately reflects *actual physical health status*. Due to the inherent differences between objective and subjective measures of health, they may differ in terms of what they are actually assessing. Because both life satisfaction and subjective health measures reflect personal evaluations, it may be that the subjective health measures relate differently to life satisfaction than does objective health status. It was the purpose of this research question to explore whether the mediational role of perceived control is similar regardless of whether it is tested using the subjective (self-rated) or the objective measures of health.

An additional hypothesis of the present study involved the 'power' that perceived control would have as a mediator between different age groupings of seniors. In particular, it was expected that perceived control would prove to be a stronger mediator for those subjects who are classified as 'old-old' compared to those who are classified as

'young-old'. The underpinning logic of this hypothesis can be found in Rodin's (1986) suggestion that many factors will serve to compromise our control in one way or another, particularly as we enter old age, and in Chipperfield & Greenslade's (1999) examination of perceived control as a buffer in the use of health services among older adults. In Chipperfield and Greenslade's study, less perceived control was associated with higher levels of health care usage (e.g., physician visits, laboratory tests, hospital stays). However, this relationship was only found in those seniors who reported to be restricted by his or her arthritis. This finding suggests that perceived control likely plays a more powerful role with those individuals who are more highly restricted due to disease, disability, or age. Obviously, age-related restriction can be caused by any number of factors associated with old age, such as decreased mobility, loss of muscle strength, decreased income, retirement, and bereavement. Simply put, as we age, generally, level of restriction will also increase. Therefore, with increasing age comes increased restriction, and because an increased level of perceived control appears to benefit those who are restricted, it was reasonable to predict that perceived control would benefit the old-old more than it would benefit the young-old.

The final hypothesis suggests that the mediational effect of perceived control differs based upon the number of leisure activities reported by participants. It was expected that perceived control would prove to be a stronger mediator for those participants who report a relatively lower number of leisure activities versus those participants who reported a higher number of leisure activities. It has been observed by other researchers (Menec & Chipperfield, 1997; Purcell & Keller, 1989) that in many cases, a high activity level has been equated with a *higher* level of perceived control. However, it is very often those individuals with *lower* levels of perceived control that tend

to be most influenced by perceived control in various areas of their lives (Langer & Rodin, 1977; Rodin, 1986). For this reason, it was assumed that participants reporting lower numbers of leisure activity would have lower levels of perceived control. This in turn was expected to manifest itself in a greater mediational effect in the group reporting lower numbers of leisure activities.

The final question to be examined in this study is related to the 'paradox' that may exist between health status and life satisfaction. Specifically, what characteristics explain why some individuals report *high* life satisfaction despite *poor* health, or conversely, why other individuals report *low* life satisfaction despite having relatively *good* health? Characteristics were examined for two paradoxical groupings of subjects, one group that has a high level of health status and a low level of life satisfaction, and another that has high health status and a corresponding low level of life satisfaction. Although the interest was in these two paradoxical groups of subjects, two other groups were also examined: those who report high life satisfaction and have good health, and those subjects who report low life satisfaction and have poor health status. Because there has been no research to draw upon for this particular question, an exploratory approach was employed that will look for unique underlying variables that may be contributing to this paradox.

To summarize, the present study tested four hypotheses and examined two research questions.

- 1) It was expected that perceived control would act as a significant mediator between health status and life satisfaction (Hypothesis one).

- 2) I was expected that domain-specific indicator of perceived control (i.e., perceived control over the health domain) would prove to be a more powerful mediator of the health–life satisfaction relationship than the global indicator of perceived control (Hypothesis two).
- 3) Do subjective and objective health measures have an influence on the power of perceived control as a mediating variable? (Research question one)
- 4) It was expected that the ‘power’ of perceived control as a mediator of the health–life satisfaction link would be more evident in the old-old than in the young-old subjects (Hypothesis three)
- 5) It was expected that the mediational role of perceived control would be stronger for those seniors reporting fewer leisure activities than those seniors who report a relatively higher number of leisure activities (Hypothesis four)
- 6) What factors distinguish between subjects with differing levels of life satisfaction and health status, that is, subjects with high life satisfaction and high health status, low life satisfaction and low health status, high life satisfaction and low health status, and low life satisfaction and high health status? (Research question two)

Method

Dataset

The Aging in Manitoba (AIM) project. The dataset utilized in this study was the Aging in Manitoba Study 1996 (AIM 1996) which had a sample size of $n=1868$. The AIM study is one of the largest cross-sectional and longitudinal studies on aging that has even been carried out, and has data on nearly 9,000 seniors. Subjects from Winnipeg and surrounding areas and municipalities (e.g., Brandon, Selkirk) were interviewed (through in-person interviews) for the first time in 1971, 1976, 1983-84, with follow-up data collected in 1990, 1996, and 2001. The value in the Aging in Manitoba data is evident from the large body of research arising out of it. Several factors make this dataset so valuable: first, 1359 participants are over 80 years of age, and thus allows for the study of a hard to reach age group (i.e., the oldest-old). Second, the AIM data has been merged with mortality and health service utilization data which provided details not seen in other longitudinal studies (Chipperfield, Havens, & Doig, 1997). Finally, the sampling method utilized in the AIM Study (stratified area-probability random sampling) results in a study sample that was representative of the larger sample which allows for a great degree of generalizability. A more detailed description of the Aging in Manitoba Study and its procedures can be found in Chipperfield et al (1997).

The issue of secondary analysis. It should be pointed out that the present study represents a secondary analysis of pre-existing data. There are both advantages and disadvantages to this approach, particularly in relation to the dataset being utilized in this study. Working with secondary data does provide some shortcomings that are very difficult to work around during the analytical phase. For example, the measurement of objective health involved asking subjects to respond "yes or no" to a health problem

checklist, that is, indicating whether or not they experienced the health problem in question. One problem with this particular measure is that it only accounts for *number* of health problems. As a result, an individual experiencing severe debilitating arthritis (one health problem) will appear healthier than an individual who may have minor sight, hearing, and skin problems. Having an indication of the level of restriction due to health problems would have been much better, but this was not assessed at the time of the interview.

Shortcomings aside, there are positive aspects to working with a secondary dataset. For example, very large sample sizes ($n = 1868$), the longitudinal nature of the data collected, along with the proven quality of the ongoing Aging in Manitoba Project (Chipperfield et al, 1997) all provide strong points in favour of the utilization of a pre-existing dataset for analysis of this subject.

As with any use of data, ethics approval was necessary in order to conduct this study. Consideration for ethical approval followed the University of Manitoba guidelines, and ethical approval was received from the Faculty of Arts (psychology) (see Appendix B)

Variables

The variables that were considered in this study can be classified into four sub-categories which will be dealt with separately: sociodemographic variables, major independent variables, mediating variables, and the dependent measures. A descriptive summary of these variables can be found in Table 1.

Sociodemographic variables. In addition to the primary variables of interest, numerous sociodemographic variables were considered. Gender (1=male, $n=745$; 2=female, $n=1123$) and age were self-reported, and although most analyses used the continuous age variable, some utilized a dichotomized age variable ('young-old' = 79

years and younger, $n=716$; old-old = 80 years of age and older, $n=1117$). Other variables include self-reported *marital status* (married, single/widowed/divorced-separated) and *years of formal education*, derived from a question that asked "How many grades did you complete in school"?

The amount of *social contact* subjects experienced was assessed through the use of five- items in the survey. Individuals were asked "Of the relatives (including any in household) you feel closest to, how many relatives do you see or talk to..."; 'everyday' (1), 'once a week' (2), 'a few times a month' (3), 'once a month' (4), and 'less often than once a month' (5). These 5-items were summed to create an indication of total 'meaningful' social contact experienced on a regular basis.

Total monthly income was obtained by summing subjects' reports of income from three possible areas: subjects' own resources (e.g., private pensions, wages), pensions or allowances (e.g., old age security, Guaranteed Income Supplement, Canada Pension Plan, tax credits), and other sources (e.g., regular cash from children, service groups, or some private agency). In addition, subjects' perceptions on '*income adequacy*' were also considered by asking; "Can you tell me how well you think your income and assets currently satisfy your needs? (very well = 5, adequately = 4, with some difficulty = 3, not very well = 2, totally inadequate = 1).

Physical functioning, religion and cognitive variables. Also included was subject's level of *physical functioning* on daily instrumental activities of daily living (IADL). This includes such things as being able to: (do light housework, do heavy housework, make a cup of tea or coffee, prepare a hot meal, do yardwork, go shopping, manage financial matters, do laundry and do major household repairs) Subjects responded to this list of activities, and were given a score of 1 for each task they reported being able to carry out

without any assistance. The scores were then summed to create a total level of physical functioning score. Thus, the more activities that a respondent reported being able to do without assistance, the higher this individual's physical functioning score would be.

Total number of *leisure activities* were assessed from subjects' responses to a series of questions about whether or not they participated in a list of 21 activities (i.e., visit family, visit friends, talk to friends on phone, watch tv, walk, gardening, other yardwork, collecting hobbies, handwork hobbies, sports or games, church activities, music, read, social multi-age recreation, social groups for elderly, legion activities, volunteer work, political activities, mass activities, travel and work) . For example, subjects were asked if, in the past week, they walked, went shopping, played sports or games, did any hobbies, read, did volunteer work, etc (no = 0, yes=1). These responses were then summed across items to create a total leisure activity score ($\alpha = .72$). Using a median split, this leisure score was divided into 'high' ($n=777$) and 'low' ($n=855$) leisure to create two groups of subjects.

Independent variables. For the purposes of this study the major independent variable, *health status*, was assessed using two different measures. *Subjective health* was assessed with a single-item health rating (1 = excellent, 5 = bad): "For your age, would you say your health is..." "Excellent (never prevents activities)", "Good (rarely prevents activities)", Fair (occasionally prevents some activities)", "Poor (very often prevents many activities)", and "Bad (health troubles or infirmity all the time prevents most activities, or requires confinement to bed)". Subjects' responses were subsequently reversed-coded which resulted in a rating of health from 1 (poor) to 5 (excellent).

A health problem checklist was also utilized to assess *objective health*. This checklist consisted of 18 items that required respondents to indicate whether they had

experienced one or more of the listed health problems "within the past year or still have after effects of having them earlier" (no = 0, yes = 1). Responses of 'yes' to such problems as; "heart and circulation problems", "diabetes", "eye trouble not relieved by glasses", etc, were summed, resulting in a score that indicated the number of reported health problems. Thus, higher health scores reflect more problems and therefore poorer health.

Mediating variables. In this study, perceived control was the mediating variable and was expected to account for some degree of the relationship between health and life satisfaction. Perceived control was examined from two distinct perspectives: *global* perceived control and *domain-specific* perceived control. First, *global perceived control* was measured using five items that required respondents to rate how much control they feel with regard to: physical health, thoughts and feelings, leisure pursuits, everyday tasks, and life in general (1= almost no control; 10 = almost total control). A total global perceived control score was created by summing over these five items ($\alpha = .80$).

Second, the *domain-specific* measure was used specifically to assess locus of control within the domain of *physical health*, which reflects an extension of Rotter's (1966) notion of internal locus of control. In particular, Wallston, Wallston, Kaplan and Maides's Health Locus of Control (HLC) Scale was used which required a response on a six-point scale ranging from 1 (strongly agree) to 6 (strongly disagree) to five statements: "If I take care of myself I can avoid illness; whenever I get sick it is because of something I've done or not done; when I feel ill, I know it is because I have not been getting the proper exercise or eating right; people's ill health results from their own carelessness; I am directly responsible for my health". These five items represented a shortened version of the original 11-item Health Locus of Control Scale. Responses to

these items were summed, resulting in a score that indicated total perceived control within the health domain, with a higher score indicating a higher level of perceived control over one's physical health ($\alpha = .68$).

Dependent measure: life satisfaction. The dependent measure in this study is life satisfaction, which was assessed with both a single-item and a multiple-item measure. The single-item measure asked respondents: "How would you describe your satisfaction with life in general at present?" (1=excellent, 2=good, 3=fair, 4=poor, and 5=bad).

The multiple-item measure was Neugarten, Havinghurst, & Tobin's (1961) Life Satisfaction Index A (LSIA), which has been utilized in many studies (Broe, Jorm, Creasey, Grayson, Edelbrock, Waite, Bennett, Cullen & Casey, 1998; Chipperfield & Havens, 2001; Ghush, Stevens & Attasi, 1998; Morgan & Bath, 1998; Steinkamp & Kelly, 1987). The LSIA is a 20-item measure ($\alpha = .91$) that requires respondents to agree or disagree to various statements (e.g., "These are the best years of my life"; "This is the dreariest time of my life"). Scores of "1" were added together across all twenty items to produce a total life satisfaction score that could range from 0 (extremely low life satisfaction) to 20 (extremely high life satisfaction). A complete list of the LSIA, along with the scoring key can be found in Appendix B.

Paradox group variable. In order to identify paradoxical groupings of subjects based upon life satisfaction and health status, categorical variables of both life satisfaction and health were created by classifying individuals using a median-split procedure. The multiple-item objective health score and the multiple-item indicator of life satisfaction were selected to create the paradox groups because these scores provided a large statistical range. This resulted in four groups, two non-paradox groups:

good health/high life satisfaction ($n=386$) and poor health/low life satisfaction ($n=331$); and two paradox groups: good health/low life satisfaction ($n=488$) and poor health /high life satisfaction ($n=228$).

Analytic approach. The proposed research hypotheses and questions were addressed using a secondary analysis of existing data. These analyses included the previously described variables from the 1996 Aging in Manitoba dataset.

The major analyses focused upon the hypothesized mediational role of perceived control in the relationship between health status and life satisfaction. There are a number of conditions that must be met to consider the mediational role of perceived control. Baron and Kenny (1986) state, "a given variable may be said to function as a mediator to the extent that it accounts for the relation between the predictor and the criterion" (p. 1176). However, it must be pointed out that a mediator does more than simply account for the relationship between two variables. They outline three conditions that, if met, determine whether a variable in a given model is acting as a mediating variable:

- 1) Variations in levels of the independent variable significantly account for variations in the presumed mediator .
- 2) Variations in the mediator significantly account for variations in the dependent variable.
- 3) When 1 and 2 are controlled, a previously significant relationship between the independent and dependent variables is no longer significant

The analytic approach for examining the mediational role of perceived control involved a series of forward stepwise regression analyses. This approach has been used

by Bisconti and Bergeman (1999) in their assessment of the role of perceived social control as a mediator between social support, well-being, and perceived health. As variables are entered into the equation, the amount of variance to be explained decreases for each variable entered thereafter. The regression models in the present study involved two steps; in the first step, the sociodemographics and the health status variable was entered, and in the second step, perceived control was added to the model. This allowed for a direct comparison of the models before and after the effects of perceived control were added into the equation. Each regression model was tested for the entire sample, along with separate analyses for subgroups differing in: leisure participation (low, high) and age (young-old vs. old-old).

In order to obtain consistency across all models in the study and to allow for cross-model comparisons, one method was used to select predictors for the regression models. All variables shown in Table 1 were examined in a correlation matrix with the two major dependent measures (LSIA score and single-item life satisfaction). Using a statistical approach similar to other researchers (Chipperfield, Perry, and Hladkyj, 2000) all those variables that correlated at $r=.15$ or higher with either dependent variables were included in all the regression models. As a result, age ($r=.33$, $p=.000$), years of formal education ($r=.15$, $p=.000$), self-reported income adequacy ($r=.25$, $p=.000$), level of IADL functioning ($r=.46$, $p=.000$), and total number of leisure activities ($r=.44$, $p=.000$), and were included in the regression models.

Results

A total of eight regression models were tested for each of the mediational hypotheses and the one research question that examined the effects of health status and perceived control on life satisfaction. A graphical representation of the difference between all models tested can be found in Figure 3. As shown in Figure 3, the *shaded* cells indicate that the corresponding variable was included in the model, while an *unshaded* cell indicates that the variable was *not* included. Models 1 through 4 included the single-item life satisfaction measure as the dependent variable, whereas Models 5 through 8 included life satisfaction as assessed by the LSIA. In addition to the difference in the major DV, the models also differed based upon health status and perceived control measures. Models 1, 2, 5, and 6 examined *objective* health status, while Models 3, 4, 7, and 8 examined *subjective* health status. With regard to perceived control, Models 1, 3, 5, and 7 assessed *global* perceived control, while Models 2, 4, 6, and 8 assessed *domain-specific* perceived control.

Although the results of regressions that used the LSIA as a dependent variable (Models 5 through 8) are provided in Appendix A, for simplicity, only the findings from Models 1 to 4 are presented in the text. This decision was based on a correlational analyses (Table 2) that indicated that the single-item life satisfaction variable correlated more highly than LSIA with both the objective health variable ($r = -.226$, $p = .000$) and the subjective health variable ($r = .389$, $p = .000$). For this reason, the single-item life satisfaction measure was used as a dependent measure in all the regression models. The fact that such a weak relationship was found with regard to the LSIA is somewhat perplexing. The LSIA was created in 1969, and perhaps the items do not capture areas that are relevant to life satisfaction in seniors today.

Before the results of the regression analyses are presented, it is important to briefly touch upon the statistical pre-conditions that must be established when considering any given mediational relationship.

Pre-conditions of Mediational Models

It has been pointed out by some researchers (Baron & Kenny, 1986; Bisconti & Bergeman, 1999) that an important "pre-condition" of mediation must be addressed prior to the testing of any mediation model. This pre-condition involves the ability of the major independent variable to significantly predict the mediating variable within a mediational model. In the present study this would involve testing the ability of health status to significantly predict level of perceived control. It was found that all of the measures of health status significantly predicted perceived control. Specifically, *objective health* significantly predicted both global ($B = -.336, p = .000$) and domain-specific perceived control ($B = -.152, p = .000$), and subjective health significantly predicted both global ($B = .371, p = .000$) and domain-specific perceived control ($B = .214, p = .000$). Having met this pre-condition of mediation, the results of the mediational models can be discussed.

PC as a Mediator of the Health-LS Relationships in the Overall Sample

Table 3 provides the results of a series of two-step regression models that were utilized to assess the mediational effect of perceived control in the overall sample. The first step included all of the sociodemographics and the leisure activity variable because it is important to control for the effects of other variables. Step 1 also included the health variable to assess the predictive value of health on life satisfaction. In the second step, perceived control was added into the regression models. This analyses provides information not only on the influence of perceived control upon the dependent measure

(life satisfaction), but on the mediational effect of perceived control on the health-life satisfaction relationship.

As shown in Table 3, the results for Models 1 and 3 suggest a strong mediational effect of global perceived control in the health-life satisfaction relationship. The F-Change ($F\Delta$) statistic in Step 2 indicates a highly significant increase in R^2 for Model 1 ($F=34.16$, $p=.000$) and for Model 3 ($F=23.32$, $p=.000$). For both models the beta weight values for health status also drop as a result of adding PC to the regression model in Step 2, $-.168$ to $-.135$ for Model 1; $.289$ to $.260$ in Model 3, and the significance level of the t-values remains unchanged at $p=.000$. Finally, the addition of perceived control in the second step results in a significant increases in R^2 and the change in R^2 was significant, ($F=23.32$, $p=.000$ in Model 3; $F=34.16$, $p=.000$ in Model 1).

Regarding the assessment of the beta weight for health, there is slight decrease in the standardized Beta-weights of health status after perceived control is added to each of the models; however, the related t-values do not become significant if previously *non-significant*, nor do they increase significance if previously *significant*. Although a drop in significance of t would be ideal and indicative of a very strong mediational effect, the drop in beta weight, coupled with the significant increase in R^2 does point to an appreciable mediational effect of perceived control between health status and life satisfaction. To summarize, Table 3 provides evidence of a mediational effect (Bisconti & Bergeman, 1999), including a significant increase in R^2 after the addition of perceived control (Models 1 and 3), a decrease in the beta weight of health status (Models 1 through 4), and a significant beta weight of perceived control in the second step of the regression (Models 1 and 3). This analysis provides a broad overview of a mediational effect of perceived control on the health-life satisfaction relationship. The next sections

provide additional insights into the possible differences in the mediational role of perceived control, depending on the type of perceived control measure and health measures.

Global versus domain-specific PC measure. Table 3 can be used to examine the prediction that domain-specific perceived control would have a stronger mediational effect than the global indicator of perceived control. This involved testing the mediational effect separately using the domain-specific measure of perceived control (i.e., perceived control within the health domain) and a global measure of perceived control. A stronger mediational effect for the domain-specific over the global measure of perceived control would be supported by a relatively *greater* R^2 increase for Models 2 and 4, a *greater* R^2 value and a greater *decrease* in the beta weight of health status after perceived control was added to the model.

Table 3 shows that the *global* measure of perceived control appears to act as a significant mediator in the health-life satisfaction relationship. For Models 1 and 3 which include the global perceived control measure, all of the conditions are present which indicate a strong mediational effect. In both cases, there are highly significant increases in R^2 after perceived control is added to the model (Model 1 $F\Delta=34.16$, $p=.000$, Model 3 $F\Delta=23.32$, $p=.000$) and the beta weight for health status *decreases* as a result of adding the global perceived control measure to the regressions in Step 2. The Model 1 health beta drops from $B= -.168$ to $B= -.135$, and the Model 3 health beta drops from $B= .289$ to $B= .260$ (associated t-values all at $p=.000$).

In contrast, Models 2 and 4 (Table 3) that used the domain-specific measure of perceived control did not indicate any significant mediational effect of PC. The only indication that domain-specific PC *may* have a mediational effect lies in the very small

decreases in the beta weights of health status that resulted from adding perceived control to the models ($B = -.172$ to $B = -.169$ in Model 2) and, ($B = .298$ to $B = .296$ in Model 4). The t-values associated with these betas have a $p = .000$. There are no other indications of a mediational effect of domain-specific perceived control in these models. As a result, this hypothesis must be rejected.

Objective versus subjective health measures. The results in Table 3 can also be used to consider the hypothesis that the difference in the mediational effect of perceived control would differ depending upon the nature of the health measure (objective versus subjective). These results do not indicate any consistent differences in the mediational effect of perceived control based upon the nature of the health status variable. In two of the models, 1 and 3 (Table 3), there is evidence of a significant mediational effect; in both cases there is a highly significant $F\Delta$ statistic (Model 1 $F\Delta = 34.16$, Model 3 $F\Delta = 23.32$, both at $p = .000$), a drop in the beta weight of health after PC was added to the models ($B = -.168$ to $B = -.135$ in Model 1, and $B = .289$ to $B = .260$ in Model 3), and relatively high R^2 values for both of these models (both of which utilized a global perceived control measure). However, Model 1 contains objective health, whereas Model 3 contains subjective health. Thus, it is difficult to state with any certainty that perceived control has a stronger mediational role with one type of health measure than the other. Also, while the model using the objective health measure shows a much stronger $F\Delta$ statistic than the one using the subjective health measure, the Step 2 R^2 value in the latter case is stronger ($R^2 = .210$ versus $.172$). These conflicting findings make it impossible to claim that one type of health measure elicits a stronger mediational effect of perceived control than the other.

PC as a Mediator of the Health-LS Relationship: The Role of Participant Characteristics

In addition to the examination of mediational differences based upon variables in the regression models (i.e., health and perceived control), differences in the mediational effect of perceived control due to *participant characteristics* (i.e., age and leisure activity), were also considered. Although both of these variables were originally measured as *continuous* variables, they were dichotomized for these analyses. Age was converted into 'young-old' and 'old-old', while number of leisure activities were converted into 'low' and 'high'.

The role of age in the mediational effect of PC. This hypothesis examined the prediction that the mediational role of perceived control would be more evident in the old-old than in the young-old subjects. Using the same regression models as previously described, the analyses were conducted separately for the young-old (Models 1 to 4; Table 4) and old-old (Models 1 to 4; Table 5) age groupings, rather than including age as a predictor as was done with the previous analyses. Although these two groups are being compared in this hypothesis, the results of each group will first be described separately. In order to emphasize the mediational effects and simplify the interpretation, the remaining tables contain only health and perceived control which are mediational analyses. Thus, although not shown in subsequent tables, Step 1 also included the additional independent variables as are shown in Table 3.

For the young-old group (Table 4), there is a strong mediational effect in Models 1 and 3, and no such effect in Models 2 or 4. This mediational effect is illustrated by the large and significant increase (as quantified by the $F\Delta$ statistic) in R^2 in Model 1 ($F\Delta=17.11$, $p=.000$) as well as in Model 3 ($F\Delta=12.93$, $p=.000$). In addition, in both of these models, the beta weight of health *decreased* as a result of the addition of

perceived control into Step 2 of the regression model (Model 1: Step 1 $B = -.192$, Step 2 $B = -.150$, Model 3: Step 1 $B = .267$, Step 2 $B = .226$). In both of these cases, the significance level of the t associated with the beta values did not change ($p = .000$). The beta-weights of health also decreased in Models 2 and 4; however, the lack of a significant increase in R^2 from Step 1 to Step 2 (Model 2 $F\Delta = 2.67$, Model 4 $F\Delta = 1.55$) is inconsistent with a mediational effect of perceived control for the young-old.

As shown in Table 5, which provides the results for the old-old, the mediational effect of perceived control appears to be strongest in Models 1 and 3, while there is less evidence of mediational effects in Models 2 and 4. Model 1 shows a strong R^2 value ($R^2 = .171$) as well as a highly significant increase in R^2 from Step 1 to Step 2 ($F\Delta = 17.92$, $p = .000$). In addition, the beta weight of health status decreases from the first to the second step (Step 1: $B = -.149$, $p = .000$, Step 2: $B = -.122$, $p = .000$). Model 3 also shows this same pattern of results; it shows a stronger R^2 value for health in Step 2 ($R^2 = .229$) as well as a highly significant increase in R^2 from Step 1 to Step 2 ($F\Delta = 11.34$, $p = .000$).

Taken together, the results from Table 4 and Table 5 (Models 1 and 3) suggest that the mediational effect is *slightly* stronger for the old-old compared to the young-old groupings of subjects. Although the models for the young-old subjects (Table 4) also show a pattern of mediational results, the effect is not as pronounced as with the old-old subjects (Table 5). The R^2 change (Model 1: $F\Delta = 17.11$, $p = .000$) was not as strong for the young-old (Table 4) as for the old-old in Table 5 (Model 1: $F\Delta = 17.92$, $p = .000$), nor was the R^2 of the second step as strong for the young-old (Step 2 $R^2 = .168$ in Table 4) as with the old-old ($R^2 = .171$ in Table 5). However, these marginal differences in $F\Delta$ and R^2 are not pronounced enough to suggest that large differences exist between the young-old and old-old in the mediational role of perceived control. On the other hand, in Model

3, the magnitude of the R^2 in the second step is clearly weaker for the young-old subjects ($R^2=.188$ versus $R^2=.229$), although the R^2 increase is slightly higher for the young-old grouping ($F\Delta=12.93$, $p=.000$) versus the old-old grouping in Model 3 ($F\Delta=11.34$, $p=.000$). Thus, this pattern of results also suggests a mediational effect for both groupings of subjects, with perhaps a slightly stronger effect within the old-old subjects.

To summarize, in both groups, the mediational evidence is very similar, and it is only the higher levels of adjusted R^2 in the second step of the old-old models which suggests a slightly stronger mediational effect. What these findings do suggest is that, although the old-old may be showing a stronger effect, the ability of perceived control to mediate the health-life satisfaction relationship is very strong in *both* the young-old *and* the old-old participants.

The role of leisure in the mediational effect of PC. The same models were again used to test the hypothesis that the mediational role of perceived control would be stronger for those seniors with low leisure participation than those seniors who report a relatively higher number of leisure activities. Thus, in these analyses, leisure activity was *not* included as a predictor in the model.

For *low leisure* participation, Models 1 and 3 (Table 6) both provide evidence of a mediational effect of perceived control. Model 1 shows a strong R^2 value ($R^2=.136$) as well as a highly significant increase in R^2 from Step 1 to Step 2 ($F\Delta=14.61$, $p=.000$). In addition, the beta weight of health status not only decreases from the first to the second step, but also fails to achieve significance at $p\leq .05$ (Step 1: $B=-.118$, $p\leq .05$, Step 2: $B=-.084$, $p\geq .05$). Model 3 also shows this same pattern of results; the model shows a stronger R^2 value ($R^2=.162$) as well as a highly significant increase in R^2 from Step 1 to

Step 2 ($F\Delta=11.31$, $p=.000$). However, while the beta weight for health decreases from Step 1 to Step 2, it remains significant at the same level (Step 1 $B=.229$, $p=.000$, Step 2 $B=.196$, $p=.000$). Although both of these models suggest a strong mediational effect, Model 1 shows the strongest mediational effect of perceived control. Model 2 and Model 4 do *not* show any evidence of a mediational effect aside from very slight decreases in the beta-weights of health after domain-specific perceived control is added to the model(s).

This same general pattern of results is also observed within the *high leisure* grouping of subjects (Table 7). That is, Models 1 and 3 suggest a strong mediational effect, while Models 2 and 4 show very weak mediational effects. Both Models 1 and 3 showed high $F\Delta$ statistics (Model 1 =19.89, $p=.000$; Model 3 =11.15, $p<.001$) and also decreases in the beta-weights of health (Model 1: Step1 $B= -.191$, Step 2 $B= -.158$; Model 3: Step 1 $B=.323$, Step 2 $B=.290$) after perceived control was added to the models, although there was no change in the significance of the t-values associated with these betas.

A comparison of Table 6 and Table 7 provide some evidence to suggest that the mediational effect is slightly stronger for seniors reporting lower numbers of leisure activities than their counterparts who reported higher numbers of leisure activities. That is, the R^2 is higher for the low leisure group as shown in Table 6 (Models 1 and 2) than the high leisure group shown in Table 7 (Model 1: $R^2=.136$, versus $R^2= .112$, Model 2: $R^2=.113$ versus $R^2= .085$). Most importantly, in Table 6, not only do the beta values of health status *decrease* after perceived control is added to the regression models, but in Model 1 the significant beta ($B=-.118$) becomes *non-significant* ($B=-.084$); and in Model 3 the significant ($B=.229$) drops but remains significant ($B=.196$). These reductions in

beta-weights, coupled with drops in significance of t-values for the low leisure group also lends support to the hypothesis that the mediational effect of perceived control is stronger among those individuals in the low- relative to the high-leisure grouping.

Examination of Counter-Intuitive Health/Life Satisfaction Relationships

The health/life satisfaction paradox. The final research question involves considering the characteristics of individuals in the two 'paradox' groupings, that is, those individuals who have good health and yet still report low levels of life satisfaction, and those who have relatively poor health and report higher levels of life satisfaction. In order to address this question, the analyses involved creating four groups as discussed in the method section using participants' objective health and LSIA scores (healthy & satisfied; healthy & unsatisfied; unhealthy & satisfied; unhealthy & unsatisfied). The 'non-paradoxical' groups that were intuitively logical (healthy & satisfied; unhealthy & unsatisfied) were not of particular interest. Rather, it was the counter intuitive or 'paradoxical' groups that were of particular interest. However, the 'non-paradox' groups were also examined for comparison purposes.

An examination of the differences between the four groups using ANOVA *did* uncover several significant differences between the four groups. Means of the characteristics for the four groups are shown in Table 8. As outlined in Table 9, which provides a summary of the ANOVA's, the groups did differ significantly on: age ($F=7.36$, $p=.000$), years of formal education ($F=4.24$, $p=.005$), reported level of income adequacy ($F=3.20$, $p=.023$), and total number of leisure activities reported ($F=15.16$, $p=.000$). Subsequent post-hoc tests were conducted to further explore group differences that were significant. Scheffe's T- tests were used because they are widely accepted and most often deemed acceptable for making various post-hoc comparisons (Shavelson,

1981). In addition, Shavelson points out that when using Scheffe's "the comparisons need not be planned a priori..." (p.470). This reasoning fits with the exploratory nature of this particular research question. The post hoc tests uncovered many significant differences between the four groups; however, only select differences will be discussed. Specifically, the discussion will be restricted to those significant differences that emerged between a paradox group (healthy/unsatisfied and unhealthy/satisfied) and a corresponding non-paradox group. In addition, any differences between the two paradox groups will also be highlighted.

Most of the significant differences were as expected. For example, the *healthy/satisfied* groups reported the *highest* amount of leisure participation and were *younger* than any of the other three health/life satisfaction groups. Not surprisingly, it was the *unhealthy/unsatisfied* group of subjects that reported the *least* leisure activities and also tended to be the *oldest* of all the groups. With regard to education, the post-hoc tests found that the healthy/unsatisfied reported significantly *more* education (.61 years, $p=.049$) than did the healthy/satisfied group (9.47 years versus 8.86 years).

Discussion

The results in this study generally support the primary hypothesis that perceived control would act as a significant mediator between health status and life satisfaction, even after statistically controlling for other important variables (i.e., age, IADL level of functioning, years of education, leisure activity, and income adequacy). This means that, although health status can be used to predict an older adult's level of life satisfaction, part of this relationship is explained by the mediational role of perceived control in the health - life satisfaction relationship. The common pattern was that adding perceived control to the model(s) in the second step of the regression resulted in a significantly higher R^2 change, coupled with no significant positive changes in the effects of health on life satisfaction. That is, health did not become more significant after adding perceived control; in fact, when a mediational effect was present, the beta-weight of health dropped as a result of adding perceived control into the model. According to other researchers (Bisconti & Bergeman, 1999; Baron & Kenny, 1986), this pattern of results indicates that a given variable is acting as a mediator.

Although the mediational effect of perceived control was evident in many of the models tested in this study, it was stronger and more pronounced in some sub-groups and with some variables than with others. In particular, the mediational effect differed depending on the nature of the perceived control measure used (global versus domain specific) and characteristics of the study participants, that is, the reported level of *leisure activity* (high versus low leisure activity). Although the mediational effects could be judged as small in some cases, it has been pointed out by other researchers that even seemingly small statistical effects could potentially make significant differences in the lives of the population being studied (Chipperfield & Greenslade, 1999). That is, a small

mediational effect *statistically*, may translate into an increase in the overall life satisfaction of an older adult. For example, if perceptions of control can be enhanced in an unhealthy senior, the potential negative impact of poor health could be mediated by perceived control such that level of life satisfaction will not be adversely influenced by poor health.

Perceived control and 'At-Risk' Individuals

Many researchers have pointed out that old age is characterized by loss of control (Thompson, 1996; Wolinsky & Stump, 1996; Rodin, 1986) and this may place individuals at risk. These researchers stress the importance of perceived control to the physical and psychological well-being of older adults, particularly those with lower levels of perceived control. If, as Rodin (1986) suggested, more control tends to be taken away as we grow older, perceptions of control become much more important in later life. It has also been illustrated that lower levels of perceived control can have more negative consequences for those seniors deemed "at risk" versus seniors who are not perceived to be at risk (Chipperfield & Greenslade, 1999). Specifically, when defining "at-risk" using high levels of arthritis-related restriction, these researchers found that lower perceived control had a negative influence *only* on those seniors reporting high restriction. Other researchers have also found that perceived control does appear to have more of an effect with "at-risk" senior populations (Reich & Zautra, 1991; 1989).

The hypotheses regarding the influence of leisure activity and age on the mediational power of perceived control are based upon the logic that those individuals more at risk, while more disadvantaged by a *lack* of perceived control, may also *benefit* more from the *presence* of perceived control. In both of these situations, being at risk

may explain the differences in mediation between the low- and high-leisure groups, and between the young-old and old-old participants.

The role of leisure participation. With regard to leisure activity, it was expected that perceived control would act as a stronger mediator among those subjects reporting *lower* leisure participation than those who reported *higher* leisure participation. As expected, in spite of the varying degrees of effect size, for the models in which a mediational effect of perceived control emerged, the strongest evidence for the mediational effect was found among those individuals in the low-leisure group. But why would participation in fewer leisure activities put a senior "at risk"? Having lower leisure participation per se will not put a senior at risk; however, lower leisure activity, coupled with other negative influences, may indeed place a senior at risk. Poor health, loss of independence, social isolation, physical restrictions, and lack of adequate income are just a few circumstances that can be associated with lower leisure participation. While the direction of the causation can be questioned (i.e., what came first, the problem or the decreased number of leisure activities), there are many factors that may combine to place seniors reporting low leisure participation "at risk". Experiencing one or more of these "at risk" situations may cause the senior to place more value on perceived control than would a senior with fewer of these "at risk" variables, and for this reason perceived control may be more salient, and therefore exert a stronger mediational influence.

Although the results in this study suggest that there is a difference in the mediational effect of perceived control between the high- and low-leisure groups, the difference was subtle. There are many possible explanations for why this difference was not more striking. One of the most plausible explanations has to do with the validity/reliability of the leisure activity measure. Although respondents were asked

whether they engaged in many specific leisure activities, it is possible that the primary leisure activity was not included in the list, resulting in less reported activity. In addition, participants were only asked about their leisure activity 'in the past week'; this would provide only a thumbnail sketch of the number of actual number of leisure activities reported by each participant.

In summary, partial support was found for the hypothesis regarding the role of leisure participation in the mediational power of perceived control. As expected, the low leisure group did show a greater mediational effect of perceived control than the high leisure group in all of the models reported. Even in Model 4, where the mediational effect is essentially non-existent, relative to the high leisure group, the lower leisure group showed a greater R^2 change (although non-significant) as well as the greatest decrease in the beta weight of health after PC was added to the model.

Aside from these specific results, the importance of leisure activity in potentially increasing life satisfaction warrants some attention. Many researchers have found that a higher amount or level of leisure activity is strongly associated with corresponding level of life satisfaction (Zimmer & Lin, 1996; Bevil, O'Connor & Mattoon, 1993; Ribbins, Smith, Bolden, & Osgood, 1988; Ragheb & Griffith, 1982). While not directly assessed in this study, it is important to underscore the important role that leisure participation plays in the life satisfaction levels of older adults. Having a greater amount of leisure activity can go a long way in improving the overall quality of life for all older adults.

The role of age. Old age is typically referred to as the "golden years"; however, not all aspects of old age are golden. Financial hardship, decreasing social networks, and increasing physical difficulties are just a few of the problems that many adults experience as they grow older. Similar to the reasoning in the previous hypothesis involving leisure

participation, it was expected that those subjects in the old-old age grouping (80 years and older) would be more "at-risk" than the young-old (79 years of age and younger), and therefore would place greater importance on perceived control in their lives. This increased importance of perceived control was hypothesized to manifest itself in a greater mediational effect of perceived control within the old-old, relative to the young-old subjects, and the findings partially confirm this hypothesis.

Two points underpin the reasoning of this hypothesis that the old-old will show the greatest mediational effect: 1) we will lose more and more control as we age (Thompson, 1996; Wolinsky & Stump, 1996), thus making control more important to us (Rodin, 1986), and 2) being 'at-risk' makes perceived control more salient to older adults (Rodin, 1986). In the present study, it can be assumed that, in general, the old-old subjects had lost more control than their young-old counterparts, and also that the old-old individuals were more at-risk due to the various health difficulties.

Although the statistical indicators of a mediational effect (R^2 change, beta-weight change of health, beta-weight of perceived control) demonstrated that there were strong mediational effects for both young-old and old-old subjects, the results for the old-old individuals did show slightly stronger mediational evidence than the results for the young-old subjects. However, it is important to note that, even in the model that showed the strongest mediational effect in Tables 4 and 5 (Model 1), the difference in the effect between the old-old versus the young-old subjects was not profound, suggesting there are mediational effects evident for both groups.

One possible reason for the lack of *striking* mediational differences between the young-old and old-old is perhaps that perceived control is similarly important to *all* older adults. It is possible that the *majority* of older adults place a high value on perceived

control, and for this reason, the comparison of the two different age-groupings did not elicit any *striking* results. In spite of the fact that large differences between the two groups were not observed on the statistical indicators (e.g., R^2), the old-old group did show slightly stronger mediational effects providing partial support for this hypothesis. That is, the power of perceived control to mediate the relationship between health and life satisfaction was found to be slightly stronger in the old-old than in the young-old. That being said, it is clear from these results that perceived control is important to all older adults as a mediator the health-life satisfaction relationship.

PC as a Mediator of the Health-LS Relationships in the Overall Sample

The following sections deal with the potential differences of perceived control to mediate the health-life satisfaction relationship based upon the *type of perceived control* (global versus domain-specific) and the *type of health status measure* (objective versus subjective self-rated).

Global versus domain-specific perceived control. Contrary to the prediction that the domain-specific measure of perceived control would act as a more powerful mediator than the global measure of perceived control, the opposite results were found. It was, in fact, the *global* indicator of perceived control which appeared to elicit the strongest mediational effect. The models (Models 2 and 4 – Table 3) which contained the domain-specific indicator of perceived control showed very little, if any, mediational effect.

On the other hand, the mediational effect of the global measure of perceived control was very strong, suggesting that global perceived control mediates the relationship between health and life satisfaction more strongly than does the domain-specific measure of perceived control. The relatively stronger mediational role of the global versus the domain-specific (health) perceived control measure runs counter to

Lachman's (1994) and others' (Rodin et al, 1990; Shapiro et al, 1996) intention that domain-specific perceived control measures may provide more valid results when they are used to examine a relationship between two or more variables. However, Lachman (1994) also mentions that this only holds true if *the appropriate domain of control is being assessed*. That is, according to Lachman (1994), for a domain-specific measure to elicit accurate results, the application of that measure must be appropriate to the relationship being examined.

One possible explanation for this finding resides in the very nature of the dependent variable (single-item life satisfaction). As discussed previously, life satisfaction is a very complex phenomenon, and for this reason, any one of a number of factor(s) may add/take away from an individual's level of life satisfaction. It is possible that including a perceived control measure that was specific to the domain of health was only taking into account a very small portion in the prediction of life satisfaction. That is, the one-dimensional nature of this domain-specific perceived control measure, while useful in the examination of health, may have not tapped into information that was important to the health-life satisfaction relationship. In contrast, the global measure captured perceptions of control in a number of areas including health, thoughts and feelings, leisure, day-to-day tasks, and life in general. Thus, the diversity of this perceived control measure may have better predicted the global measure of life satisfaction, acting as a much stronger mediator than the domain-specific measure.

Objective versus subjective health. The results of this study suggest that there is fundamentally no difference in the mediational power of perceived control based on the type of health status measure (objective versus subjective) utilized. Specifically, among the two models that did show a mediational effect, one used the subjective health

measure and the other used the objective health measure. This same pattern emerged for the two models that did show a mediational effect. The fact that no significant differences in the mediational effect of perceived control emerged based upon the nature of the health measure in the present study, and that the self-rated-subjective health measure was a stronger predictor of life satisfaction than the objective measure, lends support to those researchers who choose an subjective rather than an objective measure to represent health status (Jacob & Guarnaccia, 1997 ; Morris, 1997; Stolar, MacEntee, & Hill, 1992; Willits & Crider, 1988). Given the relative difficulty in gaining access to objective health measures such as health utilization information, or having to administer lengthy 'problem checklists', the knowledge that a shorter subjective measure of health status can provide valid information could streamline future research of health status in senior populations. The results from this study have illustrated, to some degree, that single-item measures of both life satisfaction and health status can provide useful information to researchers in this area.

The Health/Life Satisfaction Paradox

The final exploratory objective was to examine possible differences between four created health-life satisfaction groups, with particular attention paid to the paradox groups, that is, subjects who were; healthy and unsatisfied, and unhealthy and satisfied. Many of the significant group differences found were not surprising. For example, the non-paradoxical group of healthy and satisfied individuals was younger and exhibited the *most* leisure participation of all four groups. Conversely, of all the groups, it was the unhealthy and unsatisfied group that was oldest and reported the *least* leisure activities.

The finding that the healthy and unsatisfied group reported significantly more years of formal education than did the healthy and satisfied group of participants runs

counter-intuitive to the research that has illustrated a *positive* relationship between life satisfaction and years of education (Meeks & Murrell, 2001; Reinhardt, 1996). Again, other variables may be influencing life satisfaction. Fernandez, Zamarron, and Ruiz (2001) suggest that, for example, although higher education is typically associated with a higher level of life satisfaction, other variables such as activity, perceived health and physical illness can influence this relationship.

Another possible explanation for why unsatisfied individuals reported more education is that education fosters higher, and perhaps unachievable, expectations, which in turn erode satisfaction. On the other hand, those individuals with comparatively fewer years of education may have had more realistic and therefore achievable expectations which could easily manifest itself in a higher level of life satisfaction. Hilleras et al (2000) found that seniors reporting higher life satisfaction were characterized by the fact they 'were not disappointed with their present lives', while those with lower life satisfaction 'felt that their achievements had not amounted to much' (p.673). It could be argued that more education has created higher self-expectations, and therefore fostered this kind of feeling in the unsatisfied group.

Shortcomings of the Present Study

As with any study, there are some shortcomings that should be pointed out. First, the use of a secondary data set limits the analyses to measures based on questions that were asked many years ago. Thus, the analyses are driven by the available data. This may result in some inaccuracies in the measurement of things like health status or leisure activity due to the "incompleteness" of the measurement. For example, although *number* of leisure activities was assessed, actual *intensity* of participation was not measured, therefore the actual level of activity may be somewhat misleading if a senior

reports many sedentary activities (e.g., reading, talking with friends). Second, it is impossible to determine the direction of causality with the variables examined. For example, it is very difficult to state with any confidence that health directly influenced life satisfaction. This relationship may be circular in nature or perhaps opposite to the causal direction that has been assumed. Having a high level of life satisfaction may in fact have a positive influence on health status, rather than health status being the variable that is influencing life satisfaction.

Strengths of the Present Study

On the other hand, the size of the dataset available ($n=1868$) was an advantage in this study; such large longitudinal datasets based entirely on a senior population with an average age of 82 years are very rare. This allowed for the creation and testing of mediational models that took into account a large number of potential covariates. Specifically, given the nature of the data, level of IADL functioning, years of education, and income adequacy were included in the regression models. A more complex regression model will closely approximate a 'real life' situation than will a models very few predictor variables.

A second strong point of this study involves the variation in the constructs that were available for study. There were global and domain-specific perceived control measures, objective and subjective health measures, as well as comparatively objective (LSIA) and single-item life satisfaction measures. This diversity of these variables allowed comparison of the mediational effectiveness of perceived control based upon the use of all of these variables.

A final strength of this study is the generalizability of the findings to the larger population of seniors. Given the nature of the subject recruitment for the AIM study

(stratified area-probability random sampling), the AIM sample is representative of the overall senior population (Chipperfield, Havens, & Doig, 1997). Thus, most of the present findings can be considered representative of the larger senior population within the province of Manitoba. It is, however, important to note that those findings based upon analyses using data from the SAS Study can only be generalized to community-dwelling older adults.

Conclusions

Together, the findings in this study reinforce the complexity of the health-life satisfaction relationship. This is by no means a simple relationship, and these findings illustrate that an examination of physical health alone cannot predict corresponding levels of life satisfaction. The results of this study provide compelling evidence that the health-life satisfaction relationship is mediated by perceived control. However, this mediational effect appears to vary depending upon: age, the number of reported leisure activities, and the type of perceived control measure utilized. Interestingly, the type of health status measure (objective versus subjective) used did *not* influence the mediational effect of perceived control on the health – life satisfaction relationship.

From a theoretical perspective, one of the most important results of this study illustrated that the mediational effect of perceived control may depend on the nature of the perceived control measure being utilized. It was the *global* measure of perceived control that produced the mediational effect. This suggests that future researchers in the area of mediation and perceived control should pay particular attention not only to what *type* of perceived control is being assessed, but also *how* perceived control is measured (i.e., how the items regarding perceived control are worded). As a result, a

clearer understanding of the mediational effects of perceived control is much more likely to be uncovered.

In addition to this theoretical implication, there are potential practical implications emerging from this study. For example, counselling seniors in an attempt to increase levels of perceived control could, in turn, increase levels of life satisfaction. This kind of application may be particularly important for those individuals with poor health as they tend to be influenced by perceived control more than a comparatively healthy population (Chipperfield, 1993). The population that could potentially benefit most from this attempt to increase levels of perceived control would be those seniors who experience health problems that are least 'correctable' by modern medicine. It is very possible that we will experience problems in old age that cannot be fully addressed by medicine, however, if increasing perceived control in these situations can offset the negative impact of poor health on life satisfaction, the quality of life for many seniors could be increased as a result. This increase in life satisfaction as a result of this enhancement of perceived control could have a positive impact on many areas of a senior's life, and allow a more dignified and graceful journey through old age.

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Table 1.

Summary of Major Variables.

	<u>Range</u>	<u>Mean</u>	<u>SD</u>
<u>Sociodemographic Variables</u>			
Age	69 – 104	82.21	6.51
Gender (M=39.9%, F=60.1%)	N/A	N/A	N/A
Education	0 – 27	8.73	3.42
Marital Status (M=41.5%, NM=58.5%)	N/A	N/A	N/A
Social Contact	0 – 64	6.29	5.60
Monthly Income	0 – 5000.00	1099.83	742.53
Income Adequacy	1 – 5	4.10	0.68
<u>Physical/Leisure Variables</u>			
Physical Functioning	1 – 12	8.64	3.01
Total Leisure Activity	0 – 20	8.64	3.35
<u>Independent Variables</u>			
Objective Health ^a	0 – 16	4.37	2.68
Subjective Health	1 – 5	3.53	0.75
<u>Mediating Variables</u>			
Global Perceived Control	2 – 50	38.3	9.84
Health Perceived Control	1 – 30	18.69	5.74
<u>Dependent Variables</u>			
Life Satisfaction (Single-item)	1 – 5	3.94	0.74
Life Satisfaction (LSIA)	1 – 20	10.05	2.48

^aNote. A higher score indicates *more* health problems and therefore *poorer* health

Table 2.

Correlations between life satisfaction measures and health status measures

<u>Health Status Variable</u>	<u>Life Satisfaction Measure</u>	
	<u>LSIA Score</u>	<u>Single-item</u>
Objective	-.021	-.226*
Subjective	.039	.389*

*p=.000

Table 3.

Summary of complete regression results for tests of mediational models for entire sample (DV=single-item life satisfaction)

	Step 1			Step 2		
	B	Adj R ²	B ^b	Adj R ²	FChange	
Model 1						
Age	.109****		.100****			
IADL Score	.047		-.014			
Years Education	.104****		.088***			
Leisure activity	.203****		.176****			
Income adequacy	.183****		.167****			
Objective Health	-.168****	.151	-.135****	.172	34.16****	
Global PC	n/a		.175****			
Model 2						
Age	.110****		.108****			
IADL Score	.036		.028			
Years Education	.104****		.108****			
Leisure activity	.207****		.205****			
Income adequacy	.182****		.180****			
Objective Health	-.172****	.151	-.169****	.152	2.21	
Domain-Specific PC	n/a		.039			
Model 3						
Age	.073**		.069*			
IADL Score	.021		-.030			
Years Education	.087***		.075**			
Leisure activity	.162****		.144****			
Income adequacy	.161****		.150****			
Subjective Health	.289****	.197	.260****	.210	23.32****	
Global PC	n/a		.135***			
Model 4						
Age	.069*		.069*			
IADL Score	.008		.006			
Years Education	.088**		.089***			
Leisure activity	.167****		.167****			
Income adequacy	.163****		.163****			
Subjective Health	.298****	.201	.296****	.200	.179	
Domain-Specific PC	n/a		.011			

Note. Standardized Betas shown, significance level of related t-value is indicated

*p≤.05, **p≤.01, ***p≤.001, ****p=.000

Table 4.

Summary of regression results for tests of mediational models for young-old subjects. (DV=single-item life satisfaction)

	Step 1		Step 2		
	<u>B^b</u>	<u>Adj R²</u>	<u>B^b</u>	<u>Adj R²</u>	<u>FChange</u>
<u>Model 1</u>					
Objective Health	-.192****	.146	-.150****	.168	17.11****
Global PC	n/a		.179****		
<u>Model 2</u>					
Objective Health	-.199****	.147	-.191****	.149	2.67
Domain-Specific (Health) PC	n/a		.064		
<u>Model 3</u>					
Subjective Health	.267****	.172	.226****	.188	12.93****
Global PC	n/a		.155***		
<u>Model 4</u>					
Subjective Health	.274****	.175	.266****	.176	1.55
Domain-Specific (Health) PC	n/a		.048		

Note. Step 1 models contain age; level of physical functioning (IADL's), years education, leisure activity, and perceived income adequacy. Standardized betas shown, significance of related t-value is indicated.

* $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$, **** $p = .000$

Table 5.

Summary of regression results for tests of mediational models for old-old subjects. (DV=single-item life satisfaction)

	Step 1		Step 2		
	B ^b	Adj R ²	B ^b	Adj R ²	FChange
<u>Model 1</u>					
Objective Health	-.149****	.151	-.122****	.171	17.92****
Global PC	n/a		.175****		
<u>Model 2</u>					
Objective Health	-.151****	.151	-.150****	.150	.215
Domain-Specific (Health) PC	n/a		.017		
<u>Model 3</u>					
Subjective Health	.314****	.217	.290****	.229	11.34***
Global PC	n/a		.135***		
<u>Model 4</u>					
Subjective Health	.322****	.223	.325****	.222	.318
Domain-Specific (Health) PC	n/a		-.020		

Note. Step 1 models contain level of physical functioning (IADL's), years education, leisure activity, and perceived income adequacy. Standardized betas shown, significance of related t-value is indicated.

*p≤.05, **p≤.01, ***p≤.001, ****p=.000

Table 6.

Summary of regression results for tests of mediational models for participants with low leisure participation. (DV=single-item life satisfaction)

	Step 1		Step 2		
	B^b	Adj R²	B^b	Adj R²	FChange
<u>Model 1</u>					
Objective Health	-.118*	.110	-.084	.136	14.61****
Global PC	n/a		.205****		
<u>Model 2</u>					
Objective Health	-.124*	.110	-.119*	.113	2.41
Domain-Specific (Health) PC	n/a		.072		
<u>Model 3</u>					
Subjective Health	.229****	.143	.196****	.162	11.31***
Global PC	n/a		.179***		
<u>Model 4</u>					
Subjective Health	.242****	.145	.235****	.147	.474
Domain-Specific (Health) PC	n/a		.032		

Note. Step 1 models contain age; level of physical functioning (IADL's), years education, and perceived income adequacy. Standardized betas shown, significance of related t-value is indicated.

*p≤.05, **p≤.01, ***p≤.001, ****p=.000

Table 7.

Summary of regression results for tests of mediational models for participants with high leisure participation. (DV=single-item life satisfaction)

	Step 1		Step 2		
	B^b	Adj R²	B^b	AdjR²	FChange
<u>Model 1</u>					
Objective Health	-.191****	.088	-.158****	.112	19.89****
Global PC	n/a		.173****		
<u>Model 2</u>					
Objective Health	-.194****	.087	-.194****	.085	.085
Domain-Specific (Health) PC	n/a		.004		
<u>Model 3</u>					
Subjective Health	.323****	.150	.290****	.163	11.15***
Global PC	n/a		.128***		
<u>Model 4</u>					
Subjective Health	.327****	.150	.328****	.149	.157
Domain-Specific (Health) PC	n/a		-.015		

Note. Step 1 models contain age; level of physical functioning (IADL's), years education, and perceived income adequacy. Standardized betas shown, significance of related t-value is indicated.

*p≤.05, **p≤.01, ***p≤.001, ****p=.000

Table 8.

Summary of Means: Health-Life Satisfaction Paradox Groups

	Paradox		Non-Paradox	
	<u>Healthy & Unsatisfied</u>	<u>Unhealthy & Satisfied</u>	<u>Healthy & Satisfied</u>	<u>Unhealthy & Unsatisfied</u>
Age	80.60	81.80	80.23	81.95
Income	1214.44	1040.64	1128.15	1075.46
Education	9.47	8.68	8.86	9.01
Income Adequacy	4.14	4.03	4.16	4.04
Leisure Activity	9.63	9.04	10.11	8.76

Table 9.

Results of one-way ANOVA's comparing paradox/non-paradox health-life satisfaction groups.

<u>Variable</u>	<u>SS</u>	<u>DF</u>	<u>F</u>	<u>Sig</u>
Age	749.45	3	7.36	.000
Education	128.86	3	4.24	.005
Income Adequacy	4.33	3	3.20	.023
Leisure activity	376.17	3	15.16	.000

Figure 3.

Overview of key measures included in each regression model

Regression Model	<u>Life Satisfaction Measure</u> (Dependent Variables)		<u>Health Measure</u>		<u>PC Measure</u>	
	LSIA Score	Single-item	Objective	Subjective	Global	Domain-Specific
Model 1						
Model 2						
Model 3						
Model 4						
Model 5						
Model 6						
Model 7						
Model 8						

Note. Each shaded cell indicates the particular measures (life satisfaction, health, PC) included in each model. Unshaded cells indicate that the given measure was not included in the model.

Appendix A

Table A1.

Summary of regression results for tests of mediational models for entire sample. (DV= LSIA Score)

	Step 1		Step 2		
	B ^b	Adj R ²	B ^b	Adj R ²	FChange
<u>Model 5</u>					
Objective Health	.026	.028	.056	.046	26.88****
Global PC	n/a		.167****		
<u>Model 6</u>					
Objective Health	.012	.036	.026	.063	39.53****
Domain-Specific (Health) PC	n/a		.174***		
<u>Model 7</u>					
Subjective Health	-.003	.027	-.036	.043	24.08****
Global PC	n/a		.159****		
<u>Model 8</u>					
Subjective Health	-.001	.035	-.029	.063	39.97****
Domain-Specific (Health) PC	n/a		.177****		

Note. Step 1 models contain age; level of physical functioning (IADL's), years education, level of leisure activity, and perceived income adequacy. Standardized betas shown, significance of related t-value is indicated.

*p≤.05, **p≤.01, ***p≤.001, ****p=.000

Table A2.

Summary of regression results for tests of mediational models for young-old subjects . (DV= LSIA Score)

	Step 1		Step 2		
	B ^b	Adj R ²	B ^b	Adj R ²	FChange
<u>Model 5</u>					
Objective Health	-.013	.020	.002	.021	1.79
Global PC	n/a		.063		
<u>Model 6</u>					
Objective Health	-.026	.029	.002	.075	31.37****
Domain-Specific (Health) PC	n/a		.228****		
<u>Model 7</u>					
Subjective Health	.037	.021	.022	.022	1.43
Global PC	n/a		.056		
<u>Model 8</u>					
Subjective Health	.038	.029	-.002	.075	31.16****
Domain-Specific (Health) PC	n/a		.229****		

Note. Step 1 models contain level of physical functioning (IADL's), years education, level of leisure activity, and perceived income adequacy. Standardized betas shown, significance of related t-value is indicated.

*p≤.05, **p≤.01, ***p≤.001, ****p=.000

Table A3.

Summary of regression results for tests of mediational models for old-old subjects. (DV= LSIA Score)

	Step 1		Step 2		
	B ^b	Adj R ²	B ^b	Adj R ²	FChange
<u>Model 5</u>					
Objective Health	.060	.029	.096*	.068	30.52****
Global PC	n/a		.242****		
<u>Model 6</u>					
Objective Health	.046	.036	.051	.050	11.06***
Domain-Specific (Health) PC	n/a		.128***		
<u>Model 7</u>					
Subjective Health	-.037	.026	-.077	.062	27.96****
Global PC	n/a		.234****		
<u>Model 8</u>					
Subjective Health	-.035	.036	-.053	.050	11.72***
Domain-Specific (Health) PC	n/a		.132***		

Note. Step 1 models contain level of physical functioning (IADL's), years education, level of leisure activity and perceived income adequacy. Standardized betas shown, significance of related t-value is indicated.

*p≤.05, **p≤.01, ***p≤.001, ****p=.000

Table A4.

Summary of regression results for tests of mediational models for participants with low leisure. (DV= LSIA Score)

	Step 1		Step 2		
	B ^b	Adj R ²	B ^b	Adj R ²	FChange
<u>Model 5</u>					
Objective Health	.084	.055	.113*	.076	10.93***
Global PC	n/a		.183***		
<u>Model 6</u>					
Objective Health	.057	.067	.069	.094	13.91****
Domain-Specific (Health) PC	n/a		.175****		
<u>Model 7</u>					
Subjective Health	-.040	.050	-.070	.066	8.84***
Global PC	n/a		.167**		
<u>Model 8</u>					
Subjective Health	-.027	.065	-.070	.094	14.94****
Domain-Specific (Health) PC	n/a		.186****		

Note. Step 1 models contain age; level of physical functioning (IADL's), years education, and perceived income adequacy. Standardized betas shown, significance of related t-value is indicated.

*p≤.05, **p≤.01, ***p≤.001, ****p=.000

Table A5.

Summary of regression results for tests of mediational models for participants with high leisure. (DV= LSIA Score)

	Step 1		Step 2		
	B ^b	Adj R ²	B ^b	AdjR ²	FChange
<u>Model 5</u>					
Objective Health	.025	.004	.054	.023	14.22****
Global PC	n/a	.	.153****		
<u>Model 6</u>					
Objective Health	.031	.006	.040	.033	19.73****
Domain-Specific (Health) PC	n/a		.173****		
<u>Model 7</u>					
Subjective Health	.008	.003	-.029	.021	13.33****
Global PC	n/a		.150****		
<u>Model 8</u>					
Subjective Health	.010	.005	-.005	.032	19.25****
Domain-Specific (Health) PC	n/a		.172****		

Note. Step 1 models contain age; level of physical functioning (IADL's), years education, and perceived income adequacy. Standardized betas shown, significance of related t-value is indicated.

*p≤.05, **p≤.01, ***p≤.001, ****p=.000

Appendix B

Loring Chuchmach

From: John Acen
To: Loring Chuchmach <loring@unltdba.ca>
Cc: Judy Chipperfield
Sent: Monday, January 08, 2001 4:49 PM
Subject: Re: ethics approval

Loring,

I attempted to respond to the material you provided by telephone message to Dr. Chipperfield last Friday. She attempted to return my call today, but we still did not connect. My email has been down much of the time since the startup of classes --- thanks to the recent computer "upgrade." I didn't know how to contact you directly since no telephone number was provided. In reviewing the material you provided me, I have concluded the following:

Basically, I am prepared to assume that given the participants' earlier consent to participate in a longitudinal study about aging and accompanying quality of life and health functioning, that secondary statistical analysis of the sort you propose is generally in keeping with that consent. There are specifics to your analyses that were not specifically sought in the original consent form, however, it appears in general as if the data will be utilized for the purposes for which the data were originally collected.

Secondly, it appears as if the data have been "anonymized", that is, stored on a computer without the accompanying identifiers and that you will be using these data in this anonymized format. No reference will be made in the data analyses or in any subsequent reports of any individual by name.

Given these features of your thesis project, I am pleased to advise you that you have ethical clearance to proceed with your study.

I have forwarded this response and the information you provided on December 19 to Dr. Lorna Guse, Chair, ENREB, for her records. A copy of this reply is also being forwarded to your advisor, Dr. Chipperfield. I wish you the very best for your study.

01/09/2001

ATTITUDES

The next set of questions are about your personal thoughts & feelings about life. [If Proxy is being interviewed, skip Section G, and go to Section H (page 19)]. Following the interview, code all items in Section G as "P"]

6 GENSAT ☐ 71.* How would you describe your satisfaction with life in general at present?

- P. Proxy used, question not asked
 1. Excellent
 2. Good
 3. Fair
 4. Poor
 5. Bad

72.* Here are some statements about life in general that people feel differently about. Would you read along with me and tell me if you agree or disagree with each statement, or if you are not sure one way or the other. Please be sure to answer every question on the list.

For each question, circle the response under the "Agree" or "Disagree" or "Not Sure" column.

			<u>Agree</u>	<u>Disagree</u>	<u>Not sure</u>
.77 LSIA1	<input type="checkbox"/>	1) As I grow older, things seem better than I thought they would be.	1	0	9
.78 LSIA2	<input type="checkbox"/>	2) I have gotten more of the breaks in life than most of the people I know.	1	0	9
.129 LSIA3	<input type="checkbox"/>	3) This is the dreariest time of my life.	0	1	9
.130 LSIA4	<input type="checkbox"/>	4) I am just as happy as when I was younger.	1	0	9
.131 LSIA5	<input type="checkbox"/>	5) My life could be happier than it is now.	0	1	9
.132 LSIA6	<input type="checkbox"/>	6) These are the best years of my life.	1	0	9
.133 LSIA7	<input type="checkbox"/>	7) Most of the things I do are boring or monotonous.	0	1	9
.134 LSIA8	<input type="checkbox"/>	8) I expect some interesting & pleasant things to happen to me in the future.	1	0	9
.135 LSIA9	<input type="checkbox"/>	9) The things I do are as interesting to me as they ever were.	1	0	9
.136 LSIA10	<input type="checkbox"/>	10) I feel old and somewhat tired.	0	1	9

			<u>Agree</u>	<u>Disagree</u>	<u>Not sure</u>
LSIA11	<input type="checkbox"/>	11) I feel my age, but it does not bother me.	1	0	9
38 LSIA12	<input type="checkbox"/>	12) As I look back on my life, I am fairly well satisfied.	1	0	9
39 LSIA13	<input type="checkbox"/>	13) I would not change my past life even if I could.	1	0	9
40 LSIA14	<input type="checkbox"/>	14) Compared to other people my age, I've made a lot of foolish decisions in my life.	0	1	9
41 LSIA15	<input type="checkbox"/>	15) Compared to other people my age, I make a good appearance.	1	0	9
42 LSIA16	<input type="checkbox"/>	16) I have made plans for things I'll be doing a month or year from now.	1	0	9
43 LSIA17	<input type="checkbox"/>	17) When I think back over my life, I didn't get most of the important things I wanted.	0	1	9
44 LSIA18	<input type="checkbox"/>	18) Compared to other people, I get down in the dumps too often.	0	1	9
45 LSIA19	<input type="checkbox"/>	19) I've gotten pretty much what I expected out of life.	1	0	9
LSIA20	<input type="checkbox"/>	20) In spite of what people say, the lot of the average man is getting worse, not better.	0	1	9

73.* Perceived Control:

			<u>Agree</u>	<u>Not sure</u>	<u>Disagree</u>
147 LOCUS1	<input type="checkbox"/>	1) To a great extent my life is controlled by accidental happenings.	1	2	3
148 LOCUS2	<input type="checkbox"/>	2) I feel like what happens in my life is mostly determined by powerful people.	1	2	3
149 LOCUS3	<input type="checkbox"/>	3) When I get what I want it is usually because I am lucky.	1	2	3
50 LOCUS4	<input type="checkbox"/>	4) My life is chiefly controlled by powerful others.	1	2	3
51 LOCUS5	<input type="checkbox"/>	5) Whether or not I get in a car accident is mostly a matter of luck.	1	2	3
52 LOCUS6	<input type="checkbox"/>	6) If important people were to decide they didn't like me, I probably wouldn't make many friends.	1	2	3