

SOCIAL DETERMINANTS OF SELF-RATED HEALTH:  
THE INTERACTION OF GENDER WITH SOCIOECONOMIC STATUS  
AND SOCIAL RELATIONSHIPS IN THE YUKON

by

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## **ABSTRACT**

This study addressed the social determinants of health with a specific focus on three factors in the social environment that either individually or collectively have an influence on health status: gender, socioeconomic status (SES), and people's social relationships. The purpose of the study was to examine whether people's social relationships mediate the effects of SES on self-rated health status and to assess whether these effects differ for women and men.

The research questions were examined by formulating a theoretical model and evaluating the hypothesized relationships through the use of structural equation modelling. The analyses were conducted using LISREL on data from 1,239 non-First Nations Yukon residents who participated in the Territory's 1993 Health Promotion Survey.

The results of this study suggest that household income significantly affected women's and men's health by influencing aspects of their social relationships. A higher overall rating of the quality of one's social relationships was associated with positive health ratings for both women and men while the perception that support would be available if needed significantly affected only women's self-ratings of their health. Received social support was negatively associated with women's health, but not men's, suggesting that the context in which support is received has an important influence on women's health.

Relationship strain, as measured by care provided to several sources, was not significantly related to women's or men's health-ratings.

The analyses also identify important interrelationships among the dimensions of social relationships studied as well as some gender differences among these relationships. For both women and men, positive evaluations of the importance of social relationships for their health and a greater number of social ties significantly influenced ratings of the overall quality of their social relationships. Having more social ties also positively influenced the perception of availability of social support for both women and men. The quality of their social relationships influenced the perceived availability of social support only for women.

Given the focus of provincial and federal governments in seeking reform of their health-care systems, attention to modifiable determinants of health presents an opportunity to contribute to this reform process. The findings of this study contribute to our understanding of the effects of SES on health by providing support for gender interactions in a set of relationships where aspects of people's social relationships mediate the effects of income on health status. These findings provide support for gender-specific mechanisms by which income level influences perceived health status by shaping people's social relationships, the quality of those relationships and the support they offer.

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# **CHAPTER 1**

## **INTRODUCTION**

### **Background to the Study**

Research on determining the major factors that contribute to health has shifted from being predominantly medical and individualistic to now giving greater emphasis to the contribution of social and environmental factors. This shift has been paralleled, in recent years, in health policy and practice as the social determinants of health are promoted as an approach that could shape health-care services and responses to health needs. The federal and most provincial governments have begun to pose questions about, and implement plans for, the reorganization of the health-care system and reallocation of health-care resources. This debate, at times, has been placed in the context of consideration of the social determinants of health in making policy and program decisions. The view that social factors influence health is not a new idea but perhaps new is the amount of public attention paid to these social factors on national and provincial social policy agendas over the last decade. National organizations have called for attention to these social factors and the need for governments to address the modifiable determinants among them (Canadian Public Health Association, 1997; National Forum on Health, 1997) and some provincial governments have begun to incorporate these concepts into their

public documents of reform and reorganization of their health-care systems (Government of Saskatchewan, 1992). These reports and other documents have identified the determinants of health to include: education, income, gender, cultural affiliation, social and physical environments, personal health practices, coping skills, social support and social networks, employment and working conditions, biology and genetic endowment, and health services (Davidson et al., 1997). This study focused on the health effects of relationships among three of these determinants: gender, socioeconomic status, and social relationships.

One consistent finding is that mortality follows a gradient across all social strata, suggesting that socioeconomic status (SES) has some influence on health, or is a product of health, or some of both (Corin, 1994; Evans, 1994; Marmot, 1986; Townsend & Davidson, 1982; Wilkinson, 1986b, 1994). Separate analyses of the widely agreed upon measures of socioeconomic status (occupation, income and education) provide evidence of their differential effects on the health of women and men. Other studies cite the influence of aspects of the social environment; aspects that may include the existence of social supports, feelings of self-worth and esteem, one's social position and sense of powerlessness, coping capacities and early childhood experiences (Berkman & Syme, 1979; Hertzman, Frank, & Evans, 1994; Syme, 1994). There are theoretical perspectives and empirical evidence citing the connection between the strength of a person's social support system and health status. Other findings suggest that the effects of social relationships on health status interact

with such factors as gender, ethnicity and socioeconomic status. Several authors argue the importance of understanding more fully the relationship between macrosocial structures and social relationships because these relationships may be shaped by different social experiences (House, 1987; House, Landis, & Umberson, 1988; House & Mortimer, 1990; Turner & Marino, 1994).

Studies examining gender differences in morbidity and mortality highlight some differences between men and women (Anson, Paran, Neumann, & Chernichovsky, 1993; Arber & Ginn, 1993; Verbrugge, 1985, 1989; Verbrugge & Wingard, 1987; Waldron, 1983). Mortality rates for men exceed those of women but women tend to report more, and seek more medical care for both acute and chronic conditions that are less life threatening than those that affect men. Some studies suggest that women also tend to rate their health as poorer than do men their health and that the limitations posed by health problems are greater for women than for men (Arber & Ginn, 1993; Lapierre, 1984; Waldron, 1983). These findings are not conclusive, however, since some studies have found minimal or no gender differences on various measures of health status (Kandrack, Grant, & Segall, 1991).

### **Conceptual Issues**

One of the issues addressed in this study related to the conceptualization of socioeconomic status, health status, and social relationships. Socioeconomic

status can be defined in several ways, but based on the literature review, the decision was to include the two separate components of income and educational attainment. Similarly, health status has many definitions with debate surrounding the items that most appropriately tap this concept in population health surveys. For the purpose of this study, self-rated health was chosen as the measure of health status. The literature review and operationalization of these concepts provides a more in depth discussion and rationale for these decisions.

Another issue in this study was to arrive at a conceptualization of social relationships that was coherent with the literature in this area. The term 'social relationships' was used in this study because of its conceptual value in including many facets of relationships including social support, social networks, and social integration (House, Landis, et al., 1988). This issue became a challenge as the literature review revealed the numerous ways of operationalizing social relationships and their components of social support and social networks, and the paucity of consensus on definitions. Several themes, however, emerged from the literature review. It is advisable to include specific components of social relationships as it appears that different components may have different health effects. The literature also draws a distinction between social networks as part of the structural aspects of social relationships and social support which incorporates the expressive or emotional aspects of relationships. It is evident in the literature that the concept of social support includes many facets, each of which provides different types of information regarding peoples' support systems

and their possible consequences for health. Social support can be conceptualized in terms of its perceived availability and perceived adequacy. Social support can also be operationalized in terms of the specific support received and the sources of this support, as well as the support that is provided to others and its effects on individuals' health. Along with the supportive aspects of social relationships are the possible negative consequences that result from relationship strain. Therefore, social relationships were defined by drawing on the work of several authors, many of whom recommend that the components of social relationships be as specific as possible. Ultimately, the definition of social relationships used in this study was somewhat limited by the availability of appropriate items to tap the concept.

### **Research Questions**

The purpose of this study was to examine the effects of gender, socioeconomic status and social relationships on self-reported health status. Various explanations for gender differences in health are discussed and set the stage for arguing that it is important to view women separately from men when discussing the effects of both socioeconomic status and social relationships on health. The literature review presents a summary of findings concerning the relationship between socioeconomic status and health and an overview of some explanations offered for this relationship. The differential effects of specific components of socioeconomic status on the health of women and men are

discussed. The review of the literature addresses varying conceptualizations of social relationships and the explanations for the way in which these relationships might operate to affect health are presented. Gender differences in health status lead us to consider the question of whether there are also gender differences in the effects of perceptions and usefulness of social support in relation to health status.

In summary, this study examined some aspects of the social determinants of health in order to address the question of whether social relationships are mediating influences in the relationships among gender, socioeconomic status, and self-reported health. The research question was addressed through a secondary analysis of data from a recent health promotion survey conducted in the Yukon Territory of Canada. This general research question was addressed through seeking answers to the following specific questions:

1. What effect does socioeconomic status have on the self-rated health of women and men?
2. Are there differences in perceptions of social relationships that can be explained by either gender or socioeconomic status?
3. What effects do perceptions of social relationships have on self-rated health status?
4. Do the relationships among socioeconomic status, social relationships and self-rated health status differ for women and men?

This study adds to the work in this area by specifically postulating the mechanisms through which socioeconomic status (income and education) may affect self-rated health status and by assessing whether there is a gender interaction in any of these relationships.

The value of this research is in its potential contribution to our understanding of the relationships between selected determinants of health and self-rated health status as well as the potential to shed more light on the interrelated effects of these factors. A greater understanding in this area has the potential to provide guidance and direction for policy development and the subsequent development of programs that can enhance or support those aspects of the social environment that influence improvements in health for specific groups of people based on their social position.

## **CHAPTER 2**

### **REVIEW OF THE LITERATURE**

#### **Approach to the Literature Review**

This study examines several overlapping areas of literature that address the social determinants of health. Gender, socioeconomic status (SES) and social relationships, in various studies, have been demonstrated to be associated with health status. The focus of this literature review is to provide first an overview of gender differences in adult health status together with some proposed explanations for the observed differences between the health of women and men. The literature review then summarizes research that addresses the independent effects of SES and social relationships on health status with a further discussion of how gender interacts with these two social determinants of health. The purpose of this final section is to examine previous research findings that probe the differential effects of SES and social relationships on the health of women and men.

#### **Gender and Health**

##### **Gender Differences in Health**

Studies examining the relationship between gender and health cite evidence showing age-adjusted gender differences in mortality and morbidity

patterns. To gain a clearer understanding of gender differences in health it is useful to examine specific patterns that emerge for various indicators of mortality and morbidity.

The accumulated evidence is relatively consistent in identifying gender differences in both mortality rates and causes of death. In a review article summarizing data from several national surveys in the United States, Verbrugge and Wingard (1987) summarized findings that suggested that women live longer than men. The life expectancy for women exceeded that of men by approximately seven years and for the twelve leading causes of death, the age-adjusted mortality rate was higher for men than for women. The pattern was similar in Canada where data from the late 1970's indicated that women's life expectancy was 7 to 7.5 years greater than that of men (Lapierre, 1984; Wilkins & Adams, 1983). These differences had been increasing since the early 1900's but since 1970 the trend has slowed for those between the ages of 45 and 74 with evidence indicating that the life expectancy gap between the sexes began to narrow during the 1980's (Lapierre, 1984; Passannante & Nathanson, 1987; Verbrugge & Wingard, 1987; Waldron, 1993; Wilkins & Adams, 1983). In developed countries, this may be due to an increase for women in mortality from specific causes (e.g., lung cancer) (Statistics Canada, 1995b; Waldron, 1993) and a decrease for men in deaths from causes such as lung cancer, heart diseases, and injuries (Waldron, 1993). A more recent report (Statistics Canada, 1997) on life expectancy of women and men in Canada notes that the life

expectancy at birth rose to new highs for both men and women in 1995, and the gap between the sexes continued to narrow (81.3 years for females at birth and 75.3 years for men). Life expectancy at birth in the two Canadian territories is below that of the provinces (72.4 years in the Yukon Territory).

When one examines different measures of morbidity and health status a more complex pattern of gender differences in health begins to emerge (Kaplan, Anderson, & Wingard, 1991; Popay, Bartley, & Owen, 1993; Verbrugge, 1985, 1989). An analysis of health statistics in the United States and Canada shows that women appear to have both higher rates of acute illnesses and higher rates of most chronic conditions that are not fatal (Lapierre, 1984; Verbrugge & Wingard, 1987). Men, on the other hand, have higher injury rates and also exceed women's rates for fatal chronic conditions. In the late 1970's in Canada, male excess mortality for the younger age groups was three times that of women with this excess explained largely by accidental deaths (Lapierre, 1984).

Verbrugge and Wingard (1987) claim that women experience higher rates of morbidity, but men experience more serious morbidity. This may be somewhat of an overgeneralization, however, since some studies have suggested that women have some health advantages when age-specific and condition-specific causes of mortality are reviewed (MacIntyre, Hunt, & Sweeting, 1996; Wingard, Cohn, Kaplan, Cirillo, & Cohen, 1989). Others also note that this broad generalization does not acknowledge the health disparities that exist among

women, for example, on the basis of socioeconomic status (Love, Jackson, Edwards, & Pederson, 1997).

On health-related outcomes of disability days or number of restricted activity days, it is noted that women tend to report higher rates than men for both acute and chronic conditions (Arber & Ginn, 1993; Lapierre, 1984; Verbrugge & Wingard, 1987; Waldron, 1983). On measures of self-assessed health, some studies report that women tend to rate their health much poorer than men rate their health throughout most of the age groups (Anson et al., 1993; Rahman, Strauss, Gertler, Ashley, & Fox, 1994; Ross & Bird, 1994; Verbrugge, 1989; Verbrugge & Wingard, 1987; Waldron, 1983).

The evidence, however, on gender differences in self-rated health is not entirely consistent. Nathanson (1980) noted in her analysis of cross-sectional data from the 1974 U.S. Health Interview Survey, that differences in self-ratings of health by gender were not explained by a simple difference between women and men. For example, when she considered employment status, employed women and men were similar in their self-ratings of health and it was specifically women who were not employed outside the home (i.e., housewives) who had poorer ratings of health. One Canadian study (Statistics Canada, 1994) noted that overall, men were only slightly more likely to report positive perceptions of their health than women were to be positive about their health. Men between the ages of 15 and 24, however, were more likely to rate their health positively; this

pattern was reversed for women and men between the ages of 25 and 44. Other studies (Kandrack et al., 1991; MacIntyre et al., 1996), however, have found no significant differences between men and women on their self-reported health status.

In summary, some of the evidence reveals patterns of health for men and women differing in several ways. Women tend to report higher rates of acute and chronic conditions but men tend to experience higher rates of life-threatening chronic conditions and traumatic injury. Women tend to have higher rates of activity restriction and disability for acute and chronic conditions and some studies have found that women's self-ratings of health are lower than men's. The broad categories of leading causes of death are the same for men and women but men experience higher rates of mortality. Recent evidence, however, suggests that the gender gap in mortality rates is decreasing.

### **Proposed Explanations for Gender Differences**

Given the apparent differences in the health of men and women as reported by a number of studies using a variety of measures, this review now turns to the proposed explanations for these apparent differences. Some authors have summarized the most commonly presented hypotheses that provide possible explanations for the major patterns of death and health by gender. The explanations for gender differences in health include genetic or hereditary factors (Verbrugge, 1985, 1989), environmental factors (Safran, Rogers, Tarlov, McHorney, & Ware, 1997; Verbrugge, 1985, 1989), differences

in health perceptions and health-reporting behaviour (Gove & Hughes, 1979; Mechanic, 1978; Safran et al., 1997), and experiences with health care (Safran et al., 1997).

The hypothesis of biological risks posits that women's different morbidity rates result from genetic and hormonal differences and that sex, as a biological construct, explains the health differences between men and women (Safran et al., 1997). Other hypotheses explain the differences in the health of men and women by focusing on socio-environmental or psychosocial risks. For these hypotheses, the focus is on gender rather than sex:

While sex indicates that solely biological factors are responsible, gender indicates the presence of social, psychological, and cultural ones as well as biological. (Verbrugge, 1985, p. 157)

Socio-environmental explanations are characterized by Verbrugge (1985, 1989) as acquired risk factors that include lifestyle factors, social roles, stress, quality of social ties and socioeconomic factors. She hypothesized that these aspects may be different for men and women and consequently may help explain the differential rates of morbidity.

Psychosocial aspects, as risk factors, relate to those factors that affect perceptions of symptoms and their severity and the tendency to seek health care for these symptoms. The hypothesis concerning health-reporting behaviour proposes that women tend to have better recall about their health problems and behaviours and that this is based on the different socialization experiences of women when compared to those of men. In other words, women may be more

likely to report behaviours and more willing, able, or reinforced to take action to deal with symptoms which results in an influence on the course of their illness. Safran et al. (1997) refer to these explanations as the fixed-role hypothesis or the socialization hypothesis. The former suggests that because of women's responsibilities, they are more able to "take time off" for sickness. The latter hypothesis is based on the view that the social conditioning or socialization process for men and women differs, thus resulting in women having greater sensitivity to physical or health symptoms and consequently being more willing to report these symptoms and to seek help.

Experiences with health care as an explanation is related to the hypothesis of physician bias which, it is suggested, arises from larger societal biases about the role of women and men and which may result in women being diagnosed and treated differently than men (Safran et al., 1997).

In a study designed to test the explanatory power of the three hypotheses of acquired risks, psychosocial aspects and health-reporting behaviour, Verbrugge (1989) concluded that the aspects of social life that most strongly influence health also differ appreciably for men and women. The specific social factors and associated risks that she concluded were influences on the excess morbidity in women were lesser employment, greater felt stress and unhappiness, stronger feelings of vulnerability to illness, fewer formal time constraints, and less physically strenuous leisure activities. These findings, however, may be somewhat limited by methodological issues inherent in the

study design. The data were cross-sectional and the methods of data collection (retrospective interview and prospective health diary) may have elements of recall and reporting bias.

Two studies that examined gender differences in health for those living on a kibbutz hypothesized that fewer gender differences in mortality and morbidity would be evident largely because of the characteristics of kibbutz life that promote greater equality for women. In one of these studies, Anson, Levenson, and Bonnef (1990) reported that women in two kibbutzim rated their health better than men on the measure of self-reported health status. Their findings also indicated no gender differences on other measures of health status and illness behaviour. These findings led the researchers to conclude that gender differences rather than sex differences accounted for mortality and morbidity differences between women and men. Another study, however, assessed life expectancy on kibbutzim<sup>1</sup> and found that although the gender differences in life expectancy were less than those in the general population, it was the men on the kibbutz who gained, leading to a narrowing of the gap, and possibly refuting the hypothesis that aspects of social life in most societies account for women's lower health self-ratings (Leviatan & Cohen, 1985).

### **Social Roles Explanation**

Several studies have addressed socio-environmental risks as an explanation for gender differences in health by examining the specific influence

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<sup>1</sup> The data for this study were taken from the kibbutz federations' statistics that reported data for 73 societies for the years 1975-1980.

of social roles. The social roles explanation for gender differences in mortality and morbidity is based on the argument that the differing social positions of women and men account for some of the consistently observed health differences. The definition of social roles varies and in some studies has been defined by researchers as including marital status and social status while other researchers have focused specifically on women's and men's employment status. Still other studies have focused on the effects of multiple roles (marital, parental and employment) on women's and men's mortality and physical health.

The focus on the social roles explanation is related to the purpose of this study, which has the primary interest of examining aspects of the social environment that may differentially affect women's and men's health. To explore the literature on pertinent aspects of the social environment, this section will focus specifically on a review of studies that examined differential effects of marital status and the effects of multiple roles on women's and men's health.

#### Health effects of marital status

Some studies have shown significantly different effects of marital status on the mortality risks of women and men with the finding that marriage appears to have a more beneficial effect for men (Gove, 1973; Hu & Goldman, 1990; Umberson, 1987; Verbrugge, 1983; Verbrugge & Madans, 1985). For example, Hu and Goldman (1990) studied the effects of marital status on the risk of mortality for women and men in 16 developed countries and found that unmarried men were at a greater risk of dying than married men and that this

excess was greater than that noted in unmarried women. Among those who were unmarried, divorced men had the highest risk of mortality.

A longitudinal study (Goldman, Korenman, & Weinstein, 1995) examined the relationship between marital status and the outcomes of disability status and mortality for a group of non-institutionalized elderly women and men. After controlling for the effects of social support, social networks, and socioeconomic variables (education, home ownership, and private health insurance) the researchers found that widowed men had higher odds of mortality and higher risks of disability than married men. The differences for widowed and married women were smaller and non significant.

Two studies used prospective panel data from the U.S. National Longitudinal Surveys of Young Women to assess whether marital status had differential health effects on various groups of women. The first study (Waldron, Hughes, & Brooks, 1996) examined health status differences, as measured by a health problems scale, between married and unmarried women who were between the ages of 24 and 34. Their findings indicated significant beneficial effects of marriage but only for those women who were unemployed. Those women who were neither married nor employed had the poorest health status; the researchers noted that this disadvantage could be related to their lower levels of education and income. The researchers explained the beneficial effects of marriage for women in the context of their access to greater family income, increased likelihood of availability of social support, and the potential for fewer

damaging health behaviours. On this latter point it has been suggested that marriage may prevent people from engaging in behaviours such as smoking, excessive drinking, and neglect of medical regimens (Umberson, 1987; Wyke & Ford, 1992).

An extension of this study (Waldron, Weiss, & Hughes, 1997) suggested relatively few differences between never-married and divorced or separated women on three health outcomes of existence of health problems, psychosocial impairments, and psychosomatic symptoms. In contrast, other studies (Anson, 1989; Elstad, 1996) have found that divorced and separated women were at a greater health disadvantage than never-married women and that the health of never-married women was similar to that of married women (Elstad, 1996). Possible explanations for these conflicting findings may be related to differences in both the health outcome variables used and in the age structure of the samples. The use of long-standing disease by Elstad (1996) may not be comparable to the broader range of morbidity measures used by Waldron et al. (1997). In addition, Waldron et al. used a sample that was much younger so it may be possible that there are differences by age and cohort that would not be detected.

#### Health effects of social roles: women and men.

Two longitudinal studies that examined the relationship between multiple roles and women's and men's mortality risks came to similar conclusions. Hibbard and Pope (1991) concluded that women who were not employed were

at a significantly greater risk of death at the end of their 15-year follow-up period. This trend was similar although non-significant for men. Married women in lower status occupations had a higher mortality risk than unmarried women in similar occupations (similar to the findings of Haynes & Feinleib, 1980). Parenthood had different effects on the health of employed and unemployed women but no effects on men's health. Overall, they concluded that having more roles (employment, marriage, parenthood) appeared to have a protective effect on mortality risks for women. This was supported by the findings of an 18-year longitudinal study that examined the effects of multiple roles on mortality risks of women and men and concluded that women with the largest number of roles had the lowest mortality risks from all causes (Kotler & Wingard, 1989).

Studies that have examined the association between multiple roles and women's and men's self-rated health have primarily been cross-sectional designs that do not consistently examine the same combination or operational definition of social roles. Anson et al. (1993) studied a non-random sample of men and women with similar clinical conditions who were undergoing similar treatment regimens and found that women had poorer self-ratings of health and reported a higher number of symptoms than men. They found that the women in their study had lower levels on their measures of 'role-related' risks of happiness, satisfaction with family functioning, and sense of coherence and higher levels of distress. After controlling for these factors, the gender differences in self-reported health diminished. These findings may lack generalizability, however,

because of the use of a small convenience sample with very specific clinical conditions. Arber and Ginn (1993) explored health inequalities in elderly men and women by examining the influence of “class position” (last occupation) and possession of material resources on self-rated health status and functional disability. With increasing age both self-rated health and functional ability declined for men and women; elderly women tended to rate their health only somewhat less favourably than elderly men but were at a much greater disadvantage than men on ratings of functional ability. They also concluded that having been in a higher occupational class and having a higher level of material resources positively affected the health status of elderly women and men, although the effects were weaker for women.

Contrary to these studies, Kandrack et al. (1991) reported no gender differences in self-reported health status in their survey of a random sample of 524 individuals over the age of 18 in Winnipeg, Manitoba. They defined social roles as including both marital status and social status variables of education, income and employment status. They did, however, find significant differences between men and women in the use of specific individuals in their social networks; men tended to rely on spouses for social support while women reported they rely on children and friends for this support. They reported other gender differences where women reported a higher number of bed days because of illness than men reported.

Bird and Fremont (1991) focused specifically on the time spent in social roles in their study that explored gender differences in self-rated health. Their focus on social roles as an explanation for gender differences in health was based on the work of Gove and Hughes (1979), who in their cross-sectional study of a randomly selected sample from a large American city, found that the obligation to care for others, inherent in women's roles, affected their ability to care for themselves, thus leading to poorer health. Bird and Fremont hypothesized that women's caring and nurturing roles result in less time to care for themselves. They explored this hypothesis by examining the amount of time spent in the roles of paid work, housework, child care and caring for others and found that self-rated health was associated positively with paid work and negatively with household labour. Their findings showed that self-rated health was not related to time spent on child care or helping others. In their study, women did not spend more time than men in helping others and, contrary to their hypothesis, caring for others for both women and men was positively, not negatively, associated with health.

In a cross-sectional study of adult men and women aged 20-59, Arber (1991) explored the relationship between paid employment and occupational class (structural variables) and women's roles (marital and parental) and limitations posed by a long-standing illness. In her study, the important factors in explaining men's health were unemployment and occupational class. For women, the important factors were family roles, employment status and material

circumstances (house and car ownership). Somewhat similar findings were noted by Popay et al. (1993) who measured the health status (symptoms and limiting long-standing illness) and affective state of a sample of 2,643 men and 3,589 women aged 18-59 to test the relationship between minor illness and social position. They found that the rates of affective disorders and morbidity were higher for women than for men in each category of social roles (marital status, employment status, social class, and income) examined in their study.

Health effects of social roles: among women.

Verbrugge and Madans (1985) reviewed studies that had focused specifically on women to summarize the effects of the social roles of employment, marriage and parenthood on American women's health status. They concluded that married women had better physical health than unmarried women using the indicators of disability days, chronic limitations and self-rated health status. This difference was apparent across all age groups except for those women in the youngest age group (between the ages of 17 and 24). Employed women did better than unemployed women on all health measures. Being a parent, however, did not provide uniform or consistent health benefits for women. These were consistent with the findings of a longitudinal study (Waldron & Jacobs, 1989) where it was noted that those women who were married, employed, or both had better health trends, while parental status had few effects on women's health status. These beneficial effects, however, were not consistent across different groups of women. Being employed was more

beneficial for white women who were unmarried while being married had more positive effects on the health of those women who were not in the labour force. For black women, marriage did not provide the same beneficial health effects for those who were unemployed while being employed had beneficial effects for black women with children.

## **Summary**

This literature review raises several issues about our understanding of gender differences in health. Firstly, evidence suggests that some measures of health status, such as self-rated health and medical utilization rates, differ for women and men. Secondly, the explanations offered for these differences highlight the potential value of examining socio-environmental factors to explain these differences in health status. The hypothesis that men and women have different experiences as a result of their social positions suggests there is merit in examining health status on the basis of gender.

Social support and SES are two aspects of the social environment that are hypothesized to explain the differential mortality and morbidity rates for women and men (Kandrack et al., 1991; Matthews et al., 1997; Verbrugge, 1985, 1989; Verbrugge & Wingard, 1987). Connected to the hypothesis that differences in social roles may explain some of the differences in health status for men and women is the idea that both the sources and the effects of social support may differ by gender partly as a result of the differentiation in social role expectations. Other studies raise the importance of social class or social

position as an environmental factor which might also help in explaining gender differences in health. These two aspects appear to have differential influence on the health status of women and men. This observation raises some questions as to the way in which social support and socioeconomic level might interrelate in their effects on the health of women and men.

Social support research both acknowledges that some risk factors (e.g., health behaviours, working conditions) may explain a large proportion, but not all, of the variance in individual and group differences in health and disease and recognizes that social class differences in health and disease still persist despite many interventions (Oakley, 1992). All of these reasons highlight the potential value of research that addresses the fact that women's experiences may differ from those of men and that gender shapes the factors that affect health (Kaufert, 1996). Oakley and Rajan (1991) suggest that components of social relationships are influenced by the context in which they occur and argue that class differences affect the experiences of women. This raises the issue of considering the effect of women's social relationships on their health within the context of their SES.

### **Socioeconomic Status and Health**

This section of the literature review provides a general overview of studies that have examined differences in health status based on various measures of SES. The review addresses the proposed explanations for these apparent

differences and provides a summary of the findings of studies that have examined differences in SES and health for women and men.

### **Socioeconomic Differences in Health**

Numerous authors cite evidence of a relatively consistent relationship between lower levels of SES and poorer health outcomes. This finding is consistent across a broad range of health status measures and persists when considering mortality and morbidity rates, as well as risk factors (Millar & Wigle, 1986; Winkleby, Fortmann, & Barrett, 1990; Winkleby, Jatulis, Frank, & Fortmann, 1992), risky behaviours (Lundberg, 1991), health knowledge and beliefs (Luepker et al., 1993; Winkleby et al., 1990). What is striking about these findings is the persistence of higher rates of mortality and morbidity for those of lower SES as well as the gradient<sup>2</sup> that is experienced across the range of socioeconomic levels (Duncan, 1996; Evans, 1994; Ford, Ecob, Hunt, MacIntyre, & West, 1994; Green, Simons-Morton, & Potvin, 1997; Roberge, Berthelot, & Wolfson, 1995; Williams & Collins, 1995).

Two landmark studies have provided evidence that highlights socioeconomic differentials in mortality risks. The Whitehall study (Marmot, 1986; Marmot, Shipley, & Rose, 1984) followed approximately 10,000 British civil servants over two decades and found large health differentials across

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<sup>2</sup> The notion of the gradient is explained by Williams and Collins (1995): "Thus, elevated rates of disease and death are not restricted to the low occupational grades but are evident even for privileged groups, when compared to those of highest SES" (p. 352). Green et al. (1997) describe the gradient, "The advantages associated with better socio-economic conditions increase across the whole spectrum of each socio-economic indicator" (p. 130).

occupational groups as well as a gradient among occupational groups for many different causes of death. The Black Report (Townsend & Davidson, 1982), showed evidence of large differences in mortality by socioeconomic class over the entire population of the United Kingdom. Other studies have confirmed that people with lower SES have lower life expectancy and higher mortality rates than those with higher SES (Antonovsky, 1967; Duleep, 1995; Kaplan, Haan, Syme, Minkler, & Winkleby, 1987; Robert, 1998; Wilkinson, 1986a). Other studies have also confirmed that the relationship between lower levels of SES and higher age-adjusted death rates has been consistent over several time periods (Pappas, Queen, Hadden, & Fisher, 1993; Wilkins, Adams, & Brancker, 1989).

The relationship between SES and health is also found in studies examining morbidity rates and other health outcomes. Studies have found that those in less prestigious occupational groups tend to have higher rates of workplace absence due to illness (Marmot, 1986) and that the gradient by occupational class also holds up for chronic and acute illnesses (Townsend & Davidson, 1982). In a study examining the associations between health and social positions, MacIntyre (1986) concluded that those in lower occupational classes have higher mortality rates and a greater number of psychiatric symptoms. She defined social position as including occupational class, gender, marital status, age, ethnicity and area of residence. In her conclusions, she also suggested that insofar as an individual simultaneously occupies a position on all

of these social positions it is possible that the interactions among these factors may have important influences on health.

The Whitehall II Study (Marmot et al., 1991) followed men and women between the ages of 35 and 55 who worked in British civil service positions between 1985 and 1988. The self-administered questionnaire included an array of health status measures, items related to work characteristics, social network and social support,<sup>3</sup> health behaviours and life events, including measures on locus of control. All respondents were classified according to their grades of employment collapsed into six categories. The findings supported an inverse relationship between the employment category and the number of symptoms reported in the fourteen days prior to the survey and self-rating of health. Those in the lowest job category were twice as likely to rate their health as average or poor compared to those in the top level of the six job categories. They concluded that “socioeconomic differences in health status have persisted over the 20 years separating the two Whitehall studies” (p. 1391). The researchers also noted that those in lower status jobs were also less likely to have available social supports and to be less satisfied with their social supports. They also observed the gradient that has been evident in other studies that have examined the relationship between SES and mortality.

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<sup>3</sup> Fifteen questions were asked and based on a principal components analysis the authors noted that they collapsed these items into three categories of: confiding/emotional support, practical support and negative aspects of support.

Other studies have found that those individuals in lower income and educational attainment groupings have poorer health outcomes on a range of measures. Those with lower income have been found to have a higher number of days of restricted activity and bed disability (Newacheck, Butler, Harper, Piontkowski, & Franks, 1980), a higher number of reported limitations due to chronic conditions (House et al., 1990), and higher levels of morbidity as measured by "treatment prevalence" (Mustard, Derksen, Berthelot, Wolfson, & Roos, 1997).<sup>4</sup> It has also been noted that the prevalence of chronic conditions varies by SES; the largest differentials have been observed among those in the age group of 35 to 64 with the differential among SES groupings not decreasing until people were into their late 70's (House et al., 1990).

Analyses of data from both the 1985 and 1990 Canada Health Promotion Surveys concluded there is a relationship between educational attainment and income adequacy and self-rated health and activity limitations (Adams, 1993; Wilkins, 1988). Those with limited education had poorer self-rated health and more activity limitation due to health problems. The lowest self-rated health and most activity limitation were reported by those with low income, minimal education, no employment, and whose main activity was keeping house (Wilkins, 1988).

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<sup>4</sup> Treatment prevalence was constructed from a measure that included receiving medical care over a one year period for a specific category of medical disorder. The researchers acknowledged that the use of treatment prevalence as a measure of health status must be viewed with some caution (Mustard et al., 1997).

Robert (1998) examined whether the SES of a community<sup>5</sup> had an influence on community health status that was greater than the influence of individual socioeconomic characteristics. In a nationally representative sample, she examined this question using regression techniques and concluded that individual and family SES still exert an important influence even in the context of the SES of the community. She also concluded that the two common SES indicators of education and income may be more important predictors of health status for younger than for older people.

### **Proposed Explanations for Socioeconomic Differences**

The explanations offered for the relationship between SES and a wide array of health measures have been debated for some time with some authors discussing the 'drift' hypothesis, which assumes that individuals' socioeconomic conditions deteriorate as a result of poor health (MacIntyre, 1986). It has also been suggested that the observed relationship is spurious or is due to an 'artefact' effect based on problems with the measurement of 'health' and 'social position' (Blane, 1985; Marmot, Kogevinas, & Elston, 1987). Another explanation proposes that those in the lowest socioeconomic groups have poorer health because they do not have the same access to health care<sup>6</sup> (Adler et al., 1994). The debate includes consideration of aspects of the social

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<sup>5</sup> Robert (1998) operationalized community SES as three variables: percentage of households receiving public social assistance, percentage of adults who were unemployed, and percentage of families with annual income less than \$30,000.

<sup>6</sup> Although this is cited as one of the possible explanations, Adler et al. (1994) note that countries that provide universal health coverage also show the gradient between SES and health.

environment that may explain the relationship between SES and health (Adler et al., 1994; Evans, 1994; Green et al., 1997; LeGrand, 1982; Wilkinson, 1994; Williams, 1990).

Williams (1990), in a review of the literature on the relationship between SES and physical health status, emphasized the role played by psychosocial factors in mediating the relationship with social structures and health outcomes. His consideration of psychosocial factors includes health practices, social ties, perceptions of control and stress (family, occupational and residential). Rather than viewing lifestyle as solely an individual characteristic, Williams proposed a "social structure and personality perspective" in understanding this relationship which he argued "calls for the lifestyles of the poor to be understood within the social context of their lives" (p. 87). This opinion is shared by Green et al. (1997) who make a distinction between lifestyle as a behavioural concept and lifestyle as a sociological concept. In the latter, the social behaviour of the group remains the focus but lifestyle is seen as a "set of conditions that surround the social group, including their cultural history and socio-economic circumstances" (p. 133).

Williams (1990) discussed three principles that can be applied to the study of relationships between social stratification and health outcomes. The components principle, the proximity principle and the psychological principle each address different aspects of research concerning the link between SES and health status. The components principle refers to understanding the nature of

social structure and in this case refers more specifically to the conceptualization and measurement of SES. The proximity principle addresses the view that "social structures exert their effects through factors that bear directly on the individual" (p. 93). This is similar to MacIntyre's (1986) categorization of explanations that consider the social patterning of health through studying the influences of life circumstances, behaviour, and knowledge. Finally, the psychological principle is related to understanding the processes through which individuals respond to their social structure. Williams explained, "Thus the nature of the social influence will be affected both by the particular context in which behavior unfolds and by the meanings that the individual attributes to the situation" (p. 94). MacIntyre referred to beliefs and attitudes as falling into a category of explanation that could be construed as a lifestyles approach to health determinants and argued that the two general explanatory approaches (social patterning and lifestyles) represent the tensions between structural/materialist explanations and cultural/behavioural explanations for the social inequalities in health. She called for an integration of these two explanatory approaches and argued that they are not mutually exclusive.

The relationship between socioeconomic level and health is also addressed by Wilkinson (1994) who suggested that the health gradient affected by every level of SES is an indication of the psychosocial influences of relative income. He hypothesized that cognitive processes of social comparison are involved across socioeconomic levels and these comparisons result in stress. This stress

may be a direct cause of ill health or may lead to participation in health-damaging behaviours.

It has been suggested that limitations or constraints placed on individuals arising from their economic situation are important components of the linkage between SES and health (LeGrand, 1982). This is similar to the view of Kaplan et al. (1987) who proposed a framework of demands and resources to explain why SES has such a strong influence on health:

Specifically, those at low socioeconomic levels face greater environmental demands, both physical and social, and have fewer resources to deal with these demands. By resources, we include system resources such as money and access to medical care, interpersonal resources such as social support, and personal resources such as coping styles. (p. 127)

These personal resources could be expanded to include behaviours (skills), feelings of self-efficacy, and sense of control (Williams, 1990).

These proposed explanations of the relationship between SES and health all point to a similar theme; a further understanding of factors in the social environment may contribute to increasing our knowledge and understanding of the relationship between SES and health.

### **Gender and Socioeconomic Differences in Health**

SES can be conceived of as "a composite measure that typically incorporates economic status, measured by income; social status, as measured by education; and work status, as measured by occupation" (Dutton & Levine, 1989, p. 30). Although these three components all have been shown to have a consistent inverse relationship with mortality and morbidity rates (Abramson,

Gofin, Habib, Pridan, & Gofin, 1982; Adler et al., 1994; Adler, Boyce, Chesney, Folkman, & Syme, 1993; Anderson & Armstead, 1995; Kunst & Mackenbach, 1994; Robert & House, 1996), evidence also suggests that each component may have differential effects on health status. For example, Kitagawa and Hauser (1973) examined 1960 mortality rates in the United States and concluded that each component of SES (education, income and occupation) contributed to mortality rates. Education, however, was the best predictor of mortality rates for all except the elderly for whom income was a better predictor of mortality. Other studies point to differential health effects of components of SES for women and men. This suggests that to assess the influence of its separate components on health status, SES needs to be disaggregated (Hay, 1992; Kessler, 1982; Liberatos, Link, & Kelsey, 1988; MacIntyre, 1986).<sup>7</sup>

Some researchers have focused on the analysis of gender differences in the relationship between SES and mortality with some finding excess mortality rates for men in the lowest strata (Elo & Preston, 1996; Feldman, Makuc, Kleinman, & Cornoni-Huntley, 1989; Koskinen & Martelin, 1994; Pappas et al., 1993; Pugh & Moser, 1990, Wigle & Mao, 1980) and others finding little or no

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<sup>7</sup> The issue of whether occupational class should be included as a socioeconomic indicator in studies assessing the effects of gender on health is addressed by several authors. Some have raised the question of whether occupational status is an accurate indicator of the socioeconomic level of women's lives (Adler & Coriell, 1997; Krieger & Fee, 1994; Macran, Clarke, Sloggett, & Bethune, 1994). This argument is premised on the view that the usual classification system is based on men's occupations and the categories do not necessarily represent women's occupational experiences or prestige (Pugh & Moser, 1990). This may be the result of women's greater concentration in lower paying occupations (Pugh & Moser, 1990) and their differing patterns of employment because of childbearing, family, and child care responsibilities (Hart, 1997; Krieger, Williams, & Moss, 1997; Pugh & Moser, 1990).

gender differences in the relationship between SES and mortality (McDonough, Duncan, Williams, & House, 1997; Sorlie, Backlund, & Keller, 1995). This section reviews studies that have focused on gender differences in mortality and other health outcomes and summarizes findings from studies that have examined the SES and health outcome relationship among women.

#### Mortality outcomes.

Three Canadian studies (Millar, 1983; Ugnat & Mark, 1987; Wigle & Mao, 1980) reported that income was inversely related to mortality and that the magnitude of the relationship was stronger for men than for women. Wigle and Mao (1980) analysed 1971 mortality data by median household income level for Canadian metropolitan census areas. In a comparison of the highest and lowest income levels they noted a difference in life expectancy of 6.2 years for men compared to 2.9 years for women. For deaths from all causes, the differential by income was greater for men than women except for the 15-34 age group. An analysis of this same data indicated that gender differences in age-specific mortality rates were greater in lower than in higher income groups (Millar, 1983). An update of this study with 1984 data (Ugnat & Mark, 1987) found similar results; the difference in life expectancy by income level was greater for men than for women across all ages. Contrary to their claim that this difference began to diminish rapidly for those over 45, a closer inspection of the data revealed that the income differences did not decline. These three studies may have some limitations particularly in the choice of median household income of

the census tracts as the measurement of income and the failure to adjust for family or community size.

Other studies, however, have provided support for these findings. An examination of mortality data from the U.S. National Longitudinal Mortality Survey (Elo & Preston, 1996) across four separate gender-specific age groups (women aged 25 to 64 and 65 to 89; men aged 25 to 64 and 65 to 89) found that educational level and income had similar effects for women and men in that there were stronger effects on mortality in the younger group than on those over age 65. The magnitude of the effects, however, was larger for men than for women on both measures of SES. These findings were similar to the results of a Finnish study where it was found that, for the population between the ages of 35 and 64, the influence of education and occupation on mortality was different for women and men; the effects were larger for men (Koskinen & Martelin, 1994).

Haan, Kaplan, and Camacho (1987) conducted a prospective study of adults over the age of 35 who were residents of Oakland, California in 1965. They compared the 1965 to 1974 mortality experience of those who lived in a poverty area with those living elsewhere. In this study, poverty was operationally defined as a composite including income, employment status, education, race and housing conditions. The overall age-adjusted mortality rates were higher in the poverty area but with some differences based on gender. For white males, the poverty area had higher mortality rates at all ages. For white females, the mortality rate in the poverty area was higher than in the other area until the age

of 65 when the mortality rates between the poverty and non-poverty areas became equal.

Two studies examined changes in mortality rates over time and compared the trends for women and men. Pappas et al. (1993) concluded that the inverse relationships between income and education and mortality were still evident from 1960 to 1986. Although there had been an improvement in mortality rates over this time period, the decline in mortality was more significant for men than for women. Feldman et al. (1989) also noted a differential reduction in the effects of educational attainment on mortality rates for women and men over a time period from 1960 to 1971-84. They concluded that men had a widening of the gap between different levels of education in mortality for middle-aged and older men; for women the relationship between education and mortality remained the same over this time period. For men, the mortality rates in 1960 did not differ by educational level but the data from 1971 to 1984 showed marked differentials where the rate of decline of mortality rates was greater for more educated men. For women, the data from 1960 showed substantially higher death rates for the least educated women. This finding persisted in the 1971-84 mortality data.

The findings from two other studies contradict the hypothesis that there are gender differences in the effect of SES on mortality. The findings from a panel study for the years 1968 to 1989 (McDonough et al., 1997) and an analysis of data from the National Longitudinal Mortality Study (Sorlie et al., 1995) found no significant joint effects of gender and income on mortality. This

was similar to the findings of a Finnish study where differences on the basis of educational level and occupation for cause-specific mortality were similar for women and men (Martikainen, 1995).

The studies reviewed are relatively consistent in suggesting that gender is associated with the effects income and education have on mortality, but these results do not necessarily provide evidence of the influence of gender, income, and education on health status, per se. This review now turns to a summary of several studies that have assessed the influence of women's and men's income and education on different measures of health.

#### Morbidity and health outcomes.

Studies have explored whether SES interacts with gender in its effects on morbidity and other health-related outcomes. Stronks, Van den Mheen, Van den Bos, and Mackenbach (1995) conducted a prospective cohort study to assess whether employment status mediated the relationship between SES and the health status of men and women in the Netherlands. They used educational level and occupation of the major breadwinner as indicators of SES. They measured health status by the number of chronic conditions and self-rated health which they dichotomized into the categories 'good' and 'less than good'. They found that, for both self-rated health and the prevalence of chronic conditions, inequalities in health among women were smaller than for men. Similarly, the results of a British study (Arber, 1997) found that both occupation and educational level exhibited a steeper gradient for men's self-rated health

than for that of women. After controlling for occupational class, employment status and material conditions (housing and car ownership), education had a stronger effect on women's self-reported health than on men's health.

Hay (1992) examined separate components of SES to determine possible differential effects on health status. The study used data from the 1977, 1979 and 1981 Social Change in Canada Surveys whose target populations included all those over 18 years of age who had an address in a census enumeration area in Canada. Hay measured health status with a composite index of overall health that included reports of health troubles, self-ratings of health and physical fitness, reported sickness in the previous six months and reported days of sickness. Family income was used with a poverty line index created to take into account family and community size. Hay found that those who had lower incomes also had poorer health status at all ages. Women overall had poorer health than men although lower income was related to poorer health for both men and women. For men, the strongest predictors of health status were age and income while for women the strongest predictors were age and education.

These findings are similar to those found in a study that assessed the relative influence of income, education and occupation on psychological distress in which Kessler (1982) found that income was the strongest predictor for men. For both employed and unemployed women, the strongest predictor for psychological distress was level of education, although the effect of education was stronger for those women who were not in the labour force.

### Differences among women.

Adler and Coriell (1997) discuss the SES-health gradient among women and noted some evidence to suggest that education, as one indicator of SES, has fewer health benefits for those at the upper levels of education when compared to the lowest levels. They also argue the importance examining the SES relationship with specific diseases and causes of death for women to unravel the relationship. They argue that this focus may provide more promise for understanding the mechanisms that underlie the socioeconomic effects on women's health. They cite the example of breast cancer where women with a higher level of SES have higher rates of breast cancer. The survival rate from breast cancer, however, showed the negative relationship with women's SES that is typical of overall morbidity and mortality patterns. Of those women who were diagnosed with breast cancer, it was more likely that women with lower levels of SES would die from the disease.

Two British studies examined the question of the relationship between women's self-rated health status and their SES as measured by their occupation, employment status, household income and household composition. The findings from both studies concluded that certain groups of women assessed their health differently; those women who were unemployed, in unskilled occupations, single parents or living in low income households were more likely to rate their health negatively (Macran, Clarke, & Joshi, 1996; Macran et al., 1994). The findings of a recent Canadian study (Walters, Lenton, & McKeary, 1995) noted that women

with elementary school education were most likely to report poor health. Macran et al. (1994) also found “occupational group to offer greater explanatory power than income, at least as far as self-assessed health is concerned” (p. 204). This finding is in contrast to that of Popay et al. (1993) who concluded that there was a stronger relationship between household income than occupational class and both minor physical morbidity and affective disorders in women.

### **Summary**

The literature reviewed relates to the conceptualization of SES and the need to consider disaggregating the components (occupation, income and education) to examine their differential effects on health status, and disaggregating health effects to examine specific sources or mechanisms of the SES effects. The first point is supported by Kessler (1982) who found that it may be important to disaggregate SES because of the possible “masking effect” that could occur if several variables are combined into one composite index. The decision whether to treat SES as a composite indicator or as separate variables is also related to the purpose of the study. Treating SES as separate components permits greater statistical power in detecting specific effects of different aspects of SES. Evidence was also reviewed which suggests that each component of SES, and specifically income and education, may have differential effects on the health of women and men. Campbell and Parker (1983), in a comparison of the usefulness of the Duncan socioeconomic index (SEI) and individual indicators, concluded that there is sufficient justification for separating

out the effects of education and income and not including occupational status as an indicator of SES. Krieger et al. (1997) argued that occupational classification, as a measure of SES, may not adequately describe differences in conditions based on race or gender. This measure may not be applicable to those who are not in the paid labour force such as women, for example, who are homemakers.

The second point derived from this review of the literature concern the need to disaggregate the measures of health. The relationship between SES and health is a complex one with the certainty that factors intervene to mediate the relationship (Anderson & Armstead, 1995). Different health outcomes could be mediated by different mechanisms or intervening variables. Illsley and Baker (1991) argued that a class-based analysis to understanding inequalities in health is limited and that a deeper understanding of contextual factors that shape inequalities and health is important when examining explanations for differences in health status. Corin (1994) and Evans (1994) echoed this opinion and argued that while SES has an influence on health, it does not encompass all of the factors in the social environment and that an exclusive focus on SES may lead to a failure to locate other influential factors.

Socioeconomic status (SES) is, however, only one aspect of the social context. Such status, however defined, is very far from encompassing all the ways in which the social environment may influence health, or focusing all the possible strategies for remedial policy and action. An exclusive emphasis on SES could have the perverse effect of enforcing a purely objective and deterministic conception of environmental influences on the health of individuals and groups. (Corin, 1994, p. 127-128)

What this suggests is the importance of considering other facets of an individual's social environment that could enhance our understanding of the complex relationship between SES and health. Both the components and proximity principles (Williams, 1990) are relevant to the current research study since the emphasis is on the way in which the larger social structures (SES, for example) affect an individual's health through intermediate structures, such as social ties or social relationships. Gender is one factor that affects health but this raises the question of the way in which SES affects the health of women and men differently. It may be possible that other aspects of the social environment can be introduced to further explain the gender and socioeconomic differences in health status. Another aspect of the environment that has been shown to influence health is the existence and supportiveness of people's social relationships.

### **Social Relationships and Health**

"Social relationships" is an 'umbrella' term that encompasses several aspects of the ways in which people's connections to others can influence their health status (House, 1987; House, Umberson, & Landis, 1988; Umberson, Chen, House, Hopkins, & Slaten, 1996). Specifically, the concept of social support is one component while other aspects of social relationships include the type, quantity, and quality of relationships with others (Barrera, 1986; House, 1987; House, Umberson, et al., 1988). This section reviews the definitions and

conceptualizations of social relationships through a discussion of social networks, social integration, and social support, reviews proposed explanations and empirical evidence for the association between social relationships and health, and discusses findings that suggest differential effects of social relationships on the health of women and men.

### **Defining Social Relationships**

The conceptualization of social relationships is discussed in the context of varying definitions of social networks and social support. Although there is no agreement on one definition of social support, the theme of social support and social networks being different concepts is consistent in the literature. Several authors (Matthews et al., 1997; Schwarzer & Leppin, 1992; Seeman & Berkman, 1988; Thoits, 1992; Umberson et al., 1996; Vaux, 1992) note that, although they find no consensus on the definition of social support, it is nonetheless important that different dimensions of supportive relationships be identified and specified. Some authors view social support as being a subset of social networks (Auslander, 1988a, 1988b; Israel, 1982) while others see both social support and social networks as components of a larger concept of social relationships or social interactions (Eurelings-Bontekoe, Diekstra, & Verschuur, 1995; House, 1987).

#### **Social networks and social support.**

Social relationships can be grouped into two general categories: social networks and social support (Wortman & Dunkel-Schetter, 1987). A person's

social network can be defined as the actual size of their network of social contacts (Auslander, 1988a, 1988b; Israel, 1982), which has an influence on the availability of social support (Mitchell & Trickett, 1980). The network can also be characterized by its density, or the extent to which the members of an individual's social network interact with or know each other. A network of social contacts can include the actual number of close friends or relatives as well as one's marital status and can also incorporate the mobilization of social ties (Auslander, 1988a, 1988b). The mobilization of social ties can refer to the frequency of contact or visits with friends and relatives, church attendance and participation in groups or organizations. Barrera, Sandler, and Ramsay (1981) refer to the concept of 'social embeddedness' which measures the nature and structure of social ties with others and which would foster social network analysis. The relationship of social ties to health is believed to be related to the social integration function provided by these ties or connections to others.

Barrera (1981) argued that including the concept of social integration in research studies will "provide information concerning the extent to which individuals are linked to significant people and have opportunities to interact in ways that might foster the expression of support" (p. 71). Social integration is hypothesized to affect health through shared beliefs and responsibilities, commitment, rewards and social control (Anson, 1989; Umberson, 1992). Social integration can represent the social contacts or social ties that an individual has and can be operationalized as membership in community organizations and

living arrangements. One social tie that is considered an aspect of social integration is one's marital status (Alwin, Converse, & Martin, 1985; Anson, 1989; Hibbard, 1985). Hurlbert and Acock (1990) examined the relationship between marital status and social networks and concluded that those who were married had denser networks (i.e., more social ties) than those who were not married. They proposed that having more social ties could lead to greater social support. Umberson (1992) proposed that marital status influences health status through the social control function that she argued is a dimension of social integration. She hypothesized that spouses (particularly women) have influence on facilitating or controlling health behaviours. These, in turn, affect overall health.

Others refer to social networks as the structural or interactional dimensions of an individual's social contacts (Ell, 1984; Thoits, 1982; Wortman & Dunkel-Schetter, 1987). Social network analysis is seen as the starting point for understanding how individual and environmental factors influence the availability of social support (Mitchell & Trickett, 1980) but should not be confused with the support that is actually available to an individual. Social network focuses on the size, frequency and intensity of interactions but does not specify whether all these interactions are seen as supportive by the individual (Israel, 1982, O'Reilly, 1988).

Social support, on the other hand, incorporates individuals' perceptions of their social network by addressing the supportiveness of these social contacts or

social ties (Auslander, 1988a) or the quality of social relationships (Wortman & Dunkel-Schetter, 1987). Thoits (1982) referred to social support as the functional component of an individual's social network which includes perceptions of both the amount and adequacy of support received. Social support refers to both the emotional and material support that people obtain from their social network (Ell, 1984; Israel, 1982) and can also include more tangible forms of support through task-oriented assistance, communication of expectations and access to new information (Mitchell & Trickett, 1980). Other authors have highlighted the view that social support is actually a subset of individuals in one's social network who provide support (Ell, 1984; Thoits, 1982). Social support can also be conceptualized along dimensions of availability or perceived social support, adequacy (satisfaction with support that was received), activation or the ability to mobilize one's social ties (Wortman & Dunkel-Schetter, 1987) and can include assessments of both support received and provided to others (Tardy, 1985).

#### Relationship strain.

The concept of social support is often viewed in the context of its supportive or positive relationship to health but some writers note the potential negative aspects of social support that also should be considered (Gerstel & Gallagher, 1993; House, Umberson, et al., 1988; Kessler & McLeod, 1984; Matthews et al., 1997; Rook, 1984).

Just as social integration and social networks are measured in a variety of ways, so has relationship strain been conceptualized and measured differently. In a two-wave panel study, Umberson et al. (1996) examined the gender differences of the effects of social relationships on psychological well-being. Their concept of 'relational content' included both social support (positive) and relationship strain (negative). Relationship strain was measured by a dimension of care provision which included whether care was being provided for physical or mental illnesses, whether care was being provided directly or was arranged for, the number of hours spent providing care, and an assessment of the level of stress associated with providing this care. They found gender differences in social relationships with women reporting more involvement in intimate relationships while support from spouses was more likely to be reported by men. Women were also more likely to have provided care to others and to have experienced more stress from this role than men. Although there were gender differences in social relationships, this study did not find any gender differences in the effects of these relationships on psychological functioning.

The concept of providing care as one measure of the strain of social relationships has been used in some studies. Gerstel and Gallagher (1993) included the concept of provision of care as a measure of the potentially negative aspects of social relationships but with a particular focus on care provided to relatives. Green (1993) used a general measure<sup>8</sup> of care provided to

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<sup>8</sup> This measure was the question: "In the past 30 days, have you helped care for a relative or friend who was suffering from physical or mental health problems?"

others as an indicator of relationship strain in her analysis of data from the 1990 Canadian Health Promotion Survey. Rook (1984) focused more specifically on problematic social ties in her study of the effects of positive and negative social ties on the health of elderly women. In her study, she defined problematic social ties as those individuals identified by the respondent as creating problems for them and found that both positive and negative social ties affected well-being but that the effect of negative social ties was stronger.

#### The concept of social relationships.

Authors have advanced a conceptualization of social support as being a component, along with social networks, of a larger set of social relationships (Eurelings-Bontekoe et al., 1995; House, 1987; House, Umberson et al., 1988; Laireiter & Baumann, 1992; Olsen, Iversen, & Sabroe, 1991; Schwarzer & Leppin, 1992; Vaux, 1988; Wethington & Kessler, 1986). The distinction between social networks and social support remain essentially the same as for those who see social support as a subset of social networks. This view, however, would place social relationships as the overarching concept that includes social support, social networks, and social integration.

#### Determinants of social relationships.

In addition to a need for clarity on the different components of social relationships and their proposed effects, some authors are concerned with the determinants of social support. Social support may be differentially available to or utilized by people based on a number of individual characteristics and

environmental factors (Antonucci, 1985; Israel, 1982; Shumaker & Brownell, 1984). For example, there may be a social selection process operating where those who are healthy have stronger social supports (Thoits, 1982), individual differences in coping style may influence the utilization of support (Israel, 1982), or individual differences in beliefs and behaviours about seeking help may affect the extent to which support is available and utilized (Eckenrode, 1983).

There can be environmental influences that may affect the availability or utilization of social support. In other words, particular resources and demands can vary depending on people's social position or the environmental stressors they face (Antonucci, 1985; House, 1987; House, Landis, et al., 1988; Mitchell & Trickett, 1980). House, Landis, et al. (1988) argued that it is important to consider the determinants of social relationships since these relationships can also be affected by one's social position:

Whether people are employed, married, attend church, belong to organizations have frequent contact with friends and relatives, and the nature and quality of those relationships, are all determined in part by their positions in a larger social structure that is stratified by age, race, sex, and socioeconomic status and is organized in terms of residential communities, work organizations, and larger political and economic structures. (p. 544)

It is also suggested that gender, as an aspect of environmental influences, may affect the availability and utilization of social support. Vaux (1985) suggested that there are significant differences between men and women in terms of the kind and use of social support available to them and that these

differences are connected to their differing social positions.<sup>9</sup> Although gender, as an aspect of social status, has been the focus of studies on the effect of social support on health, Vaux cautioned that it is difficult to separate the effects of the interaction of other components of social status. To separate gender from other facets such as ethnicity and age may result in an oversimplification of reality. Although not specifically referred to by Vaux, there is some evidence to indicate that components of SES are also aspects of social status that should be included, along with gender, in an analysis of the effects of social support on health. House (1987), for example, found that those who are older and those with less income tend to have lower levels of social integration. Moore (1990) argued that gender differences in social networks are a consequence of different locations in the social structure which result in women and men having different opportunities to shape their networks. Moore argued that these opportunities are related to men's higher income levels and employment outside the home compared to the predominance of housework and childcare responsibilities typically assumed by women. She hypothesized that men's experience permits greater formation of network ties outside the home while women's network ties are largely bounded by their families and neighbourhoods.

In addition to the identification of those factors that affect whether social support is available and utilized, is the discussion of how different dimensions of social relationships may be interrelated. Seeman and Berkman (1988) examined

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<sup>9</sup> Vaux (1985) argued that the extent and content of social relationships are determined, in part, by one's position relative to gender, SES, and ethnicity.

the characteristics of network structure and social ties that are most strongly related to perceived social support in a sample of elderly women. They found that more support was perceived to be available with the existence of a greater number of social ties but that perceived adequacy of support was related neither to network size nor to geographic proximity of those social ties. These findings were supported by a study (Cutrona, 1986) that examined the relationship between social networks and perceived availability of social support in two samples: elderly men and women and mothers of young children. Cutrona's (1986) findings suggested that the relationships between the size of one's social network and the frequency of contact with kin and perceived adequacy of social support were stronger for the elderly than for new mothers. This suggested that age may be an important variable to consider in the complex relationship between social networks and the perceived adequacy of social support. Another study, however, did not share these conclusions. Haines and Hurlbert (1992) examined aspects of social network structure (density, diversity, and size) that were related to social support for women and men. In their study, they operationalized social support as instrumental and expressive (emotional and companionship) support but their findings suggested that having many social ties (network size) did not lead necessarily to access to social support. Haines and Hurlbert did not examine age differences and their sample included only those women and men who were employed either full- or part-time, which may have accounted for some of the differences in their findings.

Table 1 provides a summary of various theoretical and empirical conceptualizations of social support and social networks presented by selected authors.

Table 1

Summary of selected authors' conceptualizations of social support  
and social networks

Author(s)	Conceptual definitions
Auslander (1988a, 1988b)	<ol style="list-style-type: none"> <li>1. <i>Network existence</i> (number of close friends and relatives, marital status)</li> <li>2. <i>Mobilization of network ties</i> (frequency of visiting with friends and relatives, church attendance, participation in groups or organizations)</li> <li>3. <i>Perceptions of social network</i> (feelings of happiness or satisfaction with individual's network)</li> </ol>
Barrera (1986)	<ol style="list-style-type: none"> <li>1. <i>Social embeddedness</i> (can include indicators of social ties - i.e. marital status, participation in community organizations or can include social network analysis)</li> <li>2. <i>Perceived social support</i> (perceived availability and adequacy of supportive ties)</li> <li>3. <i>Enacted support</i> (diversity and frequency of help that the individual actually receives)</li> </ol>
Eurelings-Bontekoe et al. (1995)	<ol style="list-style-type: none"> <li>1. <i>Quantity of social relationships</i> (integration versus isolation)</li> <li>2. <i>Structure of social relationships</i> (social network)</li> <li>3. <i>Qualitative content of relationships</i> (supportive functions, distinction made between actual and perceived support)</li> </ol>
House (1987); House, Umberson, et al. (1988)	<ol style="list-style-type: none"> <li>1. <i>Social integration/isolation</i> (existence or quantity; can be type of relationships (i.e. marital) and frequency)</li> <li>2. <i>Social network structure</i> (structures among a set of social relationships)</li> <li>3. <i>Relational content</i> (functional nature or quality of social relationships; can include source (spouse, friend), social support (instrumental aid, emotional caring, information), relational demands and conflict (negative aspects of relationships) and social regulation which may be either health promoting or health damaging)</li> </ol>

(table continues)

Table 1 (continued)

Summary of selected authors' conceptualizations of social support  
and social networks

Author(s)	Conceptual definitions
Laireiter & Baumann (1992)	<ol style="list-style-type: none"> <li>1. <i>Social integration/social embeddedness</i></li> <li>2. <i>Social network</i> (size and density)</li> <li>3. <i>Social network resources</i> (potential or actual supporters)</li> <li>4. <i>Supportive climate/supportive environment</i> (quality of social relationships and systems)</li> <li>5. <i>Enacted and received support</i> (real interactions where support is exchanged)</li> </ol>
Olsen et al. (1991)	<ol style="list-style-type: none"> <li>1. <i>Quantitative</i> (marital status, frequency of seeing family and friends)</li> <li>2. <i>Qualitative</i> (sources of social support, i.e. people to speak to about something personal and important)</li> </ol>
Schwarzer & Leppin (1992)	<ol style="list-style-type: none"> <li>1. <i>Social integration</i> (size of network, number of relatives and friends, frequency of contact, number of important roles held: friend, boss, being married)</li> <li>2. <i>Perceived support</i> (cognitive; sense of acceptance)</li> <li>3. <i>Received support</i> (behavioural; behaviours that have already occurred)</li> </ol>
Thoits (1982)	<ol style="list-style-type: none"> <li>1. <i>Structural components</i> (network indicators)</li> <li>2. <i>Functional components</i> (perceived amount and adequacy of support)</li> </ol>
Vaux (1988)	<ol style="list-style-type: none"> <li>1. <i>Support network resources</i></li> <li>2. <i>Supportive behaviours</i></li> <li>3. <i>Subjective appraisals of support</i></li> </ol>
Wethington & Kessler (1986)	<ol style="list-style-type: none"> <li>1. <i>Perceived support availability</i> (hypothetical situation in which support might be needed)</li> <li>2. <i>Received support</i> (information about support actually provided in the past; who provided the support and type of support provided)</li> </ol>
Wortman & Dunkel-Schetter (1987)	<ol style="list-style-type: none"> <li>1. <i>Structural components</i> (social networks, social integration/ties)</li> <li>2. <i>Functional components</i> (social support which includes availability, adequacy, and activation)</li> </ol>

This brief review points to the complexity and contradictions associated with conceptualizations of social support and social networks. The themes that can be drawn from this literature, however, are helpful in delineating the components of social relationships that may have an influence on health status. These relationships can be broadly categorized as structural (social networks, social integration, social ties) or functional (social support). Furthermore, social support can be assessed in terms of its perceived availability, adequacy or supportiveness, activation, potential negative aspects or relationship strain, and whether it is provided to and received from others.

### **The Connection Between Social Relationships and Health**

#### Proposed explanations: main and buffering effects.

Two papers are often cited as the seminal works in the study of the relationship between social support and health. Cassel (1976) and Cobb (1976) reviewed studies that had examined the role of social relationships and their protective effects on physical health. They postulated that social support played primarily a buffering role in helping to deal with the results of stressful life situations.

The explanation that social support has an indirect or buffering effect on health is based on people's coping abilities when dealing with stressful life events; social support only affects health in the presence of stress (Etzion, 1984; Gore, 1978; Thoits, 1982). Strong social supports are thought to provide resources that help individuals in their ability to deal or cope with the situation or

alleviate the effects of stress by easing reactions and by providing options that reduce the perceived importance of the sources of stress (Cohen & Wills, 1985).

Another explanation for the association between social relationships and health suggests that supportive relationships can have a direct or main effect on health (Bloom, 1990; Etzion, 1984; Sheppard, 1993; Thoits, 1982). This view hypothesizes that supportive relationships can enhance health in the absence of stress. The causal mechanism is not well understood but it has been suggested that social support can promote and reinforce health behaviours which in turn can result in improved health (Gottlieb & Green, 1984). Others have proposed that these direct effects can arise from specific neuroendocrine responses that result from a sense of well-being from feeling supported by others (Broadhead et al., 1983; Ell, 1984). Thoits (1982) argued that the view supporting independent effects of social support in the absence of stress has foundation in sociological theory that addresses the importance of social integration for well-being.

It may be the case that both of these postulations account for how people's health is affected by positive and supportive social relationships. In their longitudinal study of the effects of social networks on stress and physical symptoms of the elderly, Cohen and Wills (1985) concluded that there was a dual effect of social networks on health status. Their findings indicated that social networks had an independent (direct) effect on the health of those who reported normal or low stress and also had a buffering effect supported by "the variance explained by networks under high and low stress conditions" (p. 484).

Umberson (1987) discussed the direct and indirect relationships between social ties and health in the context of the role that is played by family relationships. She argued that these relationships can act as a social control mechanism to facilitate healthful behaviours (indirect) or can operate to regulate damaging health behaviours (direct).

Over the last two decades, findings from various research studies have shown that aspects of social relationships are associated with various measures of health and illness. Researchers have examined various outcomes and the findings suggest that positive social relationships are associated with decreased risk of mortality (Berkman & Syme, 1979; Blazer, 1982; House, Robbins, & Metzner, 1982; Schoenbach, Kaplan, Fredman, & Kleinbaum, 1986), with positive psychological health outcomes (Bowling & Browne, 1991; Eurelings-Bontekoe et al., 1995; Fiore, Becker, & Coppel, 1983; Grant, Patterson, & Yager, 1988; Lin, Ensel, Simeone, & Kuo, 1979; Rook, 1984; Schaefer, Coyne, & Lazarus, 1981; Wethington & Kessler, 1986) and with increased likelihood of engaging in health promoting behaviours (Broman, 1993; Franks, Campbell, & Shields, 1992; Gottlieb & Green, 1984). Some aspects of the literature explore the effects of social support specifically on various measures of physical health (Kaplan & Toshima, 1990).

#### Mortality outcomes.

The studies that have been well-controlled and used prospective longitudinal research designs have generally used mortality as the outcome

measure (Berkman & Syme, 1979; Blazer, 1982; Broadhead et al., 1983; House et al., 1982; Schoenbach et al., 1986). The findings of the Alameda County study (Berkman & Syme, 1979) concluded that social and community ties had an influence on mortality from all causes. They operationalized social ties as marital status, contacts with close friends and relatives, church membership, and informal and formal group associations. Those who had greater levels of social ties had lower mortality rates and the effects on mortality were greater for women than for men. They also concluded that each aspect of social ties was an independent predictor of mortality. This finding held while controlling for self-reported physical health status, SES (measured as an index of income and educational level), health practices, and differential use of health services.

Two prospective studies, which partially replicated the Alameda County study, found a similar relationship between fewer social ties and increased risk of mortality. House et al. (1982) studied a cohort of women and men who were between the ages of 35 and 69 at the time of the study. They included four dimensions of social relationships in their analyses: intimate social relationships, formal organizational involvement, and both active and passive leisure activities. In their findings, they concluded that social activities and relationships are associated with mortality and that "the risk associated with these social variables is invariant across a wide range of age, occupational, and health status groups" (p. 138). Another study (Schoenbach et al., 1986) examined the relationship between the Social Network Index and survivorship in a prospective study of a

cohort of adults in the Evans County Cardiovascular Epidemiologic Study. They noted that certain aspects of the social network (marital status and church activities) predicted survivorship and that study subjects between the ages of 60 to 80 years with fewer social ties had an increased risk of mortality.

Blazer (1982) examined the mortality risks associated with three separate aspects of social relationships for a group of elderly people over the age of 65. Their operational definition of social relationships included roles and attachments, perceived social support and the frequency of social interaction. They hypothesized that each dimension would independently predict mortality and found that perceived social support had the greatest predictive power.

#### Morbidity and health outcomes.

Studies that include various measures of physical health status and morbidity provide less consistent findings than those demonstrating an association between psychological well-being and social relationships. Some findings suggest that the existence of social networks and supportive social relationships have a positive effect on physical health outcomes while other studies found a mix of inverse and null associations with specific health outcomes. As was suggested earlier, there appears to be no single definition of social support. The lack of consistency in operational definitions makes it somewhat difficult to compare findings across various studies. The inconsistency in the findings between social relationships and physical health is also confounded by the designs of many of the studies which are cross-sectional

and which have used varying measures of physical health status (House et al., 1982; Thoits, 1982; Wortman & Dunkel-Schetter, 1987).

Some studies have used self-reported health as the outcome variable with samples of older or elderly populations but have employed varying definitions of social relationships. One study concluded that satisfaction with social support, rather than the frequency of social support, had a positive effect on self-rated health (Krause, 1987) while another study of a convenience sample of 113 adults over age 55 failed to support the hypothesis that perceived social support is positively related to self-reported health (Riffle, Yoho, & Sams, 1989). The results of the latter study should be viewed with some caution, however, given the use of a convenience sample, which raises the potential of bias and lack of generalizability. In a time-series panel design study, Mor-Barak, Miller, and Syme (1991) examined the effect of social networks and life events on the self-rated health of the poor, frail elderly over age 65. Social networks were measured as a composite that included the nature of relationships (size and frequency of contact) with family and friends. They concluded that their findings supported both the direct and buffering effect hypotheses, although social networks significantly predicted self-rated health only in the short term (i.e., 6 months). While this was a well designed study that employed a time-series panel design and controlled for the effects of baseline health status, it is not clear whether these findings are generalizable to the general population of elderly people or to a younger population.

Other studies have examined the effects of social relationships on the physical health of the elderly through the use of a composite health index as the outcome measure. Gallo (1982) studied a randomly selected sample of 300 non-institutionalized and not severely ill people over the age of 60 and found that as an aggregate, the network dimensions were highly positively correlated with the health status score<sup>10</sup> and as individual components, the size of a person's social network had the strongest relationship with health status. This study has a limitation, however, because the measure of social support was limited to dimensions of the person's social network (i.e., size, frequency, and density). The findings of a longitudinal study (Cohen, Teresi, & Holmes, 1985) conducted over a one-year time period with a sample of people over the age of 60 who lived in single-room occupancy hotels in a large urban centre also found positive effects of social networks<sup>11</sup> on physical health. After controlling for physical health status at the beginning of the study, the researchers found that social networks still had a positive effect on physical health status at follow-up. Their findings also suggested support for both a direct and buffering effect of social networks on health. In a secondary analysis of cross-sectional data, Auslander (1988a) examined the relationship between the social networks of the poor and their health status as measured by a composite health index. Her findings

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<sup>10</sup> The health status score was a composite of several questions related to physical activities, mobility, general physical function, and self-rated health status.

<sup>11</sup> Social networks included four dimensions: material and emotional exchange, quantity and structure of the social network, characteristics of the network compared to the respondent, and environmental influences that affect the composition of the network.

suggested that the number of close friends one possesses (an aspect of network existence), church attendance (an aspect of mobilization of social ties), and satisfaction with network size were the strongest predictors of health status.<sup>12</sup> The usefulness of this study is that it addressed a wider age range in the sample but the findings are somewhat limited by the cross-sectional nature of the design, making it difficult to establish causal relationships.

Two other studies failed to find effects of social support on health. In a prospective study to examine the effects of social support on physical and psychological health, Grant et al. (1988) interviewed a convenience sample of 150 people over the age of 65 who were living independently in the community. Four dimensions of social support (material help, help giving, advice giving and emotional support) were each measured in terms of their quantity, quality and consistency of availability. They reported no significant effects between social support and physical health, as measured by physician ratings, even though those with physical illnesses reported more advice giving and higher quality support from relatives than those who were healthier. Similarly, Weinberger, Hiner, and Tierney (1987) also found no significant relationship between social support and their physical health measures (physical disability and pain measures) of a physician-identified sample of elderly patients who had

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<sup>12</sup> This is in contrast to the finding that other aspects of network existence (number of relatives and marital status) were not significantly related to health status. The level of group participation (an aspect of mobilization of social ties) was also not significantly related to health status while frequency of contact with friends and relatives (mobilization of social ties) was significant only for those who had either no contact or infrequent contact with friends and relatives.

osteoarthritis and who were receiving care at a clinic. They operationalized social support along three dimensions: objective (marital status, number of friends and frequency of contact), subjective (who they could count on for tangible, informational and emotional support) and satisfaction with social support. They concluded that strong social support was significantly associated with psychological health. Confidence in the findings of both these studies, however, may be somewhat limited due to the potential of bias that may arise from the methods of sample selection.

A longitudinal study conducted with a random sample of younger respondents (between the ages of 45 and 64) also concluded that social support was not related to physical health (Schaefer et al., 1981). Emotional, tangible and informational support were the specific dimensions of social support measured and physical health was measured by a range of items including chronic and somatic conditions, disability limitations, and perceived energy levels. They found no significant effects of any of the social support variables on the physical health measures. Bias may be an issue in this study because the 107 people who refused to participate in the study were significantly more likely to have less education (high school or less) than the 109 respondents who agreed to participate.

### **Gender Differences in the Effects of Social Relationships on Health**

Some researchers who have studied the effect of social relationships on health have examined possible differential effects on the health of women and

men. Sex is often included as one of the sociodemographic control variables in studies examining the effects of social relationships on health, but it is argued that gender is not often analysed separately (House, Landis, et al., 1988; Ruiz & Verbrugge, 1997). This raises the distinction between using gender as a control or confounding variable or treating it as an interaction variable. If gender is statistically controlled in a study, the strength of the relationships between other variables of interest can be determined independent of or undistorted by the effect of gender. Treating gender as an interaction term, on the other hand, can address the question of whether the strength of relationships among the variables of interest differs for men and women.

The studies that incorporate an analysis of gender sometimes have contradictory findings and most do not use the same measures of social relationships or of health status. Many of these studies have examined psychological health or well-being as the outcome measure (Antonucci & Akiyama, 1987; Gerstel, Riessman, & Rosenfield, 1985; Husaini, Newbrough, Neff, & Moore, 1982; Turner, 1994; Turner & Noh, 1983; Umberson et al., 1996) while others have examined the effects on mortality and various measures of morbidity (Berkman & Syme, 1979; House, Umberson, et al., 1988; Kaplan & Camacho, 1983; Schoenbach et al., 1986; Shye, Mullooly, Freeborn, & Pope, 1995; Wolinsky & Johnson, 1992). The findings from these various studies are somewhat inconsistent in their examination of gender differences in the strength and direction of the effects of social relationships on health. Most of

these studies seem to point to a stronger relationship between gender, social support and mental health than to physical health or mortality measures (Shumaker & Hill, 1991). The role of social support and its effect on mental health is stronger for women than for men.

The relationship between gender, social support and physical health is less conclusive. Shumaker and Hill (1991), for example, have suggested that the relationship between physical health and social support may be somewhat weaker for women than for men and the findings of some studies support this (House et al., 1982; Joung et al., 1997). Some studies, however, have found stronger effects for women (Antonucci & Akiyama, 1987; Broadhead et al., 1983) while other researchers have found no gender differences (Umberson et al., 1996; Weinberger et al., 1987). One of the difficulties in reaching conclusions about the interaction of gender with social relationships on physical health relates to the cross-sectional design of many studies, the use of different social support measures and the use of different outcome measures for health status (Thoits, 1982). There appear to be some differential effects of social relationships on the physical health of women and men but it may be that this relationship is more complex than the relationship with mental and emotional health (O'Leary & Helgeson, 1997).

To summarize diverse findings from various studies, this review focuses on literature related to gender differences in social relationships generally and then highlights studies that have specifically examined gender differences in the

effects of social relationships on health status. Emphasis in this section of the review is on those studies that have used morbidity and other measures of health outcomes.

#### Differences in women's and men's social relationships.

There is some evidence that women and men differ in the quantity of their social relationships and in their ratings of the quality of these relationships. The literature suggests that women have larger social networks composed of multiple sources (Alwin et al., 1985; Antonucci & Akiyama, 1987; Moore, 1990) and that women are exposed to more network events than men (Kessler & McLeod, 1984). Some research findings indicate that women are more likely to provide support and care to others (Gerstel & Gallagher, 1993; Green, 1993; Umberson et al., 1996; Walters et al., 1996; Wellman & Wortley, 1990), that women provide different types of support than men (Wellman & Wortley, 1990), and that women and men differ in the importance they place on different aspects of their social relationships (Umberson et al., 1996).

Gerstel and Gallagher (1993) studied the relationship between providing care for kin and level of distress in a random sample of 179 married women and 94 of their husbands. They measured care provided in terms of the nature of the relationship with whom care was given, the type of care given, and the number of hours spent giving care in the previous month. These measures were conceptualized as breadth (number of people given care), depth (number of hours of care provided), and recipients of care (parents, adult children, or other

relatives). Their findings supported the view that “women give significantly more help than men, whether practical, material, or personal support” (p. 604).

Antonucci and Akiyama (1987) examined gender differences in social support and its effect on well-being or happiness. They found differences between men and women in their sources of social support with women being more likely to have larger social networks from which they received support and to which they provided support (children, friends, and spouse). Men, on the other hand, were more likely to rely on their spouses for both receiving and providing support.

Wellman and Wortley (1990) suggested that women tend to provide more emotional aid while men tend to provide material aid:

.. women interact ‘face-to-face’ by exchanging companionship and emotional support while men interact ‘side-by-side’ by exchanging material aid. (p. 576)

#### Mortality outcomes.

Studies that assessed gender differences in the effect of social support on mortality indicated that the effect is different for women and men. In the Alameda County study, the social support measures included marital status, contact with family and close friends, church membership and group affiliation (Berkman & Syme, 1979). Both women and men who scored low on the social support composite had similar trends in age-adjusted relative risk of death, however the effect was greater for women than men in each age group from 30 to 69 years. Being married, however, had a greater protective effect on men’s

health, particularly for those between the age of 30 and 59. In the Tecumseh Community Health study, House et al. (1982) found that all four measures of social support were significantly associated with increased risk of mortality for men but, for women, only church attendance was significantly related. The composite index of social relationships, after controlling for baseline morbidity and health behaviours, was still significantly associated with increased mortality for men but not for women. Their finding on the protective effect of marriage for men was similar to the findings in the Alameda County study. The Evans County study (Schoenbach et al., 1986) found that "marriage modestly predicted survivorship in white males, black males, and white females" (p. 588). Shye et al. (1995) studied a random sample of people over the age of 65 who were selected from health plan members in a region in the United States. They examined the effects of social support, health status and levels of stress on mortality during a 15-year follow-up period. Social support was measured as marital status, network size (number of people and informal social contacts) and frequency of interaction. As in other studies (Alwin et al., 1985; Antonucci & Akiyama, 1987), they found that women were more likely to have larger networks and more frequent interaction with people in their network. They also found that the indirect effects of social support on mortality was significant for men but not for women. Social support operated indirectly through its effect on men's health status. The indirect effects of marital status on health status and mortality

through network size was significant for men but not for women. Shye et al. (1995) concluded that:

These findings of gender differences in the pathways by which social support affects mortality confirm the need to model the relationship between social support and mortality differently for men and women, rather than simply to 'control' for sex. (p. 943)

#### Morbidity and health outcomes.

The literature related to the interaction of gender with the association between social relationships and health shows diverse findings from studies that cannot be easily compared because of different operationalizations of social support and health outcomes. What emerges from the literature is a profile of gender differences that are sometimes stronger for women, sometimes stronger for men, or often showing mixed results where different components of social support have differential protective effects on the health of women and men. Blake and McKay (1986) examined only one measure of social support (tangible assistance) and its effect on self-reported morbidity.<sup>13</sup> Increased self-reported morbidity was significantly related to low tangible support for women but was not significant for men. In another study, the quality of social support, rather than the quantity, had a greater effect on well-being for both women and men but both quantity and quality of social support had greater effects on well-being for women (Antonucci & Akiyama, 1987).

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<sup>13</sup> Self-reported morbidity was measured as a composite of number of days of bed restriction, absence from work/school, and activity restriction due to illness or injury.

Other studies have concluded that the effects of social relationships on women's and men's health are stronger for men, or differ by specific components of relationships, or show no differences at all. Pilisuk, Montgomery, Parks, and Acredolo (1993) studied a sample of community-based older adults to examine the relationship between effects of stress, social support and locus of control on health status. The measure of social support in this study was limited to a detailed description of social networks including a major focus on friendship networks. The findings of this study noted that the direct effects of social support and locus of control on self-rated health were significant for males but not for females.

In a prospective study, Rael et al. (1995) studied a group of British civil servants between the ages of 35 and 55 to examine whether social support<sup>14</sup> affected either short (less than seven days) or long term (more than seven days) absence from work due to illness. They found that, for both women and men, the qualitative but not quantitative aspects of social support were significantly related to both long- and short-term illness absence. There were some different effects, however, for women and men on the specific dimensions of qualitative social support. A higher level of emotional support was associated with increased short-term illness absence only for men but increased long-term absence for women and men. A higher level of negative aspects of social support was significantly related to increased long-term illness absence for men.

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<sup>14</sup> Their measure of social support included marital status, network size (number of people and informal contacts), and frequency of interaction.

The researchers also examined the interaction effects of material problems<sup>15</sup> and social support on sickness absence for men and women. The findings suggested that different aspects of qualitative social support interact with the level of material problems to predict sickness absence. For men with material problems, both long- and short-term sickness absence decreased as the level of practical support increased. A high level of material problems for women was associated with higher levels of long-term sickness absence for those with higher levels of negative aspects of social support. Thus, it appeared that different aspects of social support had differential effects on the outcome variable for women and men.

Hibbard (1985) studied the relationship between social ties<sup>16</sup> and health status as measured by global self-rated health and mean annual rate of doctor visits for chronic conditions. For men, having more social ties was significantly related to better health on both measures of health status, while for women, having more social ties was related only to better perceptions of health on the global self-rated health measure.

Through a longitudinal study design, Choi and Wodarski (1996) also found differential effects of social support on the physical and functional health of a sample of men and women over the age of 70. They found gender differences in the sources of social support with women having more face-to-face contact with

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<sup>15</sup> Material problems were measured with a composite scale comprised of difficulties with finances, housing, and neighbourhood difficulties.

<sup>16</sup> The measure of social ties was a composite index comprised of marital status, frequency of contact with relatives and friends, and involvement in groups and organizations.

their children. Women reported that they received both emotional and instrumental assistance from their children while men received only emotional support from their children. Both elderly men and women who had a higher level of social support (unpaid help from relatives) were likely to have a lower level of functional deterioration after two years, but only men were likely to have had a lower level of physical deterioration.

Fusilier, Ganster, and Mayes (1986) presented results of their research that indicated few differences in the amount of support received and in the effects of social support on health for men and women. They acknowledged, however, that their sample of 274 full-time employees was not representative of all employee classifications. They found that receiving social support from people at work or at home was associated with lower levels of stress and higher levels of job satisfaction. They also concluded that there were no gender differences in receipt of social support from either work or home. The authors acknowledged that they were considering employed women only and that this finding may differ if unemployed women were compared with these results. Hibbard and Pope (1985) studied a sample of women and concluded that employed women in jobs that offered a high level of social support had better health than those women who had jobs offering little social support and integration.

## Summary

In summary, the literature highlights the broad conceptual distinctions among social networks, social integration, and social support. Social networks tend to focus on the existence or quantity of social ties which are, it is proposed, related to a social integration function. Social support implies greater emphasis on the content of the exchange that occurs in social relationships. Some of the literature reviewed notes that in addition to frequency and size of networks, the question of how supportive these networks are to the individual should be considered. In other words, both the positive and negative effects of social relationships should be assessed and we should not make the assumption that the existence of relationships necessarily implies a positive effect on health.

This review highlights the importance of specifying different dimensions of social relationships because of their potentially separate effects on health and because they may have differential effects on the health of women and men. These effects, however, vary in their strength and direction so it is somewhat difficult to identify one consistent hypothesis that is supported in the literature.

The term social relationships has been used as an 'umbrella' concept to cover several aspects of social support (Eurelings-Bontekoe et al., 1995; House, 1987; House, Umberson, et al., 1988). Within the definition of social relationships at least three general areas of study can be the focus when examining the influence of social relationships on health status; social network structure, social integration, and social support. Several authors (Barrera, 1986;

House, 1987; Vaux, 1988) provide conceptual frameworks that are useful for providing clarification of the terms. House (1987) includes three aspects within the more general concept of social relationships: social integration/isolation, social network structure and social support. Barrera (1986) uses the terms social embeddedness, enacted support and perceived support to distinguish among the different functions provided by social relationships as they relate to health. This is similar to Vaux's (1988) conceptualization of social support as being comprised of three separate constructs: support network resources, supportive behaviours and subjective appraisals of support.

The evidence that social relationships have an association with health sheds little consistent insight on how this actually occurs. As discussed in previous sections, SES and gender both contribute to differences in health status (Illsley & Baker, 1991; Johnson & Wolinsky, 1994). This final section of the literature review raises the question of the health effects of SES and gender if we examine these effects in the context of people's perceptions of their social relationships.

### **Chapter Summary**

This literature review has highlighted several findings that serve as the foundation for this study. The review of evidence on gender differences in health status reveals that patterns of mortality, morbidity and self-rated health may differ for women and men. Women have lower rates of death compared to men but

their higher rates of acute and non-fatal chronic conditions lead to higher morbidity rates. In some studies, women tend to report more activity limitation from illness and have lower self-rated health throughout most age groups. Five major hypotheses have been identified to explain these apparent gender differences in health. One hypothesis focuses on biological differences as a plausible explanation while the remaining four hypotheses cite socio-environmental or psychosocial factors to account for gender differences in health. In this study, two specific socio-environmental factors are examined to assess their effects on women's and men's health: SES and social relationships.

Overall, those with lower SES have poorer health status; a finding that is consistent whether SES is defined as a composite measure or whether the separate components of income and education are examined. When one examines the effects of income and education on the health of women and men, however, some evidence suggests that income may be a more important predictor of health status for men while education may be a more important predictor for women's health. This suggests that separate components of SES may have different health effects. Three major hypotheses have been advanced as explanations for the overall relationship between SES and health. One explanation proposes that ill health causes a reduction in socioeconomic conditions while another explanation hypothesizes that those with lower socioeconomic levels have poorer access to health care, which explains their poorer health status. A third hypothesis proposes that the impact of socio-

environmental factors is a plausible explanation for the differences in health status based on socioeconomic level. It is this latter hypothesis that has provided a framework for the questions posed in this study. One specific aspect of the social environment shown to have a relationship with health is the supportiveness of people's social support system. It is also suggested in the literature that these social relationships are influenced by situational and personal characteristics.

Studies reviewed suggest that the existence of social ties and positive perceptions of social support can have a favourable influence on health. Some findings also suggest that the source and perceptions of social support may differentially affect the health of women and men. Research findings on an association between social relationships and health are not conclusive about whether this relationship is the same across and within different subgroups of the population. Vaux (1985) suggested that cultural diversity in society, the fact that support is influenced by the larger systems within which the individual lives, the effect of policy on the availability of social support and the context within which support operates are several reasons that support the need to broaden the study of social support from only looking at the effects of support within a specific group. To gain a more thorough understanding of the relationship between social support and health it may be important to examine levels and types of support and variations in the effect of social support on different aspects of health across different groups.

The literature review raises questions and issues about the relationships among gender, SES, social relationships and health and about the offered explanations of these relationships. One could ask whether SES creates ill health for women and a similar question could be posed for social relationships and health. Do people have ill health because they have fewer supportive social relationships or because they have lower SES? These specific causal questions cannot be fully answered in this study but what will be examined are the interrelated effects of these three factors and some possible causal pathways that suggest that social relationships may mediate the effects of SES on perceived health status.

## **CHAPTER 3**

### **METHODS AND PROCEDURES**

#### **Purpose of the Study**

The role of social factors as determinants of health status requires more study to further clarify the different relationships among various social factors and health status. Gender, SES and social relationships all have been shown to have an influence on health. Empirical evidence and theoretical perspectives support relationships between gender and health status and SES and health status. Previous research also indicates a relationship between the existence of supportive relationships in a person's life and positive perceptions of health. This study examined whether social relationships influence or mediate the relationship between gender, SES and health. This involved the evaluation of a model that specified relationships among SES, social relationships and self-rated health status and determined whether these relationships differed for women and men.

#### **Research Questions**

The research study was guided by the following questions:

1. What effect does SES have on the self-rated health of women and men?
2. Are there differences in perceptions of social relationships by either gender or SES?

3. What effect do perceptions of social relationships have on self-rated health status?

4. Do the relationships among SES, social relationships and self-rated health status differ for women and men?

### **Research Design**

The research design is based on a cross-sectional survey of residents of the Yukon completed in 1993 (Government of Yukon, 1994a). The design consists of a secondary analysis of the survey data to specify and analyse relationships between measures of SES, aspects of social relationships and their consequences for self-rated health status.

### **Sample and Data<sup>17</sup>**

The data used to address the research questions in this study was derived from the Health Promotion Survey conducted in the Yukon Territory in 1993. The target population for this survey was all Yukon persons aged 15 years or older during the survey period of January to March 1993. Persons excluded from the sample for the survey included Yukoners residing in prisons and hospitals as well as persons residing in large unorganized portions of the Yukon where it was not feasible to survey during the winter months.

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<sup>17</sup> This description of the sample data and sample design is taken from Government of Yukon. (1994a). An accounting of health: What the numbers say (pp. 19-27). Whitehorse, YK: Executive Council Office, Bureau of Statistics.

A multistage sampling process used both random digit dialing and area probability sampling methods. Telephone surveying was used where feasible and if not possible, face-to-face survey interviews were conducted. These sampling methods were household-based: to avoid systematic bias that could be introduced by the availability of household members, individual respondents within the households were randomly selected. If the randomly selected member was not present at the time of the initial contact, that person was recontacted for an interview. The sample design was guided by the need to have coverage throughout the Yukon and to account for urban/rural and First Nations/non-First Nations representation.

The data set was adjusted for population totals through the use of average weights applied to specific characteristics. The number of households sampled was 1,444 with final weightings adjusted to reflect the age and sex population totals present in the 1991 Canadian Census distribution for the Yukon. The specific details of the average weights applied to the age and sex totals are provided in Appendix A.

Permission for use of the Yukon Health Promotion Survey data set was limited to those respondents who indicated non-First Nations status (see Appendix B). The total sample used in this study was adjusted to remove those individuals who identified themselves as having First Nations status, resulting in a final sample of 1,239 individuals. There are two reasons for the decision to remove the First Nations respondents from the sample. It is very likely that the

First Nations population represents a substantially different group than the non-First Nations population, thus the responses of these two groups on the questions posed in this study may be different. The second reason is that comparisons between these two groups will be possible if there is a decision in the future to examine these research questions within the First Nations population.

The questionnaire (see Appendix C) was 18 pages in length and asked a range of questions related to overall health status, physical health,<sup>18</sup> health and social service utilization,<sup>19</sup> physical environment, mental and emotional health, social health,<sup>20</sup> spiritual and socio-cultural aspects,<sup>21</sup> health risks and barriers,<sup>22</sup> children's health, dental health, nutrition, alcohol and drugs and health knowledge. The response rate for the survey was 79.7%.<sup>23</sup>

### **Profile of the Yukon Territory**

The Yukon Territory occupies a wide expanse of land in the northwest corner of Canada. In 1991, the population of the Territory was 27,797 with the majority of residents (17,925) living in the capital city of Whitehorse (Statistics

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<sup>18</sup> This section included questions on exercise activities, chronic diseases and injuries.

<sup>19</sup> Included questions on receiving and giving care, visits to health professionals and medical tests.

<sup>20</sup> Included questions related to stress, including those questions included in the Bradburn Scale (see McDowell & Praught, 1982).

<sup>21</sup> Included questions on church attendance, importance of spirituality, First Nations status, employment and work related questions.

<sup>22</sup> Included questions on activity limitations and safety.

<sup>23</sup> The total number of households identified for the sample was 1,811 with 1,444 of these responding. The non respondents fell into one of the following categories: non-responding households, respondent refusals, language problems or illness, unavailable, and incomplete survey forms (Government of Yukon, 1994a, pp. 28-29).

Canada, 1992). There was an 18.6% increase in the population between 1986 and 1991; a considerably larger population increase than the overall Canadian population increase of 7.9% over the same period. The Yukon has a younger population than the overall Canadian population and the proportion of residents over the age of 65 (4%) is less than for the rest of Canada (12%).

There are several ethnic groups in the Yukon but most population information distinguishes between two groups; First Nations and non-First Nations people. The First Nations population of the Yukon Territory is estimated at between 25% to 30% of the total population (Matthias, 1994).

Labour force statistics (Government of Yukon, 1993) indicate that average weekly earnings in the Yukon were substantially higher than the Canadian average for September 1992 (\$634.20 compared to \$540.57). It is reported that the gap between the rich and the poor, however, is greater than in most other areas of Canada with 22.0% of Yukoners in the low income category as compared to 12.7% of Canadians in a similar income category (Government of Yukon, 1994b). Approximately one third of those in the labour force in the Yukon are employed by one of the levels of government. The next most common employment category is in accommodation/services (17%), followed by wholesale and retail trade (14%). The published unemployment rate in the Yukon is comparable to the Canadian average during 1992 (10% compared to 11%). Approximately 7% of the Yukon population relied on transfer payments through the social assistance program in 1989/90.

## **Yukon Health Promotion Survey Methods**

An aspect of the Yukon Health Promotion Survey that makes it unique is the combination of both qualitative and quantitative methods in completing the population survey. The survey employed a socio-ecological perspective of health and was conducted in several phases that permitted the combination of both qualitative and quantitative research methods. The qualitative aspect<sup>24</sup> of the survey was conducted in the initial phases with the objectives of gaining an understanding of Yukon residents' concepts of health, what residents see as meaningful ways to measure health, and how residents prioritize their health. The overall goal of this phase of the research process was to develop a quantitative survey instrument that would be reflective of and meaningful to the needs and perceptions of Yukon residents.

### **Analysis**

All quantitative analyses were conducted on an IBM-compatible computer using SPSS for Windows Release 6.1 (SPSS, 1993) and LISREL 7.2, a specific module designed for use with SPSS for Windows. After the model was conceptualized, the analyses were conducted in two steps in order to answer the research questions posed. The first step focused on examining bivariate relationships among the relevant concepts. The characteristics of the sample

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<sup>24</sup> The qualitative research involved interviews with about 80 individuals and focus groups involving more than 180 residents.

were described using univariate analysis. This analysis also made it possible to determine whether there was sufficient variation within each of the study variables for both women and men. Bivariate analyses were conducted to determine the relationship of gender, age, education, income and existence of chronic diseases to the concepts of care received, care provided, perceived social support, importance of social relationships, quality of social relationships, social integration and self-rated health status. The rationale for including this first step of exploring some of these key relationships was to assist the reader in understanding the complex set of relationships that were examined in the model.

All univariate and bivariate analyses were carried out on the weighted data. The original weighting variable for the complete data set was derived by the Yukon Bureau of Statistics to weight the data for age and sex population distributions. The use of this original weighting variable resulted in an inflated sample size leading to inaccurate estimations of the standard error. The original weighting variable, therefore, was divided by the mean weight which, when applied to the data, retained the original sample size of 1,239.

The second step of the analysis estimated the proposed structural model specifying relationships between gender, SES, social relationships and self-rated health status. Estimating and assessing the proposed model involved structural equation modelling and the use of the program LISREL (Linear Structural

RELations), a widely used program for estimating structural equations.

Structural equation modelling (SEM) is defined as:

...a method of simultaneously analyzing multiple variables in a confirmatory and hypothesis-testing manner that may include latent or unmeasured constructs. This method is simultaneous in that it solves at one time a specific group of linear equations and the results reflect a system of dependent relationships. These relationships reflect the associations predicted among many variables. (Newcomb, 1990, p. 27)

SEM incorporates both a structural and measurement aspect into one model and has some advantages over path analysis because it incorporates measurement error into the model. Another feature of SEM is the requirement that models be specified prior to analysis thus providing theoretical grounding for the proposed causal relationships hypothesized in the model (Newcomb, 1990; Pedhazur, 1982; Ratner, Bottorff, & Johnson, 1998).

### **Variables and Measurement**

This section discusses the operational definitions that were used for the major concepts in this study and describes the variables and their associated indicators. The wording of the survey questions and the original coding used in the data set are described along with the way in which each item was recoded for use in the current study. The variable labels created for use in this study, appear in parentheses following each variable name.

#### Gender.

**Gender** (*GENDER*) was originally coded as 'M' for male and 'F' for female and was recoded as 1 = male and 0 = female for the purpose of this study.

### Age.

It is consistently reported that, as people age they tend to be less positive about their health status so therefore this variable was introduced as a control in the study (Arber & Ginn, 1993; House et al., 1982; MacIntyre, 1986).

**Age (AGE):** During the initial survey contact, the individual answering the telephone was asked to report both the age and date of birth of all persons residing in the household. When the specific respondent was selected, that individual's gender and age was verified. For the purpose of this study, the continuous variable of age was used as the indicator.

### Presence of chronic diseases.

The presence of chronic disease was introduced as a variable because it was believed that, as a measure of existing illness state, it might affect how people both viewed their social relationships and how they viewed their health status.

**Presence of chronic diseases (CHRDIS):** This indicator was a composite of the number of chronic diseases reported derived from the survey questions: "Are you presently diagnosed as having (or have you been told by a health care professional that you have)... (a) high blood pressure (*for women add: except when you were pregnant?*), (b) high blood cholesterol, (c) heart problems, (d) diabetes, (e) cancer, (f) arthritis, (g) asthma, (h) other?" Each of these questions had the same response category: 1 = yes, 2 = no, 8 = don't know, 9 = refused. A composite of these questions was derived and specified the number of chronic

diseases that were reported. The indicator was coded with 0 = no or don't know,<sup>25</sup> 1 = yes, and 9 = a missing value. The responses to the eight items were summed, the new variable had values ranging from 0 (no diseases) to 8 (eight diseases).

#### Socioeconomic status.

Rather than using a composite measure of SES, the variables of household income and educational attainment were treated as separate variables.

**Household income (INCOME):** Responses for household income were obtained from the question, "Now, I will read a range of incomes. What is your best estimate of your total household income in 1991 before tax deductions? Was it... 1 = less than \$10,000, 2 = between \$10,000 and \$20,000, 3 = between \$20,000 and \$40,000, 4 = between \$40,000 and \$60,000, 5 = between \$60,000 and \$80,000, 6 = more than \$80,000." Responses for 'not stated' (8) and 'don't know' (9) were recoded as missing values.

**Education (EDUC):** Education was measured by responses to the question "What is the highest grade or level of education you have ever attended or completed?" The responses were coded: 'A' = no schooling, 'B' = some elementary, 'C' = some secondary, 'D' = some college, 'E' = some university, 'F' = completed elementary, 'G' = completed secondary, 'H' = completed college, 'I' =

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<sup>25</sup> It was argued that if someone "didn't know" if he/she had diabetes (or any of the conditions listed), it was unlikely that the condition, if present, could affect their social relationships or perceived health status.

completed university, 'J' = other education, 'Z' = refused. All alphanumeric codings were recoded to numeric codes for this item and reordered: 1 = no schooling, 2 = some elementary, 3 = completed elementary, 4 = some secondary, 5 = completed secondary, 6 = some college, 7 = completed college, 8 = some university, 9 = completed university. The responses of 'other education' (J) and 'refused' (Z) were recoded as missing values.

### Social relationships.

The term 'social relationships' is used in this study because of its broad conceptual definition and its ability to capture many aspects of supportive relationships (House, 1987). In achieving clarity for the concepts used in this study, the suggestion by House and Kahn (1985) is useful for translating the theoretical concepts into empirical measures. They advise that any study of the effects of social relationships on health should include at least two different aspects of social relationships. The work of several authors has been used in this study as a guideline for the decision to conceptualize social relationships as including one aspect of social networks (social integration or social ties) and several aspects of social support. On this latter point, several authors (Fiore et al., 1983; Sarason, Pierce, & Sarason, 1990; Schwarzer & Leppin, 1992; Thoits, 1992; Turner & Marino, 1994; Vaux, 1992; Wethington & Kessler, 1986) urge researchers to make conceptual distinctions between perceived social support and support that is actually received. Others also address the importance of making distinctions between support that is received and support that is provided

(Sarason, Sarason, & Pierce, 1990; Tardy, 1985). The concept of enacted (or provided) support focuses "on the actions that others perform to assist a particular person" (Sarason, Sarason, et al., 1990, p. 15) while received support is a concept related to what a person believes he or she has received from others that was intended to be helpful. Sarason, Sarason, et al. make the point that these two concepts are distinct from each other and that received social support is also different from the perception of availability of social support. A further distinction is the "relational content" (Umberson et al., 1996) of social support that attempts to distinguish between positive assessments of social support and social support that is viewed as negative or is a relationship "strain" (Rook, 1984; Umberson et al., 1996). Therefore, the conceptualization of social relationships for this study included:

- 1) Received social support: This concept includes the number of sources that care has been received from. The item in the questionnaire used the term "care" and did not ask respondents to specify what types of care or support that may have been received, although most respondents would likely interpret this in relation to health or illness. The item also specifically asked whether this care had been received from a relative, friend, or household member.

- 2) Enacted social support: This concept includes the number of sources to whom care has been provided. The item used for this concept asked respondents whether they had provided care to a relative, friend, or household member in the 30 days prior to the survey. Again, the item did not ask

respondents to specify what type of care had been provided. In her analysis of data from the 1990 Canada Health Promotion Survey, Green (1993) used this item as an indicator of relationship strain.

3) Perceived social support: This concept includes three aspects of perceived social support: perceptions of support, an evaluation of the quality of respondents' social relationships, and an assessment of the perceived importance of social relationships for health and well-being. All of these concepts are thought to give some assessment of the supportiveness, or positive aspects, of general social support.

4) Social integration: One aspect of social networks refers to the existence or quantity of social ties or social relationships that are proposed to provide a social integration function. For this study, social integration was defined as the number of aspects of social ties indicated by the respondent (marital status, involvement in community activities, and membership in an organized religion).

***Received social support (CAREREC):*** This concept was measured by one indicator. The indicator was derived from responses to the question: "In the past 30 days have you experienced a physical or mental health problem for which you received some care from... (i) a relative? (ii) a friend? (iii) a household member?" Each of the three questions has the same response category: 1 = yes, 2 = no, 8 = don't know, 9 = refused. A composite of these three questions was derived to specify the amount of care received. The

responses were recoded so that 0 = no or don't know, 1 = yes, and 9 = missing data. The responses to the three items were summed to provide a scale of 0 to 3 with the highest score indicating care received from relatively more sources.

***Enacted social support (CAREPRO):*** This concept was measured by one indicator and was derived from the question: "In the past 30 days have you helped care for... (i) a relative who was suffering from a physical or mental health problem, (ii) a friend who was suffering from a physical or mental health problem? (iii) a household member who was suffering from a physical or mental health problem?" As in the previous indicator, the responses to each of the three questions were originally coded as: 1 = yes, 2 = no, 8 = don't know, 9 = refused and were recoded as 0 = no or don't know, 1 = yes, and 9 = missing value. The responses to the three items were summed to provide a scale of 0 to 3 with the highest score identifying care provided to relatively more sources.

***Perceived social support:*** This concept was measured by three indicators, including perceived social support, a rating of respondents' social relationships, and the perceived importance of social relationships.

***(a) Perceived support (PERSUPP):*** This indicator was derived from responses to the question, "For each of the following statements, please state if you agree, disagree, or have no opinion: (i) I have at least one person I can confide in, (ii) my spouse or partner is supportive, (iii) my family is not supportive." The responses were originally coded as 1 = agree, 2 = disagree,

3 = no opinion, 8 = don't know, 9 = refused. For the current study, the responses were recoded in the following manner: responses to (i) and (ii) were recoded as 0 = disagree and 1 = agree while the responses to (iii) were recoded in the opposite direction (0 = agree and 1 = disagree) to indicate family support. Responses of 'no opinion' and 'don't know' were recoded as 'disagree' for all three questions. Those responses coded as 'refused' (9) were recoded as missing values. The responses to these three items were summed to provide a scale of low (0) to high (3) levels of perceived social support.

**(b) Rating of quality of social relationships (RELRATE):** This indicator was derived from responses to the question, "Would you describe your social relationships as ..." with the response categories and original coding of 1 = excellent, 2 = very good, 3 = good, 4 = fair, 5 = poor, 6 = no opinion, 8 = don't know and 9 = refused. The responses were recoded in the opposite direction so that a higher score indicated a more positive rating of social relationships (1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent). Codes for 'no opinion', 'don't know', and 'refused' were recoded as missing values.

**(c) Importance of social relationships (RELIMP):** This indicator was derived from responses to the question, "How important are social relationships for your overall health and well-being?" with the responses coded as 1 = very important, 2 = somewhat important, 3 = not at all important, 8 = don't know, 9 = refused. The items were recoded in the opposite direction so that a higher score indicated greater importance placed on social relationships (0 = not at all

important, 1 = somewhat important, 2 = very important). Codes for 'don't know' were recoded as 'not at all important' (0) and 'refused' was recoded as a missing value.

***Social integration (SOCTIES):*** The concept of social integration was represented by an indicator derived from a composite of three of the survey questions. The first question, "What is your current marital status?" was originally coded as 11 = single (never married), 12 = living with spouse or partner and 13 = separated, divorced or widowed. The responses were recoded as: 0 = non-married (included 11 and 13) and 1 = married.

The second item was, "I am regularly involved in community activities" with responses originally coded as 1 = agree, 2 = disagree, 3 = no opinion, 8 = don't know and 9 = refused. The responses were recoded: 0 = disagree and 1 = agree. Responses of 'no opinion' and 'don't know' were recoded as disagree (0) and responses of 'refused' recoded as a missing value.

The third question, "Are you an active member of an organized religion?" was originally coded as 1 = yes, 2 = no, 8 = don't know and 9 = refused. The responses were recoded as 0 = no or don't know, 1 = yes, and responses of 'refused' recoded as a missing value.

The responses from the above three survey questions were summed to provide a scale of low (0) to high (3) degree of social ties.

### Self-rated health status.

The concept of health status employed in this study was limited to self-rated or perceived health status, and was operationally defined as individuals' perceptions of their health status relative to others their age. The response categories were a five-point scale ranging from poor to excellent. This single indicator of self-rated health status has been used in other population-based health surveys (Statistics Canada, 1995a; Stephens & Graham, 1993) and in several studies that have examined the effects of social relationships or social support on health (Auslander, 1988a; Gottlieb & Green, 1984; Hibbard, 1985; Pilisuk et al., 1993).

The fact that this measure of health status has been used extensively in other studies lends some credibility for its use in this study. There are some questions raised, however, about the validity of this measure and more generally, about the dimensions or components of health represented in this global self-assessment of health status.

Cunney and Perri (1991) studied a convenience sample of 35 chronically ill adults to assess whether scores from 20 items measuring health status (covering physical functioning, role functioning, general mental health, current health perceptions, pain and social functioning) were correlated with responses to a single-item measure of health-related quality of life. Their findings indicate that the single-item self-reported health status question is positively and significantly correlated ( $r=0.86$ ,  $p<.0001$ ) with the overall composite score of the 20 items.

These findings should be viewed with some caution because of the size of the sample and the fact that the respondents were all experiencing chronic illness. This raises the question of whether these results are generalizable to the health of general populations.

Results from other studies (Idler & Kasl, 1995; Liang, 1986; Segovia, Bartlett, & Edwards, 1989) that examined the components of the single-item self-reported health status question provide further information on dimensions of health represented by responses to this question. Idler and Kasl (1995) explored whether self-ratings of health predict future levels of functional ability by conducting annual interviews over a six-year period in a sample of 2,812 elderly people in Connecticut. They concluded that those who self-reported the poorest levels of health at the beginning of the study were more likely than those who reported excellent health to have a functional disability at the end of the six-year period. This association held even when chronic disease status, medications, symptoms of conditions and sociodemographic status (age, sex, race, income adequacy, marital status and education) were controlled. Their findings indicate that the single-item measure of self-reported health status is strongly associated with change in functioning; this association holds true for males and females but is stronger in the younger than in the older elderly.

Segovia et al. (1989) studied a random sample of 3,300 adults in households in St. John's, Newfoundland to explore the existence of separate dimensions in the overall concept of health status. They examined the

associations between several variables and health status, health practices and medical care utilization. A principal components analysis produced a five factor solution accounting for 70% of the variance. Of particular interest is their finding that self-reported health loaded on two of the dimensions: disease and subjective opinions of physical condition. These two studies provide information on the meaning of overall self-rated health status and empirical support for the claim that the single-item self-report of health status may measure primarily physical health status. According to Idler and Kasl (1995), self-reported health is strongly associated with functional ability and according to Segovia et al., self-reported health incorporates the two dimensions of disease and subjective views of one's physical condition.

Qualitative research conducted on the meanings that people attach to their responses to the single-item health status question also shed light on understanding what is actually measured by this single question. Jylha (1994) and Krause and Jay (1994) used qualitative research approaches to examine the reference points used by people when they respond to this question on the global assessment of their health status. In both studies, respondents were asked the closed question on how they would rate their health status and then their responses were probed in an interview to clarify why they responded the way they did. Both studies revealed that people's responses about their health are interpreted in different ways according to their own context. Krause and Jay provide further detail by indicating that, although global health is interpreted in

different ways by different respondents, 70% of their respondents identified their referent, when responding to the global health status question, to be a physical health factor.

The relevance of these studies is their support for the single-item question on self-reported health as a measure of health status which can reflect disease states as well as subjective views of the state of one's health. There is no dispute that health is a multidimensional concept and it seems likely that the use of this single-item of self-rated health would tend to measure primarily physical health. This is further supported by a recent analysis using the Yukon Health Promotion Survey data. Of four possible domains of health, physical self-rated health accounted for most of the variance in the overall self-reported health measure (Ratner, Johnson, & Jeffery, 1998). The three other domains of emotional, social and spiritual health did not contribute significantly to the variance in the single-item self-reported health measure.

***Self-rated health status (PERHLTH):*** The indicator for self-rated health is the survey question that asks, "In general, compared to other people your age, would you say your health is..." with the response categories coded as 1 = excellent, 2 = very good, 3 = good, 4 = fair, 5 = poor, 6 = no opinion, 8 = don't know, 9 = refused. The responses to this question were recoded in the opposite direction so that a higher score indicated more positive self-reports of health status (1 = poor, 2 = fair, 3 = good, 4 = very good, 5 = excellent). Responses of 'no opinion', 'don't know', and 'refused' were recoded as missing values.

Table 2 summarizes the observed indicators that were used as measures of the latent concepts to be assessed in the proposed model and the corresponding variable name assigned to each indicator for the purposes of this study.

Table 2

Concepts, indicators and variable names

Concept	Observed indicators (Survey questionnaire item)	Variable name
<i>Gender</i>	22. (from control sheet)	GENDER
<i>Age</i>	22. (from control sheet)	AGE
<i>Presence of Chronic Diseases</i>	A.14. Are you presently diagnosed as having (or have you been told by a health care professional that you have)... (yes/no/don't know)  a) high blood pressure b) high blood cholesterol c) heart problems d) diabetes e) cancer f) arthritis g) asthma h) other (please specify)	CHRDIS

Note. Gender and age of each member of the household were recorded from responses given by the person who initially answered the telephone and then later verified with the specific respondent who was selected from that household.

(table continues)

Table 2 (continued)

Concepts, indicators and variable names

Concept	Observed indicators (Survey questionnaire item)	Variable name
<i>Household Income</i>	<p>O.3. Now, I will read a range of incomes. What is your best estimate of your total household income in 1991 before tax deductions? Was it..</p> <ul style="list-style-type: none"> <li>- less than \$10,000</li> <li>- between \$10,000 and \$20,000</li> <li>- between \$20,000 and \$40,000</li> <li>- between \$40,000 and \$60,000</li> <li>- between \$60,000 and \$80,000</li> <li>- more than \$80,000</li> </ul>	INCOME
<i>Education</i>	<p>O.2. What is the highest grade or level of education you have ever attended or completed? (Mark only one)</p> <ul style="list-style-type: none"> <li>- no schooling</li> <li>- some elementary</li> <li>- completed elementary</li> <li>- some secondary</li> <li>- completed secondary</li> <li>- some community college, technical college, CEGEP or nurse's training</li> <li>- completed community college, technical college, CEGEP or nurse's training</li> <li>- some university or teacher's college</li> <li>- completed university (e.g., BA, MA, Ph.D) or teacher's college</li> <li>- other education or training</li> </ul>	EDUC

(table continues)

Table 2 (continued)

Concepts, indicators and variable names

Concept	Observed indicators (Survey questionnaire item)	Variable name
<i>Received social support</i>	B.2. In the past 30 days, have you experienced a physical or mental health problem for which you received some care from... (yes/no)  a) a relative? b) a friend? c) a household member?	CAREREC
<i>Enacted social support</i>	B.1. In the past 30 days have you helped care for...(yes/no)  a) a relative who was suffering from a physical or mental health problem? b) a friend who was suffering from a physical or mental health problem? c) a household member who was suffering from a physical or mental health problem?	CAREPRO
<i>Perceived social support</i>	E.1. For each of the following statements, please state if you agree, disagree, or have no opinion.  i) I have at least one person I can confide in j) My spouse or partner is supportive (if applicable) k) My family is not supportive	PERSUPP

(table continues)

Table 2 (continued)

Concepts, indicators and variable names

Concept	Observed indicators (Survey questionnaire item)	Variable name
	A.4. Would you describe your ....  c) social relationships as (excellent, very good, good, fair, or poor?)	RELRATE
	A3. How important are the following for your overall health and well-being? (very/somewhat/not at all)  c) social relationships	RELIMP
<i>Social integration</i>	O1. What is your current marital status? Are you... (single(never married), living with a spouse or partner, divorced, separated or widowed?)  E.1 For each of the following statements, please state if you agree, disagree, or have no opinion.  m) I am regularly involved in community activities  F.3 Are you an active member of an organized religion? (yes/no)	SOCTIES
<i>Self-rated health status</i>	A.2. In general, compared to other people your age, would you say your health is... " (excellent, very good, good, fair, poor)	PERHLTH

## **CHAPTER 4**

### **DESCRIPTION OF THE SAMPLE**

The purpose of this section is to provide an overall description of the sample of Yukon men and women used in this study. The section also summarizes the bivariate relationships among the study variables as a way of examining some of the research questions posed in this study.

#### **Tests of Normality**

Prior to the analyses, all variables were examined for departures from normality (see Table 3). The distribution of the variables, 'care received' (CAREREC), 'care provided' (CAREPRO) and 'presence of chronic diseases' (CHRDIS) were positively skewed. Most of the respondents indicated that they had received no care or that they had not provided care to others. Both of these variables were recoded into binary variables with responses coded as either "0" for no care provided or received or "1" for care provided or received from various sources. Most of the respondents also indicated that they had no chronic diseases at the time of the survey. This variable (CHRDIS) was also recoded as a binary variable<sup>26</sup> with "0" indicating no chronic diseases and "1" indicating one or more chronic diseases.

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<sup>26</sup> The reason for recoding these three variables into binary variables was related to the assumptions underlying LISREL. Although LISREL is robust, the assumptions are based on normality and linearity. If variables are non-normally distributed, it may result in some unreliability of the findings.

Table 3

Summary of tests of assumptions

Variable	Min.- Max.	<u>M</u>	<u>SD</u>	Median	Skewness	Kurtosis
Gender (GENDER)	0-1	0.49	0.50	0	N/A*	N/A
Age (AGE)	15-82	38.01	11.87	37.00	0.53	0.22
Marital status (MARITAL)	0-1	0.64	0.48	1	N/A	N/A
Income (INCOME)	1-6	3.88	1.27	4	0.03	-0.63
Education (EDUC)	1-9	6.10	1.88	6	0.16	-1.01
Presence of chronic disease (CHRDIS)	0-8	0.35	0.66	0	2.12	4.95
Care provided (CAREPRO)	0-3	0.47	0.71	0	1.50	1.82
Care received (CAREREC)	0-3	0.19	0.57	0	3.28	10.66
Perceived social support (PERSUPP)	0-3	2.59	0.60	3	-1.30	1.28
Importance of social relationships (RELIMP)	0-2	1.62	0.53	2	-0.96	-0.17
Rating of social relationships (RELRATE)	1-5	3.67	0.88	4	-0.32	-0.05
Level of social integration (SOCTIES)	0-3	1.37	0.85	1	0.07	-0.62
Self-rated health (PERHLTH)	1-5	3.83	0.97	4	-0.55	-0.12

Note. All variables were examined using the Explore procedure in SPSS without weighting.

\* Not applicable.

### **Examination of Missing Values**

The variables also were examined to determine the occurrence of missing data (see Table 4). A variable of concern was household income because of the high percentage (8.6%) of people who did not respond to this question. The 106 missing cases were examined to determine if these non-respondents differed in terms of gender, marital status or educational level from those who responded.

Nonrespondents were found to be proportionately the same as the full sample in gender, marital status, and educational attainment. It was not only those with relatively higher education who did not respond to this question. One way of dealing with missing cases is to impute a value for each case based on known and related attributes. To accomplish this, a multiple regression analysis was conducted regressing household income on gender, marital status, and educational level. These three predictor variables, however, accounted for only 14% of the variance in income. In light of such poor predictive power, values were not imputed for the missing cases; they were omitted from further analyses. Although this may be a limitation of the analysis, there did not appear to be a pattern among the attributes of those who did not answer the income question, thereby reducing the likelihood of systematic error or bias. All other variables had a tolerable number of missing cases.

Table 4

Missing data of total sample and by gender

Variable	Total sample (%) (n=1,239)	Women (%) (n=631)	Men (%) (n=608)
Gender (GENDER)	0	0	0
Age (AGE)	0	0	0
Marital status (MARITAL)	0.5 (n=6)	0.3 (n=2)	0.7 (n=4)
Income (INCOME)	8.6 (n=106)	8.6 (n=54)	8.6 (n=52)
Education (EDUC)	1.4 (n=17)	0.8 (n=5)	2.0 (n=12)
Presences of chronic disease (CHRDIS)	0.2 (n=2)	0.3 (n=2)	0
Care provided (CAREPRO)	0.2 (n=3)	0.2 (n=1)	0.3 (n=2)
Care received (CAREREC)	0.3 (n=4)	0.3 (n=2)	0.3 (n=2)
Perceived support (PERSUPP)	0.2 (n=3)	0.2 (n=1)	0.3 (n=2)
Importance of social relationships (RELIMP)	0.9 (n=11)	0.8 (n=5)	1.0 (n=6)
Rating of social relationships (RELRATE)	0.6 (n=8)	0.8 (n=5)	0.5 (n=3)
Level of social integration (SOCTIES)	0.2 (n=2)	0.2 (n=1)	0.2 (n=1)
Self-rated health (PERHLTH)	0.4 (n=5)	0.3 (n=2)	0.5 (n=3)

Note. Values are based on unweighted data.

## Sample Characteristics<sup>27</sup>

### **Gender and Age**

The sample was distributed approximately equally on the basis of gender (48.5% women; 51.5% men). The mean age for the total sample was 38.2 years ( $SD = 14.0$ ). The average age of female respondents was 37.1 years ( $SD = 13.8$ ) which was slightly younger than the average age of male respondents ( $M = 39.2$ ,  $SD = 14.1$ )

### **Income**

As shown in Table 5, 28.0% of the respondents had a household income between \$20,000 and \$39,999, another 26.2% indicated an annual household income between \$40,000 and \$59,999 and another 29.5% indicated that their household income was \$60,000 or more. Women and men did not differ significantly on the distribution of their household incomes,  $\chi^2 (4, N = 1,125) = 4.0$ ,  $p = .55$ .

### **Education**

More than one quarter of the respondents (27.4%) had completed secondary education and an additional 31.0% had completed either college or university education (see Table 6). A very small percentage (4.3%) of the respondents had completed only elementary education or less. A comparison of the educational levels of women and men revealed that 18.0% of women

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<sup>27</sup> All of the following point estimates are based on the weighted data.

completed less than high school compared to 23.6% of men,  $\chi^2 (8, N = 1,220) = 18.4, p = .02$ .

Table 5

Annual household income of total sample and by gender

Household income range	Total sample (%) (n=1,125)	Women (%) (n=547)	Men (%) (n=578)
<\$10,000	3.6	3.2	3.8
between \$10,000-\$19,999	12.8	13.3	12.4
between \$20,000-\$39,999	28.0	26.6	29.4
between \$40,000-\$59,999	26.2	28.4	24.1
between \$60,000-\$79,999	16.3	15.4	17.2
≥\$80,000	13.2	13.0	13.2

Note. The actual wording of the question asked people to indicate if they fell between certain income levels: "Is your household income between \$10,000 and \$20,000?" For the purposes of this study, the response categories have been altered to reflect the intention of the question.

Table 6

Education completed of total sample and by gender

Education completed	Total sample (%) (n=1,220)	Women (%) (n=626)	Men (%) (n=594)
No school	0.1	0	0.2
Some elementary	1.5	0.9	2.2
Completed elementary	2.7	1.7	3.6
Some secondary	16.5	15.4	17.6
Completed secondary	27.4	27.7	27.1
Some college	10.6	12.5	8.9
Completed college	13.8	12.4	15.2
Some university	10.2	11.5	8.9
Completed university	17.2	18.0	16.3

**Presence of Chronic Diseases**

Almost three quarters of the respondents (72.7%) reportedly did not have a chronic disease at the time of the survey (see Table 7). The differences between women and men were not significant,  $\chi^2 (4, N = 1,238) = 8.9, p = .06$ .

Table 7

Presence of chronic diseases of total sample and by gender

Presence of chronic diseases	Total sample (%) (n=1,238)	Women (%) (n=630)	Men (%) (n=608)
None	72.7	70.1	75.2
Some	27.3	29.9	24.9

**Care Provided**

Slightly more than one third (34.0%) of the respondents indicated that they had provided care for either a household member, a relative, or a friend in the 30 days prior to the survey (see Table 8). Women were 1.6 times more likely to have provided care to at least one of these recipients than men,  $\chi^2 (1, N = 1,234) = 16.1, p < .001$ .

Table 8

Care provided by total sample and by gender

Care provided in past 30 days	Total sample (%) (n=1,234)	Women (%) (n=601)	Men (%) (n=633)
No care provided	66.0	60.4	71.2
Care provided to some sources	34.0	39.6	28.8

### **Care Received**

A small proportion (14.0%) of the respondents indicated that they had received care from at least one source<sup>28</sup> in the previous 30 days (see Table 9). Women (17.7%) were 1.8 times more likely than men (10.9%) to report that they had received care from someone in the 30 days prior to the survey,  $\chi^2 (1, N = 1,234) = 11.7, p < .001$ .

Table 9

#### **Care received by total sample and by gender**

Care received in past 30 days	Total sample (%) (n=1,234)	Women (%) (n=600)	Men (%) (n=634)
No care received	86.1	82.3	89.1
Care received	14.0	17.7	10.9

### **Perceived Social Support**

'Perceived social support' measured whether the respondents believed that support would be available to them if they should need or request it. Almost two thirds of the respondents (60.5%) indicated that they were very positive about the support available to them (see Table 10). No statistically significant

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<sup>28</sup> These are the same three sources that were in the response categories for care provided: a household member, a relative, or a friend.

difference was found between women and men in their response to this question,  $\chi^2 (3, N = 1,235) = 6.3, p = .10$ .

Table 10

Availability of social support of total sample and by gender

Likert-type scale rating	Total sample (%) (n=1,235)	Women (%) (n=601)	Men (%) (n=634)
Low level of support	1.0	0.6	1.4
2	6.4	6.2	6.6
3	32.1	29.5	34.6
High level of support	60.5	63.7	57.4

**Importance of Social Relationships**

Approximately two thirds of the respondents (63.2%) indicated that social relationships were very important to their overall health and well-being (see Table 11). Women and men differed significantly in terms of the strength of their opinions on this question. More women (68.3%) than men (58.5%) believed that social relationships were very important,  $\chi^2 (2, N = 1,230) = 13.1, p < .001$ .

**Quality of Social Relationships**

In rating the quality of their social relationships, 15.8% of the respondents reported their social relationships to be "excellent" and 41.0% rated them as "very good" (see Table 12). Women tended to rate the quality of their social

relationships more highly than men (62.0% of women rated their social relationships as “excellent” or “very good” compared to 51.9% of men),  $\chi^2$  (4,  $N$  = 1,233) = 31.2,  $p$  < .001.

Table 11

Importance of social relationships of total sample and by gender

Rating	Total sample (%) (n=1,230)	Women (%) (n=597)	Men (%) (n=633)
Not at all important	2.8	2.2	3.3
Somewhat important	34.0	29.5	38.2
Very important	63.2	68.3	58.5

Table 12

Quality of social relationships of total sample and by gender

Rating	Total sample (%) (n=1,233)	Women (%) (n=597)	Men (%) (n=636)
Excellent	15.8	17.5	14.3
Very good	41.0	44.5	37.6
Good	33.2	32.7	33.7
Fair	8.7	4.5	12.7
Poor	1.3	0.8	1.8

### **Social Integration**

In ranking the respondents according to their level of social ties, the majority (60.8%) were found to be at the lower end of the scale (see Table 13). About one fifth (21.4%) of male respondents reported no social ties compared to 15.5% of female respondents,  $\chi^2 (3, N = 1,236) = 14.0, p < .001$ .

Table 13

#### **Social integration of total sample and by gender**

Likert-type scale rating	Total sample (%) (n=1,236)	Women (%) (n=601)	Men (%) (n=635)
No social ties	18.5	15.5	21.4
2	42.3	40.6	43.9
3	32.2	35.6	29.0
High social ties	7.0	8.3	5.7

### **Self-Rated Health Status**

Approximately two thirds (63.3%) of the respondents rated their health as “very good” or “excellent” (see Table 14). Women and men did not differ significantly in their self-rated health status,  $\chi^2 (4, N = 1,234) = 4.3, p = .37$ .

Table 14

Self-rated health of total sample and by gender

Rating	Total sample (%) (n=1,234)	Women (%) (n=599)	Men (%) (n=635)
Excellent	26.7	28.5	25.0
Very good	36.6	37.4	35.9
Good	25.6	23.2	27.9
Fair	7.9	7.7	8.0
Poor	3.2	3.2	3.2

**Bivariate Relationships Among Study Variables**

This section presents the relationships among the variables, age, income, education, and presence of chronic diseases and the remaining study variables. These bivariate relationships were examined using correlational analyses and measures of association.

**Age**

The relationships between age and the study variables were measured with Pearson's correlation coefficients and two-tailed tests of significance (see Table 15). Age is significantly correlated with CAREPRO, CAREREC, PERSUPP, RELRATE and PERHLTH. All of these relationships are relatively weak and

negatively correlated with age. Older respondents indicated that they had both received less care and provided less care to others. Those who are older rated their health and the quality of their social relationships less positively and indicated that less support is available to them than younger people.

### **Income**

The relationships between income and the relevant study variables were tested with Kendall's tau and two-tailed tests of significance. Income is significantly correlated with CAREPRO, CAREREC, PERSUPP, SOCTIES, and PERHLTH (see Table 16) . Although these relationships are weak, those with higher incomes provided care to at least one source, are less likely to have received care from at least one source, rated the quality of their social relationships more positively and rated their own health more positively. The relationships between income and PERSUPP and SOCTIES are stronger with those with higher incomes having higher levels of social integration and perceived social support.

### **Education**

The relationships between education and the relevant study variables were tested with Kendall's tau and two-tailed tests of significance. Education is significantly correlated with PERSUPP, RELRATE, SOCTIES and PERHLTH (see Table 17). There is a weak relationship between EDUC and RELRATE; those with higher education rated the quality of their social relationships more positively. The remainder of the statistically significant relationships are stronger; those with higher education rated their perceived support and the level of their social

Table 15

Correlations between age and selected study variables

	CAREPRO	CAREREC	PERSUPP	RELRATE	RELIMP	SOCTIES	PERHLTH
Age							
r	-.15	-.07	-.14	-.08	-.02	-.02	-.07
p	.00*	.01*	.00*	.00*	.45	.52	.02*
*p ≤ .05 (2-tailed)							

Table 16

Correlations between income and selected study variables

	CAREPRO	CAREREC	PERSUPP	RELRATE	RELIMP	SOCTIES	PERHLTH
Income							
r	.05	-.06	.22	.04	.02	.20	.08
p	.05*	.05*	.00*	.07	.45	.00*	.00*
*p ≤ .05 (2-tailed)							

integration at a higher level and rated their health more positively.

### **Presence of Chronic Diseases**

The relationships between the presence of chronic diseases and the relevant study variables were tested with Kendall's tau and two-tailed tests of significance (see Table 18). CHRDIS is significantly correlated with CAREREC, PERSUPP, SOCTIES and PERHLTH. The relationship between chronic disease and these first three variables is relatively weak; those who reported some chronic disease had received care from some source, had a lower level of perceived support available to them, and had a lower level of social integration than those not affected by chronic disease. The negative relationship between the presence of chronic disease and self-rated health is very strong with those reporting chronic disease rating their health less positively.

Table 17

Correlations between education and selected study variables

	CAREPRO	CAREREC	PERSUPP	RELRATE	RELIMP	SOCTIES	PERHLTH
Education							
r	.04	.02	.11	.09	.02	.21	.12
p	.13	.36	.00*	.00*	.52	.00*	.00*

\*p ≤ .05 (2-tailed)

Table 18

Correlation between presence of chronic diseases and selected study variables

	CAREPRO	CAREREC	PERSUPP	RELRATE	RELIMP	SOCTIES	PERHLTH
Presence of chronic diseases							
r	-.04	.09	-.06	-.04	.02	-.06	-.23
p	.16	.00*	.02*	.17	.48	.02*	.00*

\*p ≤ .05 (2-tailed)

## **Chapter Summary**

This chapter presented an overview of the sample of Yukon women and men included in this study through an examination of the univariate distributions of the variables and bivariate relationships among gender, age, income, education and presence of chronic diseases and the remainder of the study variables.

The age of the respondents was significantly correlated with their perceptions of the availability of social support, the rating of the quality of their social relationships, whether they provided or received care, and their self-rated health status. As people age they perceive less social support to be available to them, and they rate the quality of their social relationships and health to be relatively poorer. Older people are more likely to have received and provided care than younger respondents.

Household income levels were associated with several of the social relationship variables and the outcome variable, self-rated health status. Those with higher household incomes reported they had both provided care and received care. They also indicated higher levels of perceived social support and social integration. Those with higher incomes were also likely to have more positive ratings of their health than those with lower household incomes.

Those with higher levels of education indicated higher levels of both perceived social support and social integration, and were more positive about the quality of their social relationships. Educational attainment was also significantly

associated with self-rated health; those with higher levels of education had more positive views of their health.

The presence of chronic diseases reported at the time of the survey was significantly related to responses about care received, perceived social support, social integration and self-rated health status. Those who reported some chronic disease indicated that they had received care but perceived that they had a lower level of social support available to them than those who reported no chronic disease. Respondents with some chronic disease reported a lower level of social integration. As might be expected, those with one or more chronic diseases rated their health less positively than those respondents who reported no chronic disease at the time of the survey.

Women and men differed significantly<sup>29</sup> on their educational level with slightly more women than men having completed university.<sup>30</sup> There were no

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<sup>29</sup> It should be noted here that the issue of significant findings may be affected by the multiple comparisons that were made for women and men. For example, with the 10  $\chi^2$  tests that were conducted at  $p \leq .05$  it could be estimated, using the Bonferroni inequality, that the overall p value is actually closer to .50 (Stevens, 1992). Clearly, this places the significance of any findings based on these tests in the realm of possible spurious results. There is debate, however, about the appropriate use of the calculation of overall p value for multiple comparisons. Some have argued that the overall p value must always be calculated (Goodman, 1998; Stevens, 1992) while others argue that it is unnecessary to do so (Savitz & Olshan, 1995, 1998). A compromise position in this debate is that the purpose of the analyses should be taken into consideration when deciding about the importance of the overall p value. If the analyses are informal and are intended to help understand the relationships between variables in order to conduct more sophisticated analyses, it may not be as important to calculate the overall p value (Thompson, 1998). Similarly, more confidence may be placed in any significant findings if a priori hypotheses are presented (Stevens, 1992). The reader may also wonder about the effects of this issue in Chapter 5 where incremental modifications were estimated to arrive at a fit model. In that case, the p value was only one of several indicators examined to assess the fit of the model. Evidence of fit was also indicated by the AGFI values and the patterns seen in the residuals.

<sup>30</sup> This finding is consistent with current Canadian trends where it is reported for the age group of 20-29: "By, 1996, however, more than half (51%) of women in this age group had a degree or diploma, compared with only 42% for men" (Statistics Canada, April 14, 1998, p. 1).

significant differences, however, between women and men in either their level of household income or whether they reported any chronic diseases at the time of the survey.

Women and men differed in relation to a number of the study variables that measured aspects of their social relationships. More women than men indicated that they had both provided and received care in the month preceding the survey. Overall, there were no differences between women and men on their perceptions of the social support that was available to them; both groups were primarily positive about this aspect of support. Women and men differed, however, in their responses to the remainder of the social relationship items. More women than men rated their social relationships to be very important to their health and well-being and the quality of their social relationships as either "excellent" or "very good". Men and women differed in their level of social integration; more men than women reported few social ties. Finally, about two thirds of the respondents rated their health as "excellent" or "very good"; women and men did not differ significantly in their self-rated health status.

A comparison of some of these findings with responses of the Canadian population from the 1990 Canada Health Promotion Survey reveals some differences between Yukoners and other Canadians (Government of Yukon, 1994a, 1994b). Overall, the proportion of Yukon respondents who reported providing care to family and friends was lower than for the Canadian population but was similar to the Canadian population in terms of having reported receiving

care from these same sources. It was also reported that, for self-rated health status, Yukon residents overall and by gender have a similar distribution to the Canadian population. This is similar to the findings of the 1994/95 National Population Health Survey where the proportion of non-Aboriginal Yukoners who rated their health as "very good" or "excellent" was similar to other Canadians (Diversity & Perez, 1998). It was noted, however, that a greater percentage of Yukon residents over the age of 65 rated their health as 'excellent' in 1993 compared to their Canadian counterparts in 1990.

## **CHAPTER 5**

### **THE EFFECTS OF SOCIAL RELATIONSHIPS ON HEALTH**

#### **The Initial Model**

The model proposed and estimated in this study explains how social relationships affect the perceived health status of women while controlling for differences in personal circumstances including age, income, education, and number of reported chronic diseases. The initial model is restricted to women to permit subsequent explorations of gender as a factor, particularly in relation to possible interactions with social relationships and their influence on health. This phase of the analysis focused on testing a conceptual model using structural equation modeling via the LISREL 7.2 program included with the SPSS statistical software package (Norusis, 1993). The proposed model for women hypothesized that age, income, education and chronic diseases directly affect individuals' perceived health status and indirectly affect health status through the mediating influences of one's social relationships.

In discussing interactions, Hayduk (1987) wrote, "An interaction exists if the magnitude of the effect of one variable on another differs, depending on the particular value possessed by some third variable (often some special condition describing the situation or environments)" (p. 52). There are several methods in structural equation modeling that can be used to assess an interaction effect.

Hayduk (1987) discussed two methods: stacking multiple groups of data and mimicking multiple regression procedures. The stacking of multiple groups is appropriate to use when the concepts are thought to be involved in several interactions while mimicking multiple regression procedures can be used when only a few interactions are suspected (Hayduk, 1987). The appropriate use of stacked models also requires that the groups are mutually exclusive and that each group has been randomly sampled from its respective population. Both of these assumptions were met in the sample used in this study. The procedure for stacking groups formed on the basis of gender permits examination of whether effect coefficients are the same or different for women and men, that is, whether interactions are present:

Since many variables may display differential effects in the different groups, stacking permits estimation of models containing multiple interactions between the variable providing the grouping and the other variables in the model. (Hayduk, 1987, p. 277)

A third approach involves arriving at a fit model for one of the groups and then separately estimating this fit model on the other group and comparing the models' estimated coefficients and goodness-of-fit.<sup>31</sup> This study addressed the possible interaction effect of gender by first testing the proposed model in a sample of women. Once a fit model was obtained for women, it was determined if the model fit the data for men. This approach allowed for the examination of

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<sup>31</sup> In the stacking approach to assessing interactions, the models for the women and men would be entered and estimated simultaneously. The only difference in the approach that was used in this study is that it was deemed simpler to estimate relatively complex models for women and men separately. Therefore, the same assumptions that are required in the stacking approach apply to the approach of estimating the models for the two groups separately.

whether there were interactions with gender by assessing whether the effects that were evident for women were similar for men.

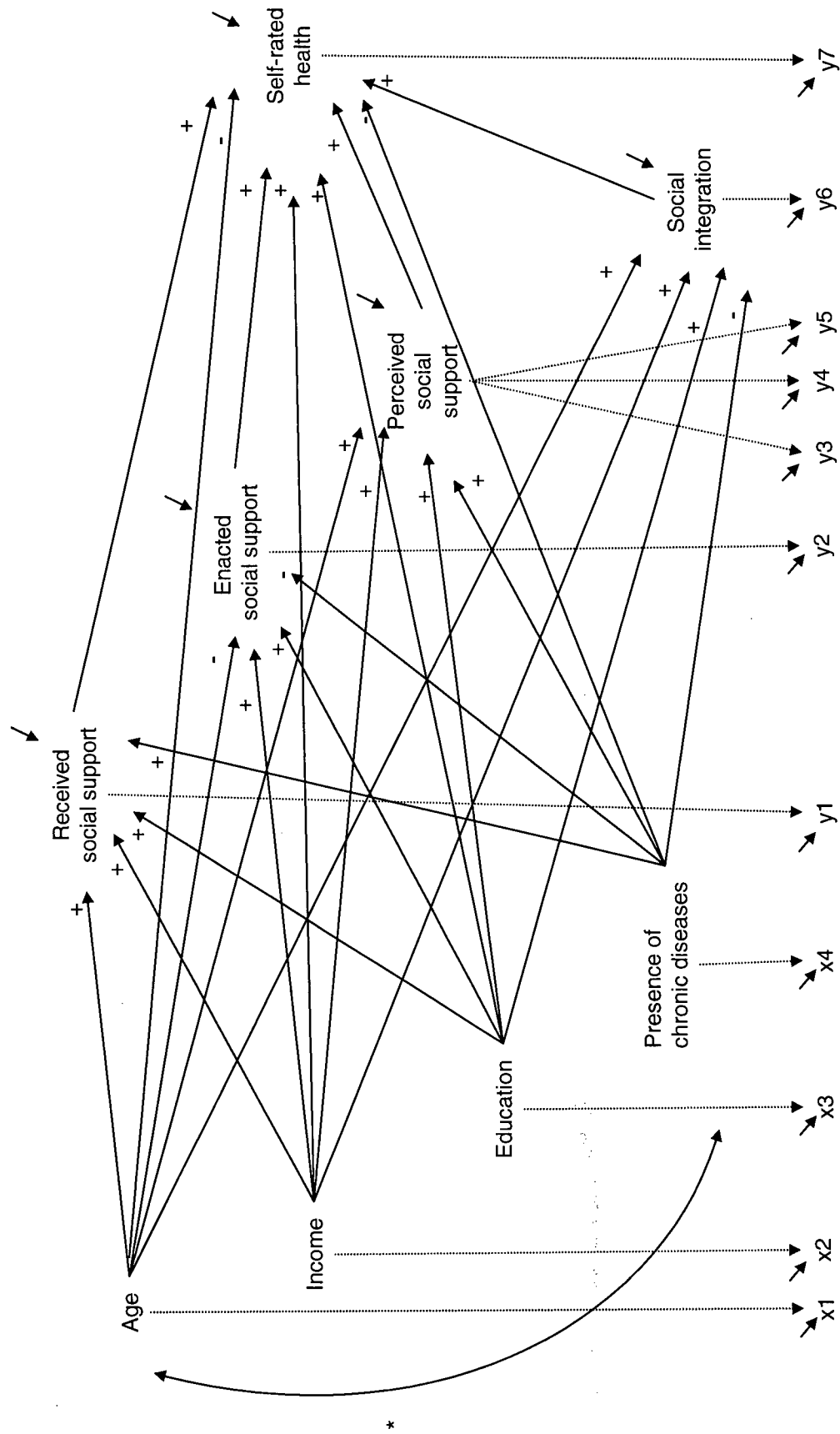
The analysis used the one-step approach to structural equation modeling where the measurement and structural aspects of the model are specified and estimated simultaneously (Ratner, Bottorff, et al., 1998). This approach is in contrast to a two-step approach that would first test the measurement model through confirmatory factor analysis and then use the results from this step to incorporate the appropriate indicators into the structural model (Bollen, 1989). The reason for choosing the one-step approach is related to the view that the definition and measurement of concepts are inseparably linked to the hypothesized relationships (Hayduk, 1987).

The clearest meanings of concepts arise when they are viewed within a particular context and are embedded in a theory. Concepts are not only granted meaning through their links to their indicators but through their links with other concepts. (Ratner, Bottorff, Johnson, & Hayduk, 1996, p. 245)

### **The Hypothesized Model**

The hypothesized model tested in this study (see Figure 1) was designed to postulate that various aspects of social relationships, as experienced by different groups of female respondents (based on differences in age, income, education and presence of chronic diseases) have consequences for their self-rated health status. The relationships specified in the model are drawn from the review of the literature.

Figure 1 Initial model (women)



\* Denotes all exogenous concepts allowed to covary

The conventions for graphic presentation of models using LISREL follow similar guidelines for path diagrams. In the model, there are four concepts exogenous to the model: age, income, education, and presence of chronic diseases. Each concept is measured by a single indicator, AGE ( $x_1$ ), INCOME ( $x_2$ ), EDUC ( $x_3$ ) and CHRDIS ( $x_4$ ), respectively with each indicator having an associated error term represented by the short arrows. The four exogenous concepts are allowed to covary as indicated by the double-headed curved arrow.

There are five concepts endogenous to the model: received social support, enacted social support, perceived social support, social integration, and self-rated health status with each endogenous concept having an associated disturbance term represented by a short arrow (representing sources of unexplained variance). Each endogenous concept is measured by its respective indicator(s) CAREREC ( $y_1$ ), CAREPRO ( $y_2$ ), PERSUPP ( $y_3$ ), RELRATE ( $y_4$ ), RELIMP ( $y_5$ ), SOCTIES ( $y_6$ ), PERHLTH ( $y_7$ ) with each indicator having an associated error term represented by the short arrows.

The following section describes the theoretical model with its specified paths and their hypothesized direction of effect noted in Figure 1.

In the model, it is hypothesized that age, income, education and presence of chronic diseases all directly affect self-rated health status. Support for including age and presence of chronic diseases as background factors is found in studies that have controlled for these factors because of their associations with health status (Anson, 1989; Arber & Ginn, 1993; House et al.,

1982; MacIntyre, 1986; Osborn, 1973; Rahman et al., 1994; Rook, 1984; Slater, Lorimor, & Lairson, 1985). It is hypothesized that age and presence of chronic diseases will have negative effects on self-rated health. Other studies support the hypothesized positive effects of income and education on self-reported health (Adams, 1993; Anson et al., 1993; Walters et al., 1995; Wilkins, 1988).

Several relationships are postulated in which age, income, education, and presence of chronic diseases indirectly affect health through their influence on the specified components of social relationships. Support for these hypothesized effects can be derived from various aspects of the literature reviewed. Income and education, as indicators of SES, are conceptualized as environmental factors that can influence received and provided social support, perceived social support, and existence of social ties (Antonucci, 1985; Belle, 1983; Coburn & Pope, 1974; House et al., 1994; House, Umberson, et al., 1988; Lin et al., 1979). Higher levels of SES are associated with more social contacts (Moore, 1990) and with stronger social support or more availability of social support (Weinberger et al., 1987). Studies have shown a relationship between other measures of SES (higher occupational status or prestige) and higher levels of perceived social support (Turner & Marino, 1994), higher support levels of social integration (Marmot et al., 1991), and increased satisfaction with supports (Marmot et al., 1991). The relationship between age and social relationships was not always examined in the studies reviewed and for those that did, the results appear to be mixed. Some studies found that age has an inverse

association with the size of the social network (Fisher & Oliner, 1983) or the number of social ties (Hibbard, 1985) while others found that the size of the network increases with age (Cutrona, 1986). In the absence of conclusive guidance, we tentatively postulated that age has a positive association on social integration, perceived and received social support and a negative relationship on enacted social support. Finally, the relationships between presence of chronic diseases and social relationships are postulated as tentative because of the lack of reference to this as a factor in the literature related to the determinants of social relationships and support. It could be surmised that having a chronic disease could be considered as one of the environmental influences on various dimensions of social relationships (Antonucci, 1985; House et al., 1994). What is not evident from the literature is the direction of the effects on the specific components of social relationships used in this study. One study (Grant et al., 1988) found that those with physical illness reported more advice giving and higher quality support from relatives than those without physical illness. We postulated that the presence of chronic diseases may mean that support might be received and that perceived social support may be positive. An additional tentative hypothesis was that the presence of chronic disease may have a negative effect on the amount of support provided to others and on the level of social integration because the diseases may limit opportunities to aid others and to interact socially (e.g., depression, physical limitations, fatigue).

The final set of relationships specify the effects of social relationships on women's perceived health status. Several studies have shown that the receipt of different types of social support has positive effects on health. Positive perceptions of the availability of social support (Broadhead et al., 1983; Thoits, 1982) and a higher number of social ties (Gallo, 1982; Hibbard, 1985; Mor-Barak et al., 1991; Shye et al., 1995) both have been found to be related to positive assessments of health. Receiving social support has also been found by some to be associated with more positive health outcomes (Blake & McKay, 1986; Choi & Wodarski, 1996; Hibbard & Pope, 1985). The relationship between enacted or provided social support appears to be less clear. This concept has been proposed as a measure of the relationship strain or potential negative aspects of social support on providers but findings of its effects on health are somewhat inconsistent. It has been hypothesized that providing care, particularly kin care, will have negative effects on health outcomes (Gerstel & Gallagher, 1993; Matthews et al., 1997; Umberson et al., 1996), and it has been found that, in studies where respondents have been asked specifically about negative perceptions of providing care to specific sources in specific contexts, this negative relationship has been significant (Gerstel & Gallagher, 1993; Rook, 1984). It is not clear from the literature, however, that this relationship would be similar in broader population samples where respondents were not asked to specifically assess the effects of providing care to others. Consequently we

postulated that providing social support may have a positive effect on health because it enhances feelings of connectedness, value, and purpose.

### **Types of Error**

There are two types of error to consider in structural equation modeling. The first, referred to as "structural disturbance," is associated with the endogenous latent concepts. The second refers to measurement error associated with the indicators or measures of both the exogenous and endogenous concepts.

#### *a) Structural Disturbance*

Structural disturbance is expressed as a percentage or proportion of the variance in the endogenous concepts that arises from sources outside of those causal variables in the model (Hayduk, 1987). Structural disturbance is a type of error that results from the possibility that there may be other variables important to the causal relationships that are not specified in the model being tested. Each endogenous concept has an error term associated with it to "represent the unexplained variance or the variance of each of the endogenous latent concepts not accounted for by the variables included in the model" (Ratner, Bottorff, et al., 1998, p. 185).

#### *b) Measurement Error*

The second type of error refers to errors in the measurement of the concepts. The quality of the measurement can be incorporated into the proposed model by specifying a specific proportion of the indicator's variance

that can be attributed to error (Hayduk, 1987). Fixing an error variance at a certain value "implies that entities other than the underlying concept can influence the indicator and, hence, acknowledges some unreliability in the measurement of the concept" (Hayduk, 1987, pp. 118-119). The remaining variance is then assigned or attributed to the underlying concept to which the indicator is associated. The following section outlines the measurement error assigned to each of the indicators.

*i) Reported age:* Information on age was solicited at the first telephone contact when the person answering the telephone was asked to provide the age and date of birth of each member living in the household. After this initial contact, the interviewer randomly selected the individual household member who would be the respondent in the survey. The respondent's age and gender were verified by the interviewer before proceeding with the interview so the chance of error in age was minimized by verifying this information with the respondent. One percent of the variance in the indicator was assigned as error to reflect the low level of error associated with the collection of date of birth data verified by the respondent and another household member. The likely source of error, if any, occurred during the keypunching process.

*ii) Reported income:* It is generally acknowledged that, in survey research, soliciting information about income is a sensitive matter, particularly for those in the higher income ranges (Liberatos et al., 1988; Ratner, 1995). Ten

percent of the variance was assigned as error to account for any possible under reporting of income.

*iii) Reported education:* This indicator was assigned an error term of 5% of the variance to account for any over reporting of education and the possibility that some educational accomplishments did not fit the response categories.

*iv) Presence of chronic diseases:* This indicator was assigned an error term of 5% to account for any under reporting or possibly incorrect information in the number of chronic diseases reported by the respondents.

*v) Measures of social relationships:* The six indicators of social relationships used in this study were each assigned the same error rate of 15%. The reason for assigning a higher proportion of error to these indicators was made on the basis of the possibility that the items may have different meanings to different respondents.

*vi) Measure of health status:* The question of whether a single-item indicator of health status taps the concept has been previously discussed.<sup>32</sup> Self-rated health status was assigned an error term of 5%.

The level of error assigned to the indicators of age, income, education and health status was determined through a review of other studies that used similar measures (Hayduk, 1987; Ratner, 1995). The specification of the error terms was also determined, in part, by conceptualizing an error term of 5% as either

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<sup>32</sup> See Chapter 3: Methods and Procedures for a description of the operationalization of health status.

"moderate" (Ratner, 1995, p. 64) or "low" (Hayduk, 1987, p. 122) and an error term of 10% as "modest" (Hayduk, 1987, p. 122).

### **Estimating the Initial Model**

The initial model, limited to women, was estimated using structural equation modeling with LISREL 7.2 (Joreskog & Sorbom, 1989) within SPSS for Windows. The first step in the analysis was to create two random samples<sup>33</sup> of the data for women in order to reserve one half of the sample for verification of the final fit model. This approach is suggested by Hayduk (1987) who argues that causal modelling cannot establish causation but can provide evidence that the hypothesized model fits the data. One method of providing more confidence in the final fit model is to test it on a random sample from the same data set. This would then suggest that any additions or deletions that were made to the model were likely substantive in nature, rather than responses to random fluctuations.<sup>34</sup>

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<sup>33</sup> Two random samples with approximately 50% in each were selected using the procedure in SPSS; the sample that was used to run all the LISREL analyses had n=328 and the sample that was reserved for verification of the final fit model had n=303.

<sup>34</sup> The importance of making revisions to the initial model can be placed in the context of substantive versus data-driven modifications. There is always the possibility that any modifications that are made based only on the data may be responses to mere random fluctuations.

## Creating the Covariance Matrix

There were two issues to deal with in the creation of the covariance matrix;<sup>35</sup> the treatment of missing cases<sup>36</sup> and the weighting of the data. One of the assumptions underlying the use of maximum likelihood procedures for estimating coefficients (MLE) is that the covariance matrix has been created through a listwise matrix. Hayduk (1987) notes, however, that there is no definite rule for the use of listwise over pairwise deletion.

The covariance matrix in this study was created using listwise deletion of missing cases. The sample size of 304<sup>37</sup> cases was used for the LISREL analyses. The decision to use this method of dealing with missing data was made after comparing different procedures for the creation of the covariance matrix.

There are two procedures for converting a correlation matrix to a covariance matrix. Either PRELIS, which is a part of the LISREL 7.2 computer package, or the 'mconvert' command in SPSS for Windows can be used.

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<sup>35</sup> The analyses were conducted using the covariance rather than correlation matrix. The procedure for estimating the coefficients (maximum likelihood estimates) is based on the use of a covariance matrix and it is also suggested that if we are comparing parameters across groups and are interested in differences in variances then it is more appropriate to use covariance matrices (Loehlin, 1992).

<sup>36</sup> Two approaches to the problem of missing data include listwise and pairwise deletion of cases with missing data. "Listwise" deletion of missing cases means that the value of each individual or case is included for all variables in the input data matrix so if a case is missing some data, it is deleted in its entirety. "Pairwise" deletion of missing cases means that each covariance is based on all the cases having information for only the relevant pair of variables, thus each case may not be included for all the variables in the data matrix if that case has missing information for one or several of the input variables, and the number of cases contributing to any covariate will vary throughout the matrix.

<sup>37</sup> Listwise deletion of missing cases resulted in the loss of 24 cases from the original sample size of 328.

PRELIS cannot deal with the weighting of data hence the next step was to compare the covariance matrices for both the weighted and unweighted data<sup>38</sup> using the 'mconvert' command. Based on the comparisons, the decision was made to use listwise deletion of missing cases with the unweighted data. It was concluded that listwise deletion of missing data was appropriate due to the minimal loss of cases when compared with pairwise deletion.<sup>39</sup>

The issue of whether to weight the data was also considered. Weighting was reasonable for the univariate and bivariate analyses because the weights, based on population parameters, permitted description of the characteristics of the population. In assessing the hypothesized model, however, we were more interested in the situation of specific individuals. In other words, we wanted to assess whether an individual woman's assessment of aspects of her social relationships affected her perception of her health. For this reason we made the decision to use unweighted data in all LISREL analyses on the initial model and subsequent revised models (see Appendix E, Table 1 for the correlation/covariance matrix for the initial model). The covariance matrices, whether weighted or unweighted or created using pairwise or listwise deletion of missing cases, were very similar.

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<sup>38</sup> This involved a comparison of weighted and unweighted covariance matrices with pairwise deletion of missing data and a similar comparison for listwise deletion of missing data. The method of weighting the data was previously discussed in Chapter 3.

<sup>39</sup> The number of cases with pairwise deletion of missing cases was 306. This was the smallest N for a particular covariate within the matrix. The number of cases will vary for each covariate and in this case, the number ranged from 306 to 328.

## Method of Estimation

Structural equation modelling is based on the premise that one is testing an over-identified model (Byrne, 1989; Munro & Page, 1993). An over-identified model is one where the number of parameters to be estimated is less than the number of known parameters or the variances and covariances of the observed variables. The proposed model is over-identified with 66 known parameters and 43 unknowns<sup>40</sup> and thus is likely to be estimated by LISREL. The next step in the analysis was to run the LISREL program to estimate the coefficients in the model through the use of maximum likelihood estimation (MLE). MLE is the most widely applicable procedure for estimating coefficients in structural equation models (Newcomb, 1990). Hayduk (1987) summarizes MLE:

We ultimately select as the best estimates those values that maximize the likelihood of any remaining differences being attributable to mere sampling fluctuations. Maximizing the likelihood minimizes what must be attributed to sampling fluctuations. (p. 132)

## Analysis of Initial Model Fit

After the model was run, the next step was to determine if the model, as hypothesized, fit reasonably well with the data provided by Yukon women. Several methods of assessing the model fit were used including examination of the goodness-of-fit of the overall model, the adequacy of the measurement

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<sup>40</sup> The number of known parameters was calculated using the formula (Byrne, 1989):  $\frac{p(p+1)}{2}$ , thus  $\frac{11(11+1)}{2} = 66$  known parameters in the model. The number of unknown parameters is the sum of all the paths, variances, covariances, and error terms (both disturbance terms and measurement error) to be estimated within the model.

model, the parameter estimates, the magnitude and patterns among standardized residuals, and the modification indices provided in the LISREL output.

*a) Goodness-of-Fit of the Overall Model*

After the estimates of the coefficients were obtained, the model was assessed using an omnibus test to determine the fit between the model-implied covariance matrix ( $\Sigma$ ) and the observed covariance matrix (S). The model is assessed to be a good 'fit' if "the relationships in a hypothesized model generate an estimated covariance matrix that closely matches the covariance matrix obtained from the sample data" (Newcomb, 1990, p. 34).

Chi-square ( $\chi^2$ ) was used as one of the indicators of goodness-of-fit of the proposed model.  $\chi^2$  is an omnibus test of the model and the MLE estimates of the free coefficients (non-zero coefficients). Because the hypothesis being tested is that the proposed parameters are equal to the sample parameters, an insignificant  $\chi^2$  is desired, which would indicate that the predicted or implied sigma ( $\Sigma$ ) matrix is close enough to the observed data covariance matrix for the remaining differences to be attributable to sampling fluctuations (Hayduk, 1987).  $\chi^2$ , however, is affected by large sample size where even the smallest differences are detected as significant. It is recommended, therefore, that other goodness-of-fit tests, in addition to  $\chi^2$ , be employed as indicators of the quality of the fit of the model (Byrne, 1989; Hayduk, 1987; Joreskog & Sorbom, 1989; Munro & Page, 1993; Newcomb, 1990). In addition to examining the  $\chi^2$  values,

the adjusted goodness-of-fit index (AGFI) was examined. The adjusted goodness-of-fit index (AGFI) corrects for degrees of freedom in the calculation and can take on a value between zero and one.<sup>41</sup>

The  $\chi^2$  (23,  $N = 304$ ) = 122.42,  $p < .001$  for the initial model, indicating that the model had a poor overall fit. The adjusted-goodness-of-fit index (AGFI) of 0.813 also provides evidence that the overall model did not fit the data well.

*b) Examination of parameter estimates*

Standard errors and correlations of estimates can be examined to assess whether any individual parameter estimates are excessively large or if there is any multicollinearity among the estimates (Byrne, 1989; Hayduk, 1987). This examination can assist in determining how accurately the free parameters have been estimated. An examination of the standard errors revealed no unusual estimates. None of the correlations of the estimates exceeded 0.80 indicating that none of the parameters was highly correlated with another.

*c) Adequacy of the Measurement Model*

The squared multiple correlations ( $R^2$ ) for each observed variable were examined to assess the measurement quality of each measure relative to the latent construct to which it was associated. The two variables that had their error

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<sup>41</sup> Loehlin (1992) defines the goodness-of-fit index (GFI) as: "the proportion of the sum of squares of the observed covariances that is explained by the model" (p. 75). The adjusted goodness-of-fit index (AGFI) is similar to the GFI with the exception of having been adjusted for degrees of freedom. The AGFI is "a parsimonious goodness-of-fit, taking into account the number of free parameters required in order to achieve a given level of fit" (Loehlin, 1992, p. 75). The AGFI provides a value from 0.00 to 1.00 that explains the relative amount of variance and covariance explained by the model. A value closer to 1.00 indicates a good overall fit of the model. Thus, a value  $>.90$  is an indication of a good fitting model.

terms left free to be estimated, RELRATE and RELIMP, were of concern because of their low estimations of variance arising from the underlying latent concept. The proportion of variance attributed to the underlying concept was 0.06 and 0.00, respectively; the remainder was attributed to error. Consequently, these two variables were deemed to be poor indicators of the latent concept 'perceived social support,' given its operationalization by the "fixing" of the indicator, PERSUPP.

### **Revisions to the Initial Model**

Given that the model was a poor fit, the next step in the analysis was to examine other estimates of model fit that could point to possible areas of misspecification. Empirically-driven modifications to the model were considered with the acknowledgment that they are only a guide and that any modification decisions would be considered in light of how theoretically plausible they might be. In other words, any alterations that were made to arrive at a fit model were also considered in terms of their ability to be explained theoretically. Two sources of information are recommended as guidelines for pointing out misspecifications in the model (Bollen, 1989; Hayduk, 1987; Loehlin, 1992): the modification indices and the standardized residuals provided with the LISREL output.

The modification indices for the "fixed" parameters estimate the expected change to the  $\chi^2$  value if a particular parameter is allowed to be freely estimated.

This usually points to improvements in model fit that can be expected when effects or covariances are added to the model. Examination of the residuals assesses possible discrepancies between the observed covariances ( $S$ ) and the model-implied covariances ( $\Sigma$ ) where standardized residual values greater than  $\pm 2.00$  indicate a substantive departure. The standardized residuals provide an indication of the number of standard deviations the observed residuals are away from the zero residuals that would be expected if the model fit perfectly (Hayduk, 1987). If the model was fitting well, we would expect about 95% of the standardized residuals to have a value within the range of  $\pm 2.00$ . In the initial model, 23 residuals exceeded  $\pm 2.00$ , which means only 65% of the standardized residuals fell within the desired range. An examination of the individual standardized residuals revealed several misspecifications within the initial model. The largest standardized residuals were noted in the covariances between: INCOME and SOCTIES (-5.89), SOCTIES and PERSUPP (6.25), and AGE and SOCTIES (5.50), and in the variance of INCOME (6.28). This suggests that the model implied too much covariance between both income and social integration and age and social integration. The standardized residual for social integration and perceived social support suggested that there was more covariance between these indicators than proposed in the model.

The issue of whether the variables 'RELIMP' and 'RELRATE' served as appropriate indicators of the concept 'perceived social support' was addressed first when revisions to the model were considered. It was clear that these two

variables were not strong indicators of an unidimensional concept of 'perceived social support.' The variable 'RELIMP' was seen as important in the development of the model but it is not an indicator of the concept, 'perceived social support,' as originally conceived and measured by PERSUPP. One way of dealing with this was to place the indicator as a measure of a unique dimension of social relations. In other words, we decided to treat 'RELIMP' as an indicator of an important background factor or antecedent that relates to how people value social relationships or the importance they place on social relationships generally. It may be the case that people's beliefs about the importance of social relationships or the value they place on them determines if they receive and provide support, the extent of their social integration and ultimately how they rate the support they are offered. Once we added this new concept to the model we hypothesized how it related to the other concepts in the model. Age, income, education and number of chronic diseases were hypothesized to directly affect the importance placed on social relationships. The importance of social relationships was hypothesized to have an indirect effect on self-rated health by affecting received social support, enacted social support, perceived social support and social integration. These changes can be supported in light of what Eckenrode (1983) referred to as the "dispositional" characteristics that affect the mobilization of social supports. In his study, he found that those with more positive beliefs about the benefits of seeking help from others were more likely to have more contacts to assist in coping. We could interpret the women's ratings

of the importance of social relationships in this study as an indicator of the value they see in these social relationships as resources to assist them. Thus, if a woman has a more positive view of social relationships generally, it is likely to have a positive effect on the social support she perceives to be available to her as well as other dimensions of social relationships. Eckenrode (1983) also found that income and education (as measures of SES) were positively associated with higher levels of potential support and more positive beliefs in the benefits of seeking help. This view is supported by others who argue that SES is related to a disposition to utilize one's social relationships (Belle, 1987) and that the exchange process in social relationships is based on power, prestige and resources which can be tied to SES (Antonucci & Jackson, 1990). We also decided to add an effect between the number of chronic diseases reported and the amount of social support received. This effect was proposed on the basis that if a woman had reported some chronic disease, then it would be likely that she would be receiving more social support. The variable RELRATE was left as an indicator of perceived social support in this first modification to the model. This model resulted in a poor fit with a significant  $\chi^2(31, N = 304) = 196.74$ ,  $p < .001$  and AGFI=.776. There was no noticeable change in the percentage of standardized residuals falling within the desired range<sup>42</sup> with the largest standardized residuals associated with the covariances between INCOME and

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<sup>42</sup> Twenty-six standardized residuals exceeded  $\pm 2.0$ ; 61% fell within the desired range.

PERHLTH (6.66), INCOME and RELIMP (-5.80), INCOME and PERSUPP (5.39) and INCOME and SOCTIES (5.34) and the covariance between PERSUPP and RELIMP (-6.47). RELRATE also was noted to be a poor indicator of the concept of 'perceived social support' with  $R^2 = .07$ ; that is, 93% of its variance was arising from error.

The next incremental change to the model, therefore, continued to focus on improving the measurement structure with the decision to treat RELRATE as an indicator of a new endogenous concept, 'quality of social relationships,' rather than as an indicator of 'perceived social support.' This resulted in perceived social support being measured by a single indicator (PERSUPP). The modification resulted in the addition of direct effects of importance of social relationships on quality of social relationships and quality of social relationships on self-rated health. This raised the question of the conceptual distinctions being made among the three concepts, importance of social relationships, perceived social support, and the quality of social relationships. The analysis suggested that both the importance and quality of social relationships are indicators of something other than perceived social support conceptualized as a unidimensional concept, and we hypothesized that both of these concepts were also distinct from each other. The importance of social relationships was seen as a concept that provided an indication of the value placed on social relationships. In other words, individuals must believe that social relationships are important if they are going to maintain a support network. The quality of social relationships, on the

other hand, was hypothesized to be a more global measure of a person's actual social relationships. We hypothesized that if a person felt more positively, overall, about the quality of the relationships in their life then they may also be likely to have more positive views of their health. This overall view of social relationships could be part of what have been referred to as "network resources" (Vaux, 1988), which are comprised of a person's "potential or actual supporters" (Laireiter & Baumann, 1992). An additional effect was added between number of chronic diseases and quality of social relationships. This latter effect was added because it was believed that having a chronic disease might affect the quality of people's social relationships. Again, the overall fit of the revised model, when estimated, was poor.<sup>43</sup> An examination of the standardized residuals suggested too much covariance was implied by the model between PERSUPP and RELIMP (-7.17), PERSUPP and SOCTIES (7.23), and PERSUPP and PERHLTH (6.53) and too much variance in PERHLTH (6.80). The modification indices suggested that, to improve model fit, an effect could be added between level of social integration and perceived social support. It was decided that this modification could be theoretically supported since it could be assumed that a person's level of social integration, or the extent to which they are connected to others, affects their perception of their available social support. In other words, if people have relatively high levels of social integration, they may also have more positive perceptions of the social support available to them. Theoretical support

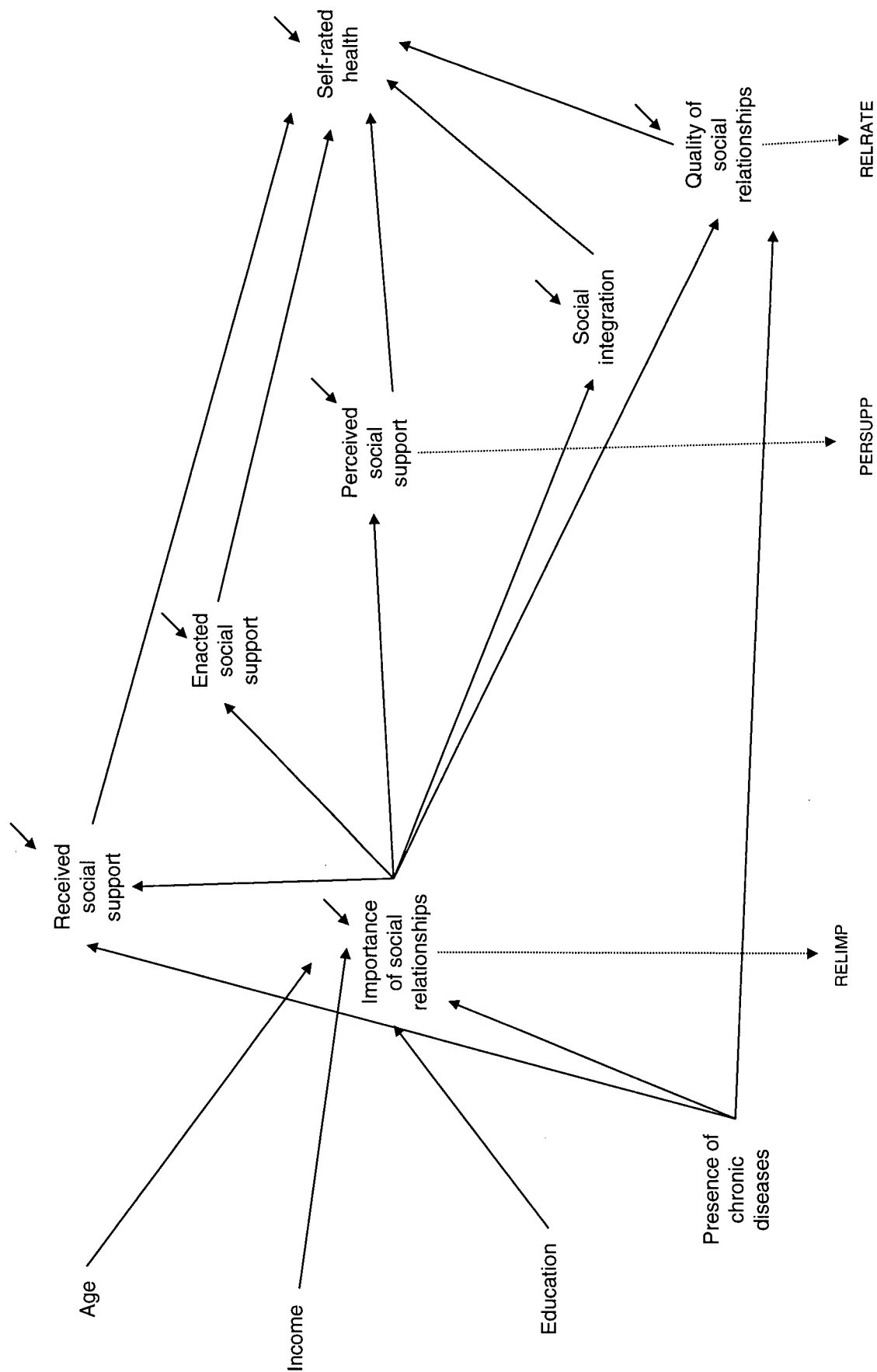
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<sup>43</sup>  $\chi^2$  (29,  $N$  = 304) = 190.29,  $p$  < .001 and AGFI = .760.

for the addition of this effect can be found in studies that have examined relationships among different aspects of social support. There is some evidence to indicate that a greater number of social ties is positively associated with a more positive perception of the availability of social support (Seeman & Berkman, 1988) or access to social support (Haines & Hurlbert, 1992). Cutrona (1986) found similar results for elderly women and men with a positive relationship between the size of a person's social network and perceived availability of social support. The addition of this effect in the model still resulted in a poor overall fit ( $\chi^2$  (28,  $N$  = 304) = 133.03,  $p$  < .001; AGFI = .835). Figure 2 presents the revisions to the initial model based on these modifications to the indicators, RELIMP and RELRATE and their corresponding new conceptualizations.

The modification indices and the largest standardized residual suggested a significant change would occur in the  $\chi^2$  value if an effect was added from income to the level of social integration. We decided to add this effect because it is reasonable to believe that those with higher incomes have opportunities that permit higher levels of social integration. This hypothesized effect was supported by the view that sociodemographic characteristics (including measures of SES) are aspects of the environment that influence access to social support (Cutrona, 1986; Eckenrode, 1983; Lin et al., 1979; Wellman & Wortley, 1990). Wellman and Wortley (1990), for example, refer to the concept of "positional resources," which could be interpreted as the influence of one's social

Figure 2 Revisions to initial model (women)



position (as indicated by income level) on the number of one's social ties (i.e., social integration). In their study, House et al. (1994) found that individuals with lower SES were disadvantaged on all measures of social relationships and support, including informal and formal social integration and perceived social support from friends and relatives. The addition of this effect resulted in a substantial reduction in the  $\chi^2$  value.<sup>44</sup> Examination of both the standardized residuals and the modification indices served as the approach for the remainder of the model modifications. Some concern persisted with the implied variance in PERHLTH (3.83) and the fact that the model still implied too much covariance between SOCTIES and RELRATE (3.87), between RELRATE and PERSUPP (3.98), and between CAREPRO and CAREREC (4.24).

The modification indices suggested the addition of the following effects: income on perceived social support, the quality of social relationships on perceived social support, and social integration on the quality of social relationships. The first effect implies that those with higher incomes may also perceive higher levels of social support. The relationship between income and perceived social support is, again, related to the influence of SES on aspects of social support (House et al., 1994). In his study, Eckenrode (1983) found that women with higher income and education levels had more potential supports available to them. It would also be reasonable to hypothesize that those people who perceive that they have good social relationships will also perceive higher

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<sup>44</sup>  $\chi^2$  (27,  $N$  = 304) = 99.34,  $p$  < .001 and AGFI = .865.

levels of social support in their lives. Finally, if people have higher levels of social integration, then they may also rate the quality of their social relationships higher. The effects related to quality of social relationships suggest that a more global evaluation of the quality of one's social relationships will lead to a more positive perception of the availability of social support. We also hypothesized that if a person had a higher number of social ties (i.e., a higher level of social integration) then she would also be more likely to have a more positive view of the quality of her social relationships overall. The covariance between enacted and received social support was not adequately addressed in the model so it was decided to allow the disturbance errors associated with these concepts to covary to recognize that their common causes, postulated by the model, did not account for all of their correlation. In other words, the postulated common sources of variance for these two concepts did not adequately explain the covariance between them; there may be other factors such as psychological components that may explain the covariance. Each of these effects or revisions to the model was added incrementally in an effort to achieve a reasonably well-fit model.

The addition of the effect between income and perceived social support resulted in a significant  $\chi^2$  difference test<sup>45</sup> and an AGFI of .875. The next effect that was added, from the quality of social relationships to perceived social support, again resulted in a significant  $\chi^2$  value<sup>46</sup> but did result in a further

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<sup>45</sup>  $\chi^2$  (26, N = 304) = 88.85,  $p < .001$ .

<sup>46</sup>  $\chi^2$  (25, N = 304) = 79.58,  $p < .001$  and AGFI = .882.

significant reduction in the  $\chi^2$ . The addition of the effects between social integration and quality of social relationships and allowing the disturbance terms to covary for received social support and enacted social support resulted in a further improvement in the  $\chi^2$  value.<sup>47</sup>

The final modifications that were made to the model were also decided upon through examination of the standardized residuals and the modification indices. It was decided that an effect between received social support and perceived social support would be added because it seems reasonable to believe that if a woman received social support then it is more likely that she would have higher levels of perceived social support. This theoretical relationship is supported by Laireiter and Baumann (1992) who state, "Theoretically, a cognitive concept or schema of being supported (perceived support) emerges out of the repeated experience of receiving support from different people in different situations" (p. 45). An added effect of social integration on enacted social support implies that people who have higher levels of social integration are more likely to provide support to those around them. Laireiter and Baumann (1992) also briefly discuss the role of enacted support in the set of relationships among social support concepts. They suggest that having close members of a network results in a greater amount of enacted support. The incremental effects of received social support on perceived social

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<sup>47</sup> The addition of the effect between social integration and quality of social relationships resulted in  $\chi^2$  (24,  $N$  = 304) = 64.95,  $p$  < .001 and AGFI = .898. The further addition of covariance between the disturbance terms for received and enacted social support resulted in  $\chi^2$  (23,  $N$  = 304) = 45.93,  $p$  = .003 and AGFI = .924.

support<sup>48</sup> and of social integration on enacted social support resulted in a reasonably good overall fit of the model with a non-significant  $\chi^2$  value,  $\chi^2$  (21,  $N = 304$ ) = 30.89,  $p = .075$  and the AGFI of .944. Examination of the standardized residuals indicated that 95%<sup>49</sup> of the standardized residuals fell within the range of  $\pm 2.0$ , which also provided support for the assessment that this was a reasonably good overall fit of the data. The largest standardized residual was associated with the covariance between EDUC and RELIMP<sup>50</sup> which had an observed correlation of -.003 compared with a model-implied correlation of .002. This was seen as a slight, trivial difference.

Table 19 provides a summary of the incremental modifications made to the initial model to arrive at a fit model. Figure 3 provides a graphic representation of all of the effects that were added to the initial model as a result of the previously described modifications.

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<sup>48</sup> The addition of this effect resulted in  $\chi^2$  (22,  $N = 304$ ) = 37.19,  $p = .023$  and AGFI = .936.

<sup>49</sup> Three of the 66 standardized residuals exceeded the value of  $\pm 2.0$ . See Appendix F, Table 1.

<sup>50</sup> See Appendix F, Table 1.

Table 19

Summary of incremental modifications made to initial model

Modifications made to initial model	$\chi^2$	df	Significance level	AGFI
1. - Importance of social relationships modified to be an indicator of a new endogenous concept, importance of social relationships	196.74	31	.000*	.776
- Effects of importance of social relationships on all other endogenous concepts added				
- Effects of all exogenous concepts on importance of social relationships added				
- Effect of number of chronic diseases on received social support added				
2. - Rating of quality of social relationships modified to be an indicator of a new endogenous concept, quality of social relationships	190.29	29	.000*	.760
- Effect of quality of social relationships on self-rated health added				
- Effect of importance of social relationships on quality of social relationships added				
- Effect of number of chronic diseases on quality of social relationships added				

\* p &lt; .001

(table continues)

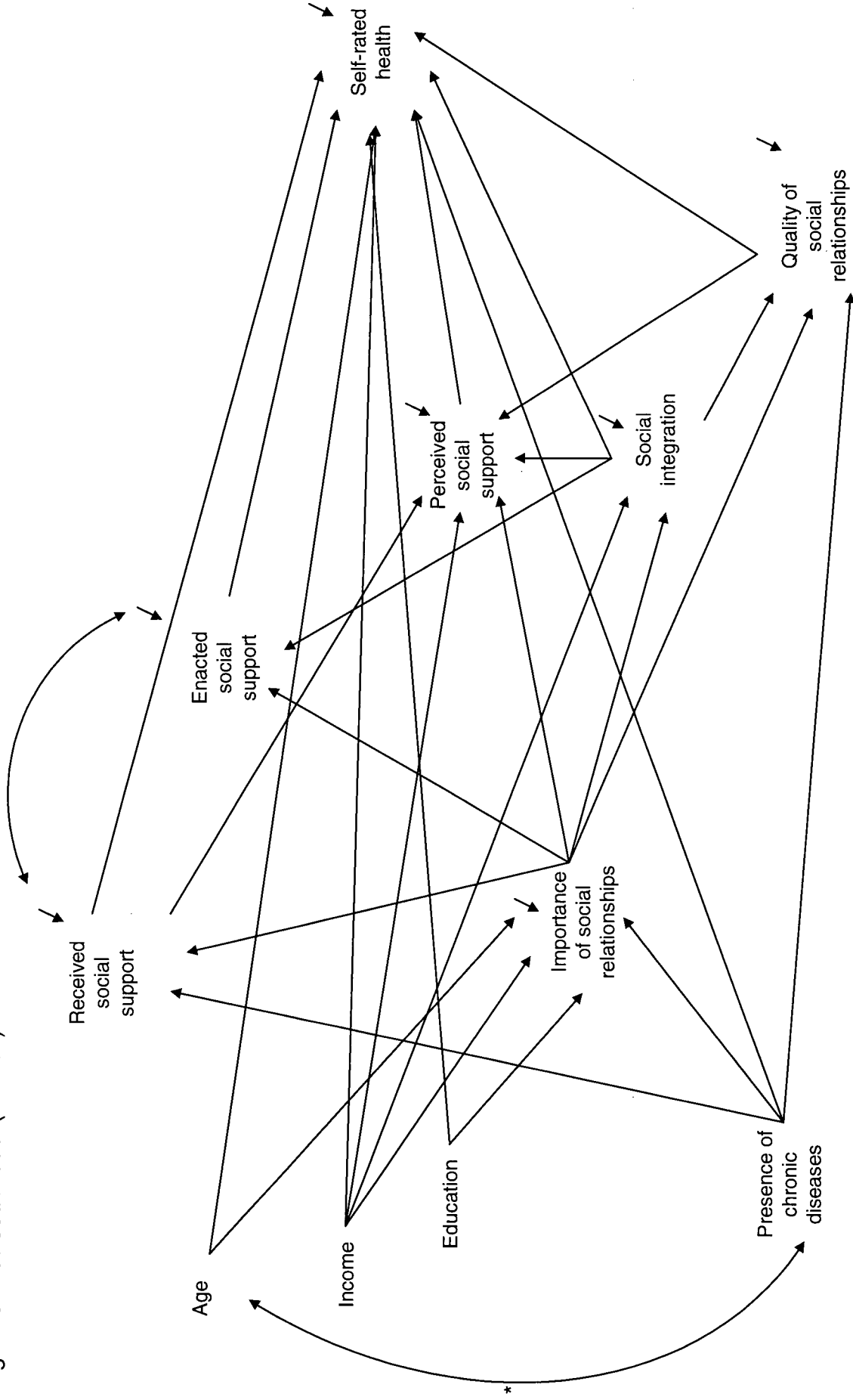
Table 19 (continued)

Summary of incremental modifications made to initial model

Modifications made to initial model	$\chi^2$	df	Significance level	AGFI
3. Effect of level of social integration on perceived social support added	133.03	28	.000*	.835
4. Effect of income on social integration added	99.34	27	.000*	.865
5. Effect of income on perceived social support added	88.85	26	.000*	.875
6. Effect of rating of quality of social relationships on perceived social support added	79.58	25	.000*	.882
7. Effect of social integration on rating of quality of social relationships added	64.95	24	.000*	.898
8. Error terms for enacted social support and received social support allowed to covary	45.93	23	.003	.924
9. Effect of received social support on perceived social support added	37.19	22	.023	.936
10. Effect of social integration on enacted social support added	30.89	21	.075	.944

\* p &lt; .001

Figure 3 Revised model (women)



\* Denotes all exogenous concepts allowed to covary

## The Coefficients

The model explained 26.0% of the variance in self-rated health status for women. The unstandardized and standardized structural coefficients for the effects in the model are presented in Table 20.<sup>51</sup> Of the exogenous factors, only age and the presence of chronic diseases significantly and directly affected self-rated health status. The effect of chronic diseases on self-rated health was in the direction that would be expected, however the estimated coefficients suggest that age had a positive, direct effect on self-rated health. Income had an indirect effect on health status by influencing both perceived social support and social integration. Women's level of education was not significantly related to self-rated health either directly or indirectly through any of the endogenous concepts of social relationships.

Once the influence of the background factors of age, income, education and presence of chronic diseases was controlled, the significant estimated effects of the endogenous concepts on self-rated health revealed that received social support, perceived social support, and the quality of social relationships directly affected self-rated health status. Social integration indirectly affected self-rated health status through its significant effects on both perceived social support and the quality of social relationships. The importance of social relationships in a person's health and well-being was related to self-rated health

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<sup>51</sup> The covariance for the error terms for enacted social support and received social support was .041 which, when standardized, was a correlation of .24. This provided support for the view that there were factors not included in this model that may be accounting for their covariance.

status by affecting the reported quality of women's social relationships, which in turn affected their perceived social support and their perceived health status.

Table 20

Maximum likelihood estimates for the revised model (women)

	Age	Income	Education	Chronic Disease	Importance of social relationships	Received social support	Enacted social support	Perceived social support	Social integration	Quality of social relationships	R <sup>2</sup>
Importance of social relationships	.000 <sup>1</sup> (-.010) <sup>2</sup>	.017 (.044)	-.003 (-.010)	-.032 (-.031)							.004
Received social support				.073 (.103)	.050 (.073)						.015
Enacted social support					-.049 (-.050)				.095* (.165*)		.027
Perceived social support		.099* (.204*)			-.081 (-.063)	-.327* (-.176*)			.289* (.382*)	.129* (.171*)	.338
Social integration		.224* (.347*)			.212 (.125)						.141
Quality of social relationships				-.001 (-.001)	.310* (.183*)				.251* (.252*)		.110
Self-rated health	.009* (.132*)	.035 (.044)	.056 (.105)	-.417* (-.196*)		-.484* (-.162*)	-.194 (-.092)	.236* (.147*)	.161 (.132)	.259* (.213*)	.260

1 Unstandardized

2 (Standardized)

\* T &gt; 2.0

## Validating the Model

### Method of Cross-Validation

Whenever any changes are made to a hypothesized model, and particularly when some of these modifications have been empirically based, it is advisable to test the fit model on a new data set (Hayduk, 1987; Loehlin, 1992). As Bollen (1989) argues, "Cross-validation or replication for an independent sample is an important step in building confidence in the new specification" (p. 305). It was not possible to replicate the fit model with a different data set but it was possible to cross-validate the model with a reserved random sample of the available data set. For this purpose, the sample of women was randomly divided with one-half used for model development and one-half used to validate the final<sup>52</sup> model. The approach to validation was to run the fit model with this reserved sample of data and then assess whether there was a good overall fit and whether the effects noted in the validation model were consistent with the magnitude and direction of significant effects in the final model for women.

As was done for the analyses on the initial half of the random sample for women, the second half of the data set<sup>53</sup> was used to create a covariance matrix<sup>54</sup> with listwise deletion of missing cases. The sample that resulted for the cross-validation analyses consisted of data from 261 women.

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<sup>52</sup> The final model is the fit model that was achieved as a result of the modifications that were previously noted.

<sup>53</sup> N = 303.

<sup>54</sup> See Appendix E, Table 3.

The model was run and was assessed to have a reasonably good overall fit with a  $\chi^2$  (21,  $N$  = 261) = 37.25,  $p$  = .016 and an AGFI of .923, although this was a slightly poorer fit than the final model for women,  $\chi^2$  (21,  $N$  = 304) = 30.89,  $p$  = .075; AGFI = .944. There was a higher percentage of standardized residuals exceeding  $\pm 2.0$ , which resulted in 85%<sup>55</sup> falling in the  $\pm 2.0$  range compared to 95% for the final model. The largest standardized residual was noted in the covariance between EDUC and SOCTIES (3.21) and the covariance between INCOME and SOCTIES (-3.02).

### **The Coefficients**

Overall, the validated model explained 31.2% of the variance in perceived health, which was higher than that explained in the final model for women (26.0%). The estimated coefficients for the validation model were similar to those found in the final model (see Table 21). Eleven of the 13 effects found to be significant in the final model for women were also significant in the validation model (see Table 22). The two effects that were not significant were the last two modifications that were made in the model.<sup>56</sup>

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<sup>55</sup> See Appendix F, Table 2.

<sup>56</sup> These two effects were received social support on perceived social support and social integration on enacted social support.

Table 21

Maximum likelihood estimates for the validation model (women)

	Age	Income	Education	Chronic Disease	Importance of social relationships	Received social support	Enacted social support	Perceived social support	Social integration	Quality of social relationships	R <sup>2</sup>
Importance of social relationships	-.001 <sup>1</sup> (-.030) <sup>2</sup>	.032 (.082)	.024 (.094)	.029 (.027)							.020
Received social support				.125* (.156*)	.028 (.037)						.026
Enacted social support					.036 (.038)				.030 (.051)		.004
Perceived social support		.086* (.202*)			-.140 (-.126)	-.045 (-.030)			.224* (.330*)	.158* (.227*)	.264
Social integration		.127* (.203*)			.115 (.070)						.049
Quality of social relationships				-.004 (-.002)	.255* (.159*)				.215* (.220*)		.080
Self-rated health	.013* (.160*)	.106* (.139*)	.008 (.015)	-.544* (-.254*)		-.532* (-.199*)	-.019 (-.009)	-.317* (-.177*)	.059 (.048)	.519* (.418*)	.312

1 Unstandardized

2 (Standardized)

\* T &gt; 2.0

Table 22

Comparison of model fit and maximum likelihood estimates for final  
model (women) and validation model (women)

Significant effects*	Final model (women)	Validation model (women)
Importance of social relationships on quality of social relationships	.310 <sup>1</sup> (.183) <sup>2</sup>	.255 (.159)
Received social support on perceived social support	-.372 (-.176)	n.s. <sup>3</sup>
Received social support on health	-.484 (-.162)	-.532 (-.199)
Perceived social support on health	.236 (.147)	-.317 (-.177)
Social integration on enacted social support	.095 (.165)	n.s.
Social integration on perceived social support	.289 (.382)	.224 (.330)
Social integration on quality of social relationships	.251 (.252)	.215 (.220)
Quality of social relationships on perceived social support	.129 (.171)	.158 (.227)
Quality of social relationships on health	.259 (.213)	.519 (.418)
Age on health	.009 (.132)	.013 (.160)

1 Unstandardized

2 (Standardized)

3 Not significant

\*  $T > 2.0$ 

(table continues)

Table 22 (continued)

Comparison of model fit and maximum likelihood estimates for final  
model (women) and validation model (women)

Significant effects*	Final model (women)	Validation model (women)
Income on perceived social support	.099 <sup>1</sup> (.204) <sup>2</sup>	.086 (.202)
Income on social integration	.224 (.347)	.127 (.203)
Chronic disease on health	-.417 (-.196)	-.544 (-.254)
Additional effects not significant in final model for women		
Income on health	n.s. <sup>3</sup>	.106 (.139)
Chronic disease on received social support	n.s.	.125 (.156)
$\chi^2$	30.89	37.25
df	21	21
p	.075	.016
AGFI	.944	.923

1 Unstandardized

2 (Standardized)

3 Not significant

\*  $T > 2.0$

Two effects were significant in the validation sample and not significant in the final model. These two effects were the direct effects of income on self-rated health and presence of chronic diseases on received social support. One effect was positive in the final model but negative in the validation model (perceived social support on self-rated health).

Given the differences in the significance tests of the last two effects added to the revised model, we calculated a  $\chi^2$  difference test<sup>57</sup> (Hayduk, 1987) to assess if the addition of these effects made substantial contributions to the fit of the final model and the validation model. The first step was to assess whether the two effects that were non-significant in the validation model were contributing to the overall fit of the model. Each of these two effects was incrementally deleted from the model and a  $\chi^2$  difference test was calculated to examine its contribution to the fit. Deleting the effect of social integration on enacted social support resulted in a non-significant  $\chi^2$  difference value ( $\chi^2 (1, N = 261) = 0.52, p = .47$ ) and deleting the next effect between received social support and perceived social support also resulted in a non-significant  $\chi^2$  difference value ( $\chi^2 (1, N = 261) = 0.20, p = .89$ ). The overall  $\chi^2$  difference test was not significant<sup>58</sup> so we concluded that these two effects did not contribute to the

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<sup>57</sup> Hayduk (1987) reports that "the difference between the two  $\chi^2$ 's is also distributed as a  $\chi^2$  with degrees of freedom equal to the difference between the degrees of freedom for the two models" (p. 164). In this case, we are testing the hypothesis that additional effects have significantly contributed to the overall fit of the model when compared to the fit of the previous model (i.e., without the effect present).

<sup>58</sup>  $\chi^2 (2, N = 261) = .072, p = .70$ .

overall fit of the model and therefore made the decision to delete them from the final model for women.

The next step was to assess whether the two effects that were significant in the validation model but not in the final model as well as the one effect that was of the opposite direction in the validation model were contributing to the overall fit of the validation model.<sup>59</sup> These three effects were deleted incrementally and the  $\chi^2$  difference test was used to assess whether each effect was contributing to the fit of the model. The effects of chronic disease on received social support and income on self-rated health both resulted in significant  $\chi^2$  values<sup>60</sup> when they were deleted incrementally from the validation model. The deletion of the effect between perceived social support and self-rated health (recall that this effect was .236 for the final model and -.317 for the validation model) resulted in a significant  $\chi^2$  (1,  $N$  = 261) = 18.19,  $p$  < .001, which suggested that this effect should be retained because it was contributing to the overall fit of the model. Finally, the overall  $\chi^2$  difference test for all three effects was significant<sup>61</sup> thus providing evidence that these effects were contributing to the overall fit of the validation model. The decision, therefore, was made to retain these effects in the final model for women.

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<sup>59</sup> The model is that one which has the two previous effects deleted.

<sup>60</sup> The deletion of the effect between chronic disease and received social support resulted in  $\chi^2$  (1,  $N$  = 261) = 5.35,  $p$  = .02; the deletion of the effect between income and self-rated health resulted in  $\chi^2$  (1,  $N$  = 261) = 4.71,  $p$  = .03.

<sup>61</sup> The overall  $\chi^2$  difference test for these three effects was  $\chi^2$  (3,  $N$  = 261) = 28.25,  $p$  < .001.

### **The Final Model for Women**

The decision was made to accept the final model for women (see Figure 4) as that one which did not include the last two effects that were added during the initial model-building phase (received social support on perceived social support and social integration on enacted social support). This section summarizes the overall model fit as well as the magnitude and direction of significant effects in the final model for women.

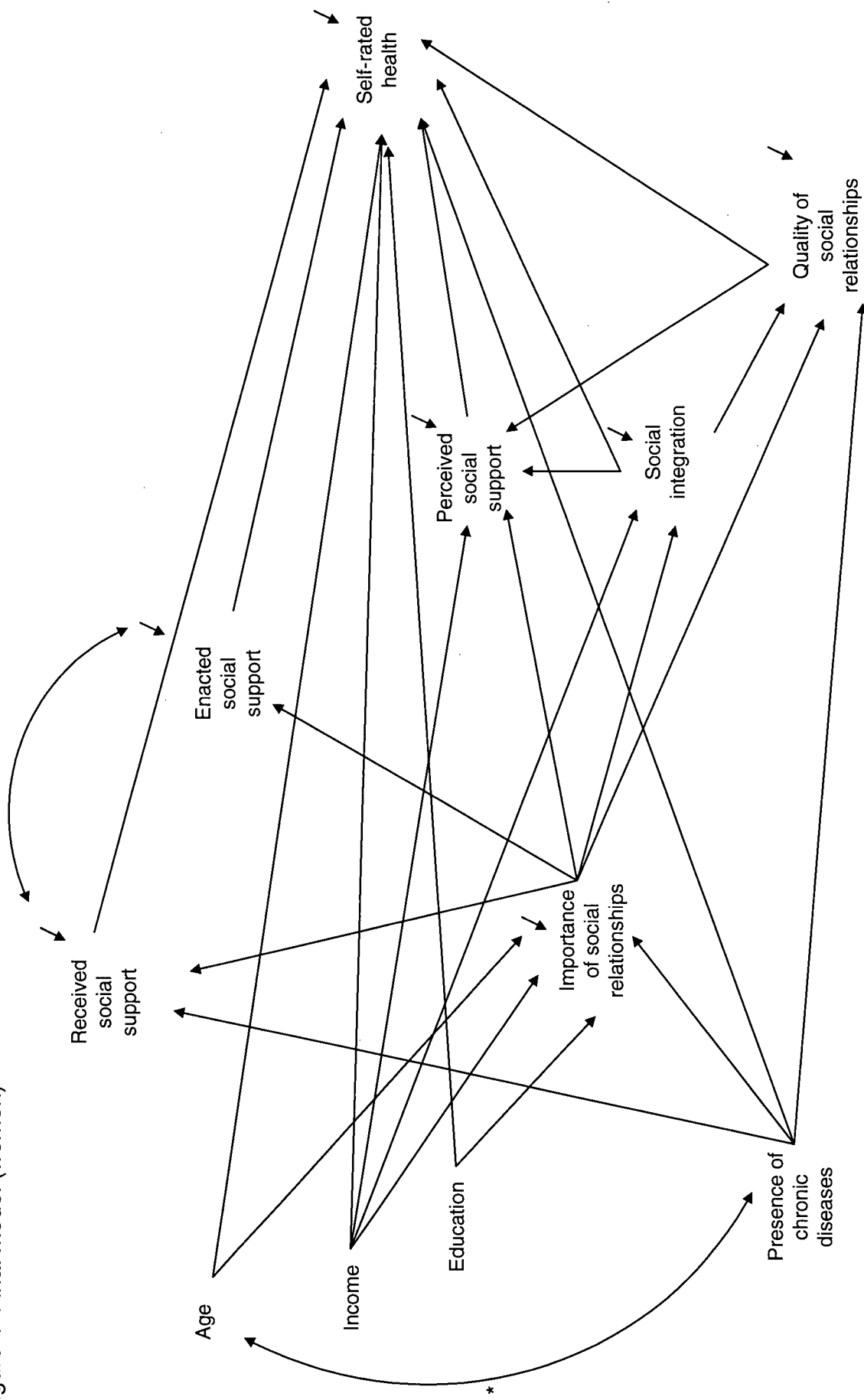
#### **Assessment of Model Fit**

The final model for women, based on the first half of the data set, resulted in  $\chi^2 (23, N = 304) = 45.93, p = .003$  and an AGFI value of .924. It was decided that this, in addition to an examination of the standardized residuals, would permit us to conclude that we had achieved a reasonably good fitting model for women. Ninety-two percent of the standardized residuals fell within the desired range with the largest standardized residuals<sup>62</sup> noted in the covariance between CAREREC and PERSUPP (-2.77) and the covariance between EDUC and RELIMP (-2.70). The observed correlation between the first two indicators (CAREREC and PERSUPP) was -.16 and the model implied correlation was -.01. The observed correlation between EDUC and RELIMP was -.003 and the model estimated the correlation as .003 between these two indicators.

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<sup>62</sup> See Appendix F, Table 3.

Figure 4 Final model (women)



## The Coefficients

The final model explained 25.9% of the variance in women's self-rated health status (see Table 23). Of the exogenous concepts, only age and chronic disease had significant direct effects on self-rated health (see Figure 5). For every one standard deviation increase in age there was a corresponding .13 standard deviation increase in self-rated health.<sup>63</sup> Those women who reported one or more chronic diseases at the time of the survey rated their health .42 units lower than those women who reported no chronic disease. Income indirectly affected self-rated health through effects on perceived social support. Income also had an indirect effect on health through its effects on social integration and quality of social relationships. A one standard deviation increase in income leads to a .23 standard deviation increase in the level of perceived social support as well as a .35 standard deviation increase in the level of social integration. In total, the direct and indirect effects of income on women's health was .17.

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<sup>63</sup> The interpretations of the coefficients fluctuate between standardized and unstandardized effects. "The 'standardized solution' LISREL reports is a *rescaling* of the maximum likelihood estimates such that *all the concepts are given variance 1.0 but the indicators remain in their original scales*" (Hayduk, 1987, pp. 179-180). The standardized effects, therefore, are typically used in interpretation. For binary variables, however, the effects are more readily interpreted if they are discussed in terms of their scaling units. Hence, the unstandardized coefficients are

Table 23

Maximum likelihood estimates for the final model (women)

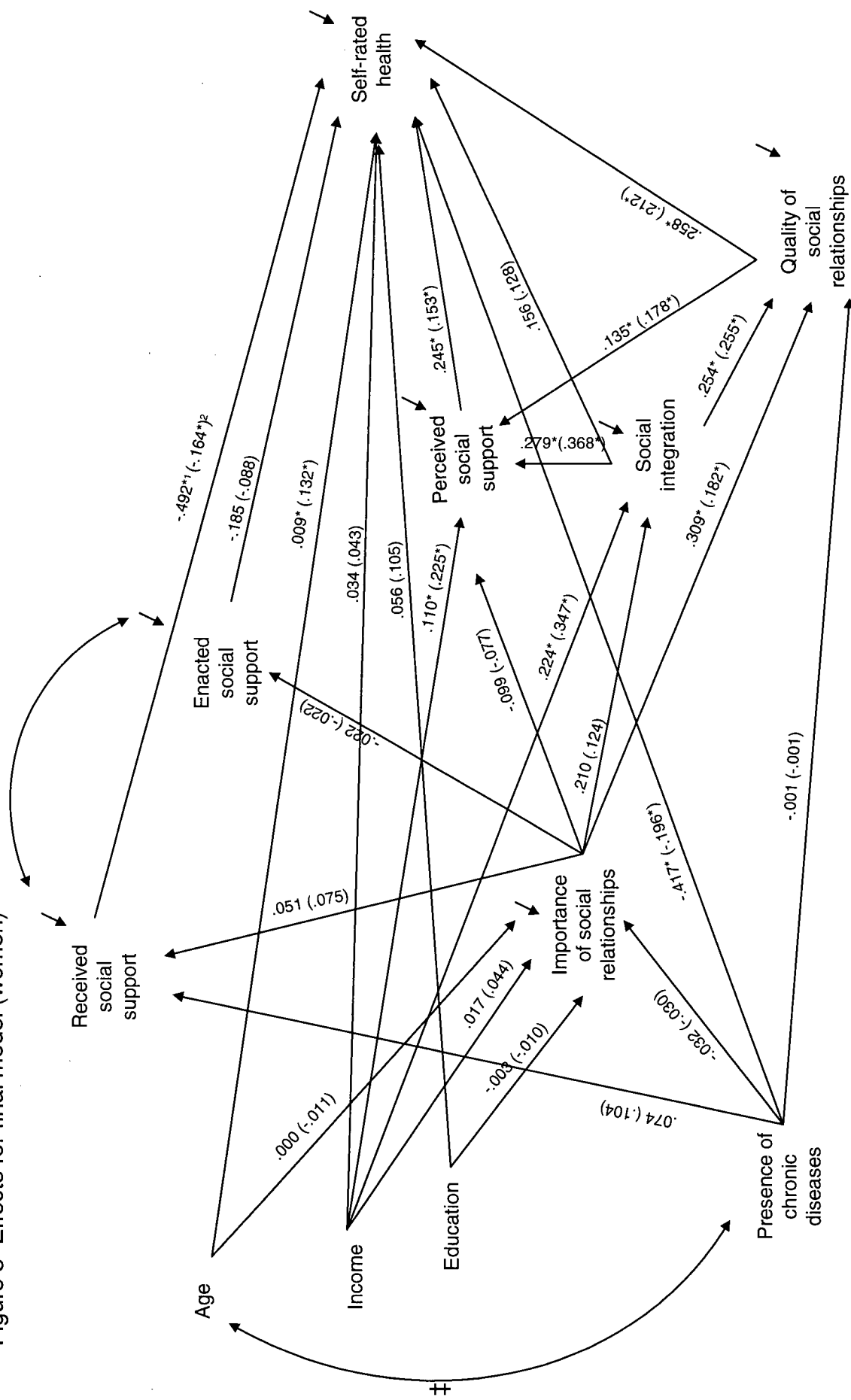
	Age	Income	Education	Chronic Disease	Importance of social relationships	Received social support	Enacted social support	Perceived social support	Social integration	Quality of social relationships	R <sup>2</sup>
Importance of social relationships	.000 <sup>1</sup> (-.011) <sup>2</sup>	.017 (.044)	-.003 (-.010)	-.032 (-.030)							.004
Received social support				.074 (.104)	.051 (.075)						.016
Enacted social support					-.022 (-.022)						.000
Perceived social support		.110* (.225*)			-.099 (-.077)				.279* (.368*)	.135* (.178*)	.311
Social integration		.224* (.347*)			.210 (.124)						.140
Quality of social relationships				-.001 (-.001)	.309* (.182*)				.254* (.255*)		.111
Self-rated health	.009* (.132*)	.034 (.043)	.056 (.105)	-.417* (-.196*)		-.492* (-.164*)	-.185 (-.088)	.245* (.153*)	.156 (.128)	.258* (.212*)	.259

1 Unstandardized

2 (Standardized)

\* T &gt; 2.0

Figure 5 Effects for final model (women)



Received social support, perceived social support and the quality of social relationships all have direct effects on women's self-rated health status. Those women who reported receiving some social support rated their health .49 units lower than those women who reported receiving no social support. A one standard deviation increase in the level of perceived social support leads to a .15 standard deviation increase in self-rated health. A one standard deviation increase in women's rating of the quality of their social relationships corresponds to a .21 standard deviation increase in their self-rated health.

There were also significant effects among some of the measures of social relationships. Both quality of social relationships and level of social integration had direct effects on perceived social support. A one standard deviation increase in the quality of social relationships corresponds to an increase of .18 standard deviation in the level of perceived social support while perceived social support increased by .37 standard deviation in the presence of a one standard deviation increase in social integration. Social integration indirectly affected self-rated health through its effect of strengthening the quality of social relationships. A one standard deviation increase in social integration corresponds with a .26 standard deviation increase in the quality of women's social relationships. The total effects of social integration and the perceived quality of social relationships on women's health was .26 and .25, respectively.

## **Summary of the Final Model for Women**

The estimates for the structural components of the final model suggest that, after controlling for some known determinants of health (i.e., age, income, education and the presence of chronic diseases), self-rated health is significantly affected by several aspects of women's social relationships. Women who perceive they have social support available to them when they need it will rate their own health more positively. This finding was contradicted in the validation sample where it appeared that perceptions of availability of social support had a negative effect on health. This is clearly a finding that requires more testing to clarify the direction of this relationship. If women assess their social relationships as being positive they are also more likely to have a more positive view of their health. Social integration indirectly enhances women's perceived health status by strengthening women's perceptions of the social support available to them and by enhancing the quality of their social relationships, both of which, in turn, improve perceived health status. The relationship between received social support and self-rated health is somewhat more puzzling. The relationship suggests that receiving social support would have a negative effect on self-rated health.

The estimates also point to findings that suggest there are important relationships among some of the endogenous concepts. We had proposed that the value that women place on their social relationships might be an antecedent variable that would mediate the relationship between the exogenous concepts

and aspects of social relationships. This was not the case, however, as there were no significant effects between any of the exogenous concepts and the importance of social relationships. However, women who believe their social relationships are important to their health and well-being are also more likely to have a more positive view of the quality of their social relationships. Whether a woman perceives she has social support when required is influenced by the quality of her social relationships, the level of her social integration and her household income. The level or extent of social integration is also influenced by income. Social integration, in turn, positively affects ratings of the quality of women's social relationships. Of the exogenous concepts, the reported existence of one or more chronic diseases at the time of the survey had a negative effect on women's self-rated health status. Age, however, appeared to have more of a protective effect on self-rated health.

### **Comparison of the Women's and Men's Models**

The final step in the analysis focused on testing the final model for women on the men's sample data to assess whether the model fit overall and, if it did, to examine differences or similarities in the magnitude and direction of significant effects.

## **Creating the Covariance Matrix**

The sample of men (N = 608) was divided into two 50% random samples<sup>64</sup> with the first half of the sample used to estimate the final model. As was the case in the analysis for women, listwise deletion of missing cases was used to create the covariance matrix,<sup>65</sup> resulting in a total number of cases of 279. The same error rates that were used in the analysis for the women's sample were applied to the measurement model for the men's sample.

## **Analysis of Model Fit**

The overall fit was similar,  $\chi^2 (23, N = 279) = 41.59, p = .010, AGFI = .925$ , to the fit for the final model for women. Only 89% of the standardized residuals, however, fell between  $\pm 2.0$  with the largest standardized residual arising in the covariance between SOCTIES and RELIMP (-3.12).<sup>66</sup> There was only a slight difference between the observed correlation of .057 and the model-implied correlation of .060 between these two indicators.

## **The Coefficients**

The final model accounted for a smaller proportion of the variance in self-rated health for men than for women (17.9% for men compared to 25.9% for women) (see Table 24). An examination of the significant effects (see Figure 6) indicated some similarities and differences in the men's sample when compared to the estimates for the final model for women. Seven of the eleven effects

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<sup>64</sup> The first random sample had N = 312, the second N = 296.

<sup>65</sup> See Appendix E, Table 4 for the correlation/covariance matrix for men.

<sup>66</sup> See Appendix F, Table 4.

noted in the final women's sample were also significant in the men's sample. No effects were significant solely in the men's sample.

Of the exogenous concepts, only chronic disease directly affected men's self-rated health status. Those men who reported one or more chronic diseases at the time of the survey had a reduction of .44 units of self-rated health compared to those men who reported no chronic diseases. Income indirectly affected self-rated health through its effects on social integration and quality of social relationships. A one standard deviation increase in income corresponds to an increase of .20 standard deviation in social integration. Income also had a direct effect on perceived social support. A one standard deviation increase in income leads to a .20 standard deviation increase in perceived social support.

The quality of social relationships was the only aspect of social relationships that had a direct effect on men's self-rated health. A one standard deviation increase in the rating of the quality of social relationships corresponds to an increase of .31 standard deviations in men's self-rated health. The importance of social relationships had a direct effect on the quality of social relationships with a one standard deviation increase in the importance of social relationships leading to a .14 standard deviation increase in the quality of social relationships. Social integration directly affected both perceived social support and quality of social relationships. A one standard deviation increase in social integration corresponds to an increase of .39 standard deviations in perceived social support and an increase of .23 standard deviations in the quality of social relationships.

Table 24

Maximum likelihood estimates for the final model (men)

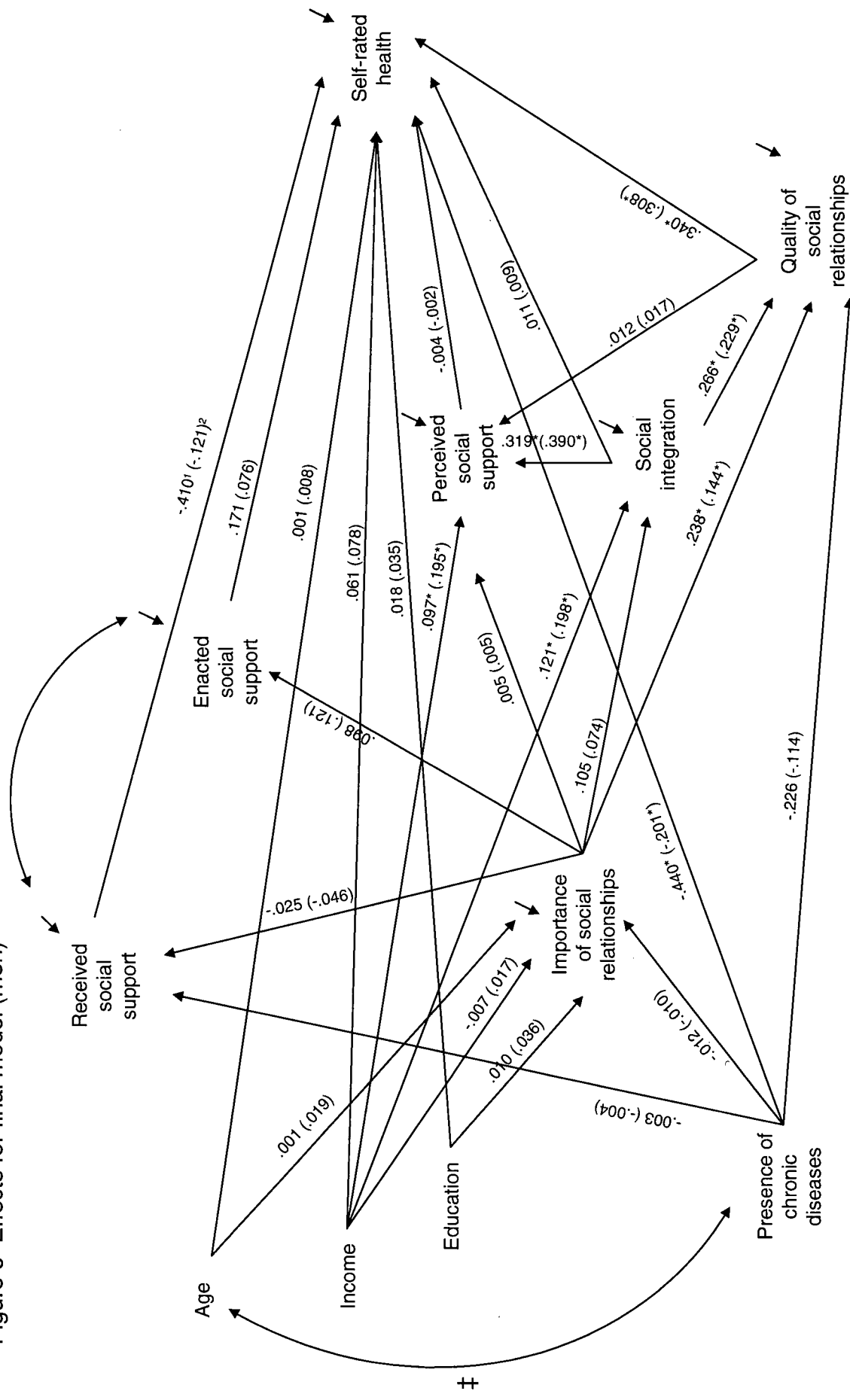
	Age	Income	Education	Chronic Disease	Importance of social relationships	Received social support	Enacted social support	Perceived social support	Social integration	Quality of social relationships	R <sup>2</sup>
Importance of social relationships	.001 <sup>1</sup> (.019) <sup>2</sup>	-.007 (-.017)	.010 (.036)	-.012 (-.010)							.002
Received social support				-.003 (-.004)	-.025 (-.046)						.002
Enacted social support					.098 (.121)						.015
Perceived social support		.097* (.195*)			.005 (.005)				.319* (.390*)	.012 (.017)	.224
Social integration		.121* (.198*)			.105 (.074)						.044
Quality of social relationships				-.226 (-.114)	.238* (.144*)				.266* (.229*)		.091
Self-rated health	.001 (.008)	.061 (.078)	.018 (.035)	-.440* (-.201*)		-.410 (-.121)	.171 (.076)	-.004 (-.002)	.011 (.009)	.340* (.308*)	.179

1 Unstandardized

2 (Standardized)

\* T &gt; 2.0

Figure 6 Effects for final model (men)



## **Summary of the Findings**

The purpose of these analyses was twofold. The first was to estimate and achieve a fit model for women to assess the effects of SES and aspects of social relationships as they influenced women's self-rated health status. The second purpose was to estimate the coefficients of the final model for women with the men's sample to address the question of whether there was an interaction effect of gender in the relationships between SES, social support and self-rated health status. Table 25 presents a comparison between women and men on the estimates of overall model fit and the significant effects among the concepts.

Neither educational level nor income had direct effects on self-rated health but for both women and men, household income had direct effects on perceived social support and the level of social integration. Those with higher income levels indicated a more positive rating of both of these aspects of social relationships. There were, however, some differences in the magnitude of these relationships; income appears to have stronger effects for women. The influence of having one or more chronic diseases had a similar negative effect on the self-rated health of both women and men. Age had a positive influence on women's health while for men this relationship was not significant.

For both women and men, the quality of their social relationships was positively related to their self-rated health, although the magnitude of the effect was smaller for women than men. Two other aspects of social relationships

Table 25

Comparison of model fit and maximum likelihood estimates for final  
model (women) and final model (men)

Significant effects <sup>*</sup>	Final model (women)	Final model (men)
Importance of social relationships on quality of social relationships	.309 <sup>1</sup> (.182) <sup>2</sup>	.238 (.144)
Received social support on health	-.492 (-.164)	n.s. <sup>3</sup>
Perceived social support on health	.245 (.153)	n.s.
Social integration on perceived social support	.279 (.368)	.319 (.390)
Social integration on quality of social relationships	.254 (.255)	.266 (.229)
Quality of social relationships on perceived social support	.135 (.178)	n.s.
Quality of social relationships on health	.258 (.212)	.340 (.308)
Age on health	.009 (.132)	n.s.
Income on perceived social support	.110 (.225)	.097 (.195)

1 Unstandardized

2 (Standardized)

3 Not significant

\*  $T > 2.0$

(table continues)

Table 25 (continued)

Comparison of model fit and maximum likelihood estimates for final  
model (women) and final model (men)

Significant effects <sup>*</sup>	Final model (women)	Final model (men)
Income on social integration	.224 <sup>1</sup> (.347) <sup>2</sup>	.121 (.198)
Chronic disease on health	-.417 (-.196)	-.440 (-.201)
$\chi^2$	45.93	41.59
df	23	23
p	.003	.010
AGFI	.924	.925

1 Unstandardized

2 (Standardized)

\*  $T > 2.0$

were related to women's but not men's health. For women, the receipt of social support had negative effects on their health while positive perceptions of the availability of social support had positive effects on their ratings of their health.

The findings also suggest significant effects for both women and men among some of the concepts of social relationships. Women and men who have more positive ratings of the importance of their social relationships to their health and well-being also reported more positive ratings of the overall quality of their social relationships. Similarly, women and men with higher levels of social integration were more positive in their perceptions that social support would be available to them if needed and reported more positive ratings about the overall quality of their social relationships. An additional effect that was significant for women but not for men was the association between more positive ratings of the quality of their social relationships and positive perceptions of social support availability.

These findings suggest that gender does interact with income and some aspects of social relationships on self-rated health status. The next chapter discusses these findings in light of previous research and the contribution of these findings to our understanding of the relationships among gender, SES, and social relationships.

## **CHAPTER 6**

### **DISCUSSION OF THE FINDINGS**

This study set out to examine some of the broad social determinants of health status as distinct from the other environmental and behavioural determinants. Specifically, the research questions addressed whether gender, SES, and social relationships were associated with the self-rated health of adult women and men. The theoretical model estimated in this study also permitted an examination of whether social relationships mediated the effect of SES on health and whether any of these effects differed for women and men. The development of this model involved the consideration of theoretical conceptualizations of SES and social relationships, a review of the diverse literature that encompasses empirical evidence supporting the relationships among these three factors and health, and a review of explanations that are suggested to explain these relationships. This chapter includes a review of some of the potential limitations of this study, provides an overview of the major findings in the context of relevant published literature, and concludes with a discussion of some broader implications of these findings for programs and policies. The chapter concludes with a brief discussion of implications for further research that arise from the findings of this study.

## **Limitations**

Some of the constraints in this study arise from methodological issues associated with the use of secondary data analysis of cross-sectional data as the method chosen to address the research questions. These limitations relate to the choice of indicators for the social relationships concepts and the issue of establishing causal relationships. The complexity of measuring the various components of social relationships has been noted in previous chapters. Given the lack of consensus regarding which aspects of social relationships are key it is possible that some components may be missing in this study. The survey was designed to capture a wide range of responses related to the health of people living in the Yukon Territory. Consequently, the questions related to social relationships were not specific and complete. For example, the data did not permit the inclusion of assessments of the satisfaction with specific social support received nor did it allow for an assessment of specific types of support that were provided to others. Although two measures of enacted and received social support were used in this study, it is likely that the specific wording of these questions in relationship to care received or provided for a health problem may have led to underestimation of the amount of support provided and received. Finally, the decision to include the two concepts of 'importance of social relationships' and 'quality of social relationships' as separate dimensions of social relationships might be open to criticism on the basis of questions of conceptual clarity about these two concepts. In other words, it is not necessarily

clear what underlies these two concepts but it appears that the phenomena they represent are distinct from other concepts such as perceived availability of social support.

One of the limitations of studies that use cross-sectional data to examine the health effects of social support is the inability to firmly establish causal relationships. The findings of this study support different relationships among SES, social relationships and health status for women and men but these findings do not confirm causal relationships. They do, however, provide for a plausible causal pathway that is consistent with the observed data. This study produced statistically significant evidence that some aspects of social relationships mediate the relationship between SES and health and provides support that gender interacts with some of the relationships proposed in the estimated model. This does not mean, however, that other models with different hypothesized relationships might not also prove to be significant. The analytical method used in this study permits an assessment about whether the proposed model fits the data but it does not rule out the possibility of other models or alternative hypotheses that would fit the data equally well. One final point on the analytical methods used is the potential for error when data-driven modifications are made to the model. While the modifications made to the initial model were guided by examination of the standardized residuals and modification indices, each change was carefully considered in light of its theoretical plausibility. We

are reasonably confident that consideration of these changes from a theoretical basis helped to minimize potential errors in the model-building phase.

Finally, it is not known whether these findings have generalizability beyond those residents of the Yukon Territory. When compared to their Canadian counterparts, it would appear that Yukoners are somewhat different in their ratings of items such as self-rated health status and care provided to family and friends (Government of Yukon, 1994b). Furthermore, it may be the case that the aboriginal population differs from the non-aboriginal population sampled here on factors examined in this study, so it would be advisable to limit the generalizations of these findings to the population of non-aboriginal Yukon residents.

## **Discussion**

This section summarizes the major findings arising from the hypothesized model in terms of gender differences in the health consequences of social relationships, the effects of SES, and associations among the different aspects of social relationships.

### **Health Consequences of Social Relationships**

The findings from this study support gender interactions in the effects of components of social relationships on self-rated health status. One notable finding is that only one of the dimensions of social relationships examined in this study had an effect on men's health status. Women's and men's evaluations of

the overall quality of their social relationships had importance for their perceptions of their health and this effect was stronger for men than for women. This raises the question of the meaning of this particular concept particularly in the context of some of the literature on measures of social support where the recommendations are to be specific about these measures and avoid the use of global ratings. One possible explanation for this finding could be that this rating of quality of social relationships is related to people's views about the potential resources that would be available to them if they needed them. However, it is not clear whether this global rating of the quality of one's social relationships actually measures any supportive functions.

Women who perceived that they have support available to them were also more likely to have positive perceptions of their health; a finding that is consistent with findings of other studies (Flaherty & Richman, 1989; Procidano & Smith, 1997; Wethington & Kessler, 1986). Belle (1987) noted there is evidence that men and women differ in their social networks and relationships. Men participate more "extensively" in relationships focused on activities while women participate more "intensively" in emotionally intimate relationships. We could speculate that the perception of availability of social support is related to the expressive, rather than instrumental, aspects of social support. This would then suggest that those relationships that provide more emotional support might be seen as more important for women than for men in the context of their self-rated health. This finding for women, however, requires more study because, although the

relationship between perceived social support and health was significant in the validation sample, it was in the opposite direction.

Some of the bivariate analyses conducted in this study suggest that women both received and provided more social support than men. These findings are consistent with other studies (Belle, 1987; Flaherty & Richman, 1989; Kessler, McLeod, & Wethington, 1985; Vaux, 1988). Although the negative relationship between received social support and self-rated health status for women may be a consequence of the wording of the question, there is a plausible explanation in light of the importance of context in assessing social support effects. It is possible that support may be received when it is not wanted, is received in such a manner that creates more distress for the recipient, or the support that is provided is not what is needed (Rook, 1982). Brownell and Shumaker (1985), for example, suggest that support interventions should be cognizant of those people who do not necessarily see support as positive because it implies an inability to take care of oneself. The fact that this relationship was not significant for men raises an interesting point in terms of what some see as essential gender differences in relationships. Wills (1985) argued that studies of the functions of social support should allow for testing differences in the support needs of men and women and others have highlighted theories that explain what are believed to be differences in the relationships of men and women that may account for these differences in the relative importance of different aspects of social relationships (Gilligan, 1982).

The lack of a significant relationship between care that was provided to various sources and self-rated health status for women and men raises questions regarding the issue of relationship strain. It is noted that relationship strain can be one of the negative aspects of social relationships and it is hypothesized that because women tend to provide more care to others they are more susceptible to the potential negative aspects of relationships (Belle, 1982; Umberson et al., 1996). The findings from this study indicate that women reported providing care to more sources than men reported, however, this provision of care did not have any significant effects on women's health-ratings.

The finding that the level of social integration was not directly related to health status for either men or women merits some discussion. While some studies have shown evidence of effects of some individual measures of social integration on health status (Cramer, 1993; Wyke & Ford, 1992), it could be the case that the use of a composite index of social integration in this study tended to obscure these relationships. Marital status, for example, which has shown a consistent positive relationship on men's health status, was included as one of the variables comprising the composite measure of social integration. Studies that have used marital status as a single indicator of a measure of social integration or social ties have not found a consistent relationship with women's health status (Elstad, 1996; Waldron et al., 1997). In this study, social integration influenced self-rated health status and did so by influencing the

quality of women's and men's social relationships and by influencing women's perceptions of the availability of social support.

### **The Influence of Socioeconomic Status**

Of the SES variables studied here, only income had significant effects on both women's and men's health. Income, however, was not directly related to health status but rather was indirectly related through its effects on perceived social support for women and their level of social integration and also through the perceived quality of women's and men's social relationships. Women and men with higher levels of household income had more positive perceptions of the support available to them and also had higher levels of social integration. Both of these effects were stronger for women, which suggests that, for women, income level is more important for these aspects of social relationships than for men. This finding is supportive of the view that income, as one aspect of SES, affects both the quality of social relationships and access to social support (Antonucci & Jackson, 1990; Belle, 1987; Green, 1970; Hall & Wellman, 1985; Wellman & Wortley, 1990). Green's (1970) status identity concept, for example, postulates that people gravitate to social relationships with others who share their highest SES indicator, which would imply more productive or higher "quality" of social support perceived among those with higher income. As Belle (1987) stated:

... Research suggests that the supportive aspects of social ties are more pronounced among those subgroups favoured with high levels of personal resources, such as income, education, and internal locus of control.  
(p. 258)

These stronger effects for women suggest support for the structural perspective on determinants of social support. Umberson et al. (1996) define the structural position as it may affect the social relationships of women and men:

Structuralists argue that different structural positions of adult men and women in society are associated with different opportunities, constraints, and demands that influence the types of relationships they have with others. (p. 839)

Social relationships are a resource that can have protective effects on health and are affected by other resources available or possessed by an individual. These resources can be environmental or individual factors (Mitchell & Trickett, 1980; Richman, Rosenfeld, & Hardy, 1993) or can be “dispositional” or “structural” (Fischer & Oliner, 1983), or a combination of both. Fischer and Oliner (1983) posit that dispositional approaches would focus on explanations that emphasize the roles of biology and socialization while structural explanations explain gender differences in terms of “different positions women and men typically occupy in the social system, and their differing access to economic, political, and ideological resources of power and privilege” (Fischer & Oliner, 1983, p. 124).

Thus, income affects the health status of men and women in this study and the findings suggest that the way in which this occurs is through its effects on women’s perceptions of availability of social support and, to some extent, on its effects on social integration for both women and men. This suggests that income is a more important factor for women than for men, insofar as it affects those aspects of social relationships that directly affect women’s health status.

This finding, however, requires more study since there was evidence of a need for an additional direct relationship between income and self-rated health status for women in the validation sample.

The lack of any significant findings related to women's and men's educational level and their health-ratings is not consistent with other studies that have examined this relationship. The findings of other studies suggest that educational level has stronger effects for women's self-rated health than men's (Arber, 1997) and that income is a stronger predictor of health for men than for women (Hay, 1992).

### **Associations among Aspects of Social Relationships**

Associations that emerged in the findings from this study among the dimensions of social relationships provide us with a greater understanding of the relationships among aspects of social relationships as they affect health. This may assist in determining the important aspects of social relationships to emphasize for effective program and policy development. These relationships can be seen as determinants of social support that affect both the support resources that may be available as well as the satisfaction with any support that is received. Although most of the emphasis on social support is on its effects on specific outcomes, such as health, Shinn, Lehmann, and Wong (1984) claim:

... its determinants are rarely examined ... Support does influence individual outcomes, such as psychological distress, but in turn it is influenced by stressors, distress, personal characteristics of the recipient, and environmental conditions. (p. 56)

Previous discussion noted that level of income affected two dimensions of social relationships for men and women. Significant relationships among these dimensions also suggest that some aspects of social relationships are important influences on those dimensions of relationships that are more directly related to perceptions of health.

Level of social integration, as measured by the number of social ties, did not have a significant direct effect on health but it did affect both the perception of the availability of social support and the rating of the quality of social relationships for men and women. A higher level of social integration meant that respondents were also more positive about the availability of support and more positive in their overall ratings of the quality of their social relationships. This finding is consistent with studies that have examined the relationship between perceived social support and social integration (Bloom & Spiegel, 1984; Cutrona, 1986; Hurlbert & Acock, 1990; Schaefer et al., 1981; Vaux & Harrison, 1985). In their study of a sample of women university students, Vaux and Harrison (1985) concluded that perceptions of support were related to the size and composition of an individual's social network. The finding that social integration affects other measures of social relationships and thus only indirectly affects health status, receives support from the social activity hypothesis. Bloom and Spiegel's (1984) social activity hypothesis postulates that if people are involved in social activities (high level of social integration) then this provides them with opportunities to receive support.

Women and men who reported that social relationships were important to their health also had more positive ratings of the overall quality of their social relationships. This finding could be interpreted in light of those personal characteristics that are cited as one aspect of the determinants of social relationships (Shinn et al., 1984). If people have an intrinsic belief that they need social relationships to enhance and sustain their health then they may rate the quality of their social relationships more positively. This, in turn, may have beneficial effects on their health-ratings.

The other notable finding is that women who rated the quality of their social relationships more positively were also more positive in their perceptions of support availability. This relationship was not significant for men. This might lead us to surmise that the perceived quality of one's relationships plays a more important role for women in enhancing and sustaining their perception that support will be available to them when they need it. This raises the questions of what underlies perceived social support that makes it protective of women's self-rated health but not of men's and what men receive from their social relationships other than social support. Wethington and Kessler (1986), for example, found that perceived availability of social support had more influence on adjustment to stressful life events than did received social support and concluded that:

It may be that personal coping competence is bolstered by mentally cataloguing one's reserve of ancillary coping resources, including available supporters. (Wethington & Kessler, 1986, p. 85)

This view underscores the psychological impact of knowing that social support is available, which Weiss (1974) cites as part of the “relational provisions” that are provided to us through various aspects of our social relationships. Weiss (1974) cites several categories of what is provided through these relationships: attachment, reassurance of worth, a sense of alliance with others, social integration, opportunity for nurturance, and the opportunity to obtain guidance.

These findings provide support for gender differences in the magnitude of the effect of income on social relationships, differences in the health consequences of social relationships, and differences between men and women among some of the domains of social relationships that were studied. Although women and men reported similar self-ratings of health, the amount of variance accounted for in the hypothesized model was greater for women than for men. Taken together, these findings lend support to the view that program and policy development that would incorporate social relationships as a determinant of health need to be sensitive to both the structural determinants of social relationships as well as the dispositional resources that characterize the perceived helpfulness of social support interventions. The issue of income adequacy, as one of the structural determinants, is a factor that warrants continued policy attention. As noted by House et al. (1994):

It may be difficult to modify health behaviours, stress, self-efficacy, or social relationships as long as people remain in the same conditions of life and work which foster and maintain these psychosocial risk factors in the first place. (p. 229)

## Conclusions

This study examined selected determinants of the social environment and demonstrated gender interactions in their associations with self-rated health. This final section focuses on a review of some implications of these findings for approaches that incorporate social support interventions.

The types of interventions related to developing or enhancing social support can be grouped into several categories (Blythe, 1983; Petchers & Milligan, 1987; Thompson & Heller, 1990; Vaux, 1991). The interventions can range from individual to community-level interventions and can focus on enhancing the use of existing resources or developing new support resources (Israel, 1985; Specht, 1986). Individual-level interventions would focus on developing and strengthening access to human services related to individual and interpersonal support needs while community-level interventions would focus on strategies to address broader economic and social stressors (Israel, 1985). Vaux (1991) outlined a framework for support interventions that included: improving the utilization of resources, developing and maintaining support resources, improving the management of resources, and facilitating positive perceptions of the availability and quality of support. The implementation of individually focused interventions, however, can be difficult in the context of the complexity of the associations among various support variables. For example, one study that evaluated the effectiveness of using peer-telephone dyads to provide support for low income, elderly women found that the intervention was

no more effective in providing support than providing only one contact in the form of an assessment interview (Heller, Thompson, Trueba, Hogg, & Vlachos-Weber, 1991). This raises the issue of the limitations that can be presented when formal supports are utilized.

The findings from this study support the consideration of gender in understanding the different pathways by which social relationships affect health as well as the influence of income in affecting social relationships; two factors which Heller, Price, and Hogg (1990) referred to as "prisms" of social support. Heller et al. (1990) argued that gender differences in social relationships suggest that interventions that strive to provide emotional support should use women as the providers of support for both women and men. They also suggest there is a need to consider different types of support interventions for those who are in a lower socioeconomic position. This latter point is supported by Riley and Eckenrode (1986) who, in a cross-sectional study, found that women with lower levels of material and psychological resources received fewer benefits from informal social ties than did women who possessed a higher level of resources.

Kaufert (1996) takes a broader view of gender when she argues that gender is a determinant of health. This argument is based on the premise that gender is a determinant insofar as it interacts with other determinants of health such as social supports and income distribution. The findings from this study provide support for the argument that when women are poor it is harder on their health than when men are poor. The issue of income distribution is particularly

relevant because of women's greater income inequality and the consequences of the "feminization of poverty", which places women at a higher risk of poverty than men (McLanahan, Sorensen, & Watson, 1989). In Canada in 1991, the composition of those who lived below the poverty line included 62.0% of single-parent mothers compared to 24.0% of single-parent families headed by men (Harder, 1996). In 1994, unattached women over the age of 65 had a poverty rate of 44.1% compared with 25.2% for men in this same age group (Harder, 1996).

Others have also argued that health policy should address these sociodemographic factors (Hall & Wellman, 1985; House et al., 1994; Pilisuk & Minkler, 1985) in conjunction with considerations of the influence of social relationships. Hall and Wellman (1985) identified limitations of approaches to social support interventions that focus only on the individual with insufficient attention given to the broader social structures:

A broader structural approach, however, expands the scope of investigation toward an understanding of why stress and attendant health problems develop in various social contexts (e.g., the social class-health relationship). The very nature of this approach forces researchers to consider the larger structural constraints operating on the provision of support and encourages them to recognize the limitations of common-sense social network intervention strategies that try to add more or better support ties. In health research generally it represents a return to an intervention logic, which includes structural as well as individual changes. (p. 39)

Other researchers urge caution in advancing wholeheartedly into designing and implementing support interventions. Some see the emphasis on social support intervention as indicative of a view that believes it is more

economical to do this than to focus on changing or reducing other stressors, such as unemployment and poverty (Rook & Dooley, 1985). Auslander and Litwin (1987), for example, argued that the focus on social support interventions might have less to do with the efficacy of these interventions and more to do with economic savings in the health-care system. In other words, it is cheaper to develop social intervention programs than to develop programs and policies that focus on advancing more equitable distributions of income.

Another way of understanding these findings and their implications is to place them in the context of proximal and distal determinants of health (House et al., 1994). Even though we can understand the effect of income (distal) on health through the mediating effects of aspects of social relationships (proximal), it can be argued that “we cannot disregard socioeconomic status in favor of these mechanisms” (House et al., 1994, p. 229). In the context of the findings of this study, and supported by findings of other studies, this raises the need for further development of more effective income security policies as important components of health policy.

The findings of this study support the view that these selected determinants of health operate differently for women and men and provide support for the influence of specific aspects of social relationships on self-rated health status. An additional contribution from this study is related to the findings of the relationships among the dimensions of social relationships, such as the

influence of social ties on those dimensions of social relationships that have a more direct influence on health.

The major contribution of these findings to our ongoing understanding of the effects of social determinants of health is in specifying the paths of relationships from different domains of social relationships to health and the explication of a plausible relationship by which income affects health status.

### **Implications for Further Research**

The findings of this study have implications for areas of further research that would advance our understanding of these complex relationships among social determinants of health. The model that was estimated in this study has provided evidence of relationships among gender, SES, and social relationships and health. Increased confidence in the relationships found in this study would be enhanced if this model were tested in different populations and particularly if further investigation used a longitudinal design. Our understanding of the effects of these determinants on health would also benefit from examining these relationships among First Nations people because of the gap in related research that currently exists in Canada. Given the increase in transfer of delivery of health services to First Nations governments, it would be beneficial to explore the relationships among these determinants of health for First Nations populations.

Further research in this area should extend the model by including employment status as a concept that may also help to illuminate the relationships found in this study. The influence of employment or lack of employment may be a crucial variable to consider in light of the gender differences found in this study. Further elaboration of the model evaluated here could also include even greater specificity on some concepts of social relationships. One component that should be included in future research is a measure of the assessment of both the type and quality of support that is provided and an examination of the possible consequences of this for health status. This has the potential to provide greater specificity for program development and interventions that would incorporate social support.

Further investigation should also continue to explore the relationship of the components of SES to health. An exploration of the reasons why income, but not educational level, was related to health through domains of social relationships may be explicated by testing the model on different populations. A further line of inquiry, however, is to explore in greater detail the basis for the finding that income has a stronger effect on aspects of women's but not men's social relationships. Approaches to this line of inquiry could include qualitative methods that would seek to explore the meaning behind the importance of social relationships for low-income women and men and their connection to health status.

The findings of this study have contributed to a further understanding of the way in which both SES and social relationships affect women's and men's health. Further research in the areas suggested would enhance our ability to understand the processes by which these determinants affect health and would provide guidance for the development of more effective policies and programs aimed at sustaining and enhancing the health of populations.

## REFERENCES

- Abramson, J.H., Gofin, R., Habib, J., Pridan, H., & Gofin, J. (1982). Indicators of social class: A comparative appraisal of measures for use in epidemiological studies. Social Science and Medicine, 16, 1739-1746.
- Adams, O. (1993). Health status. In T. Stephens & D.F. Graham (Eds.), Canada's Health Promotion Survey 1990: Technical report (pp. 23-40). Ottawa: Minister of Supply and Services Canada, Health and Welfare Canada.
- Adler, N.E., Boyce, T., Chesney, M.A., Cohen, S., Folkman, S., Kahn, R.G., & Syme, S.L. (1994). Socioeconomic status and health: The challenge of the gradient. American Psychologist, 49, 15-24.
- Adler, N.E., Boyce, T., Chesney, M.A., Folkman, S., & Syme, S.L. (1993). Socioeconomic inequalities in health: No easy solution. Journal of the American Medical Association, 269, 3140-3145.
- Adler, N.E., & Coriell, M. (1997). Socioeconomic status and women's health. In S.J. Gallant, G.P. Keita, & R. Royak-Schaler (Eds.), Health care and women: Psychological, social, and behavioral Influences (pp. 11-23). Washington, DC: American Psychological Association.
- Alwin, D.F., Converse, P.E., & Martin, S.S. (1985). Living arrangements and social integration. Journal of Marriage and the Family, 47, 319-334.
- Anderson, N.B., & Armstead, C.A. (1995). Toward understanding the association of socioeconomic status and health: A new challenge for the biopsychosocial approach. Psychosomatic Medicine, 57, 213-225.
- Anson, O. (1989). Marital status and women's health revisited: The importance of a proximate adult. Journal of Marriage and the Family, 51, 185-194.
- Anson, O., Levenson, A., & Bonne, D.Y. (1990). Gender and health on the kibbutz. Sex Roles, 22, 213-233.
- Anson, O., Paran, E., Neumann, L., & Chernichovsky, D. (1993). Gender differences in health perceptions and their predictors. Social Science and Medicine, 36, 419-427.

- Antonucci, T.C. (1985). Social support: Theoretical advances, recent findings and pressing issues. In I.G. Sarason & B.R. Sarason (Eds.), Social support: Theory, research and applications (pp. 21-38). Boston: Martinus Nijhoff.
- Antonucci, T.C., & Akiyama, H. (1987). An examination of sex differences in social support among older men and women. Sex Roles, 17, 737-749.
- Antonucci, T.C., & Jackson, J.S. (1990). The role of reciprocity in social support. In B.R. Sarason, I.G. Sarason, & G.R. Pierce (Eds.), Social support: An interactional view (pp. 173-198). New York: John Wiley & Sons.
- Antonovsky, A. (1967). Social class, life expectancy and overall mortality. Milbank Memorial Fund Quarterly, 45, 31-73.
- Arber, S. (1991). Class, paid employment and family roles: Making sense of structural disadvantage, gender, and health status. Social Science and Medicine, 32, 425-436.
- Arber, S. (1997). Comparing inequalities in women's and men's health: Britain in the 1990's. Social Science and Medicine, 44, 773-787.
- Arber, S., & Ginn, J. (1993). Gender and inequalities in health in later life. Social Science and Medicine, 36, 33-46.
- Auslander, G. (1988a). Social networks and the functional health status of the poor: A secondary analysis of data from the National Survey of Personal Health Practices and Consequences. Journal of Community Health, 13, 197-209.
- Auslander, G. (1988b, Summer). Social networks and health status of the unemployed. Health and Social Work, 191-200.
- Auslander, G., & Litwin, H. (1987, June). The parameters of network intervention: A social work application. Social Service Review, 305-318.
- Barrera, M. (1981). Social support in the adjustment of pregnant adolescents: Assessment issues. In B.H. Gottlieb (Ed.), Social networks and social support (pp. 69-96). Beverly Hills, CA: Sage.
- Barrera, M. (1986). Distinctions between social support concepts, measures, and models. American Journal of Community Psychology, 14, 413-445.

- Barrera, M., Sandler, N., & Ramsay, T.B. (1981). Preliminary development of a scale of social support: Studies on college students. American Journal of Community Psychology, 9, 435-447.
- Belle, D. (1982). The stress of caring: Women as providers of social support. In L. Goldberger & S. Breznitz (Eds.), Handbook of stress: Theoretical and clinical aspects (pp. 496-505). New York: The Free Press.
- Belle, D. (1983). The impact of poverty on social networks and support. Marriage and Family Review, 5, 89-103.
- Belle, D. (1987). Gender differences in the social moderators of stress. In R.C. Bartlett, L. Biener, & G.K. Baruch (Eds.), Gender and stress (pp. 257-277). New York: Free Press.
- Berkman, L.F., & Syme, L. (1979). Social networks, host resistance and mortality: A nine-year follow-up study of Alameda County residents. American Journal of Epidemiology, 109, 186-204.
- Bird, C.E., & Fremont, A.M. (1991). Gender, time use, and health. Journal of Health and Social Behaviour, 32, 114-129.
- Blake, R.L., & McKay, D.A. (1986). A single-item measure of social supports as a predictor of morbidity. The Journal of Family Practice, 22, 82-84.
- Blane, D. (1985). An assessment of the Black Report's explanations of health inequalities. Sociology of Health and Illness, 7, 423-445.
- Blazer, D.G. (1982). Social support and mortality in an elderly community population. American Journal of Epidemiology, 115, 684-694.
- Bloom, J. (1990). The relationship of social support and health. Social Science and Medicine, 30, 635-637.
- Bloom, J., & Spiegel, D. (1984). The relationship of two dimensions of social support to the psychological well-being and social functioning of women with advanced breast cancer. Social Science and Medicine, 19, 831-837.
- Blythe, B.J. (1983). Social support networks in health care and health promotion. In J.K. Whittaker, J. Garbarino, & Associates (Eds.), Social support networks: Informal and formal helping in the human services (pp. 107-131). New York: Aldine.
- Bollen, K.A. (1989). Structural equation models with latent variables. New York: John Wiley & Sons.

- Bowling, A., & Browne, P.D. (1991). Social networks, health and emotional well-being among the oldest old in London. Journal of Gerontology, 46, 520-532.
- Broadhead, W.E., Kaplan, B.H., James, S.A., Wagner, E.H., Schoenbach, V.J., Grimson, R., Heyden, S., Tibblin, G., & Gehlbach, S.H. (1983). The epidemiologic evidence for a relationship between social support and health. American Journal of Epidemiology, 117, 521-537.
- Broman, C.L. (1993). Social relationships and health-related behavior. Journal of Behavioral Medicine, 16, 335-350.
- Brownell, A., & Shumaker, S.A. (1985). Where do we go from here? The policy implications of social support. Journal of Social Issues, 41, 111-121.
- Byrne, B.M. (1989). A primer of LISREL. New York: Springer-Verlag.
- Campbell, R.T., & Parker, R.N. (1983). Substantive and statistical considerations in the interpretation of multiple measures of SES. Social Forces, 62, 450-466.
- Canadian Public Health Association. (1997, March). Health impacts of social and economic conditions: Implications for public policy. Ottawa, Ontario: Author.
- Cassel, J. (1976). The contribution of the social environment to host resistance. American Journal of Epidemiology, 104, 107-123.
- Choi, N.G., & Wodarski, J.S. (1996). The relationship between social support and health status of elderly people: Does social support slow down physical and functional deterioration? Social Work Research, 20, 52-63.
- Cobb, S. (1976). Social support as a moderator of life stress. Psychosomatic Medicine, 38, 300-314.
- Coburn, D., & Pope, C.R. (1974). Socioeconomic status and preventive health behavior. Journal of Health and Social Behavior, 15, 67-77.
- Cohen, C.I., Teresi, J., & Holmes, D. (1985). Social networks, stress, and physical health: A longitudinal study of an inner-city elderly population. Journal of Gerontology, 40, 478-486.
- Cohen, S., & Wills, T.A. (1985). Stress, social support, and the buffering

- hypothesis. Psychological Bulletin, 98, 310-357.
- Corin, E. (1994). The social and cultural matrix of health and disease. In R.G. Evans, M.L. Barer, & T.R. Marmor (Eds.), Why are some people healthy and others not? The determinants of health of populations (pp. 93-132). New York: Aldine de Gruyter.
- Cramer, D. (1993). Living alone, marital status, gender and health. Journal of Community and Applied Social Psychology, 3, 1-15.
- Cunney, K.A., & Perri, M. (1991). Single-item vs multiple-item measures of health-related quality of life. Psychological Reports, 69, 127-130.
- Cutrona, E.C. (1986). Objective determinants of perceived social support. Journal of Personality and Social Psychology, 50, 349-355.
- Davidson, K., Holderby, A., Stewart, M., van Roosmalen, E., Poirier, L., Bentley, S., & Kirkland, S. (1997, July). Considering gender as a modifiable health determinant. Paper presented at The Fifth National Health Promotion Conference, Halifax, Nova Scotia.
- Diverty, B., & Perez, C. (1998). The health of Northern residents. Health Reports, 9, 49-58.
- Duleep, H.O. (1995). Mortality and income inequality among economically developed countries. Social Security Bulletin, 58, 34-50.
- Duncan, G. (1996). Income dynamics and health. International Journal of Health Services, 26, 419-444.
- Dutton, D.B., & Levine, S. (1989). Socioeconomic status and health: Overview, methodological critique, and reformulation. In J.P. Bunker, D.S. Gombay, & B.H. Kehr (Eds.), Pathways to health (pp. 26-69). Menlo Park, CA: Henry J. Kaiser Family Foundation.
- Eckenrode, J. (1983). The mobilization of social supports: Some individual constraints. American Journal of Community Psychology, 11, 509-528.
- Ell, K. (1984, March). Social networks, social support and health status: A review. Social Service Review, 133-149.
- Elo, I.T., & Preston, S.H. (1996). Educational differences in mortality: United States, 1979-85. Social Science and Medicine, 42, 47-57.
- Elstad, J.I. (1996). Inequalities in health related to women's marital, parental, and

- employment status - a comparison between the early 70s and the late 80s, Norway. Social Science and Medicine, 42, 75-89.
- Etzion, D. (1984). Moderating effect of social support on the stress-burnout relationship. Journal of Applied Psychology, 69, 615-622.
- Eurelings-Bontekoe, E.H.M., Diekstra, R.F.W., & Verschuur, M. (1995). Psychological distress, social support and social support seeking: A prospective study among primary mental health care patients. Social Science and Medicine, 40, 1083-1089.
- Evans, R.G. (1994). Introduction. In R.G. Evans, M.L. Barer, & T.R. Marmor (Eds.), Why are some people healthy and others not? The determinants of health of populations (pp. 3-26). New York: Aldine de Gruyter.
- Feldman, J.J., Makuc, D.M., Kleinman, J.C., & Cornoni-Huntley, J. (1989). National trends in educational differentials in mortality. American Journal of Epidemiology, 129, 919-933.
- Fiore, J., Becker, J., & Coppel, D.B. (1983). Social network interactions: A buffer or a stress. American Journal of Community Psychology, 11, 423-439.
- Fischer, C.S., & Oliner, S.J. (1983). A research note on friendship, gender, and the life cycle. Social Forces, 62, 124-133.
- Flaherty, J., & Richman, J. (1989). Gender differences in the perception and utilization of social support: Theoretical perspectives and an empirical test. Social Science and Medicine, 28, 1221-1228.
- Ford, G., Ecob, R., Hunt, K., MacIntyre, S., & West, P. (1994). Patterns of class inequality in health through the lifespan: Class gradients at 15, 35 and 55 years in the west of Scotland. Social Science and Medicine, 39, 1037-1050.
- Franks, P., Campbell, T.L., & Shields, C.G. (1992). Social relationships and health: The relative roles of family functioning and social support. Social Science and Medicine, 34, 779-788.
- Fusilier, M., Ganster, D.C., & Mayes, B.T. (1986). The social support and health relationship: Is there a gender difference? Journal of Occupational Psychology, 59, 145-153.
- Gallo, F. (1982). The effects of social support networks on the health of the elderly. Social Work in Health Care, 8, 65-75.

- Gerstel, N., & Gallagher, S.K. (1993). Kinkeeping & distress: Gender, recipients of care, and work-family conflict. Journal of Marriage and the Family, 55, 598-607.
- Gerstel, N., Riessman, C.K., & Rosenfield, S. (1985). Explaining the symptomatology of separated and divorced women and men: The role of material conditions and social networks. Social Forces, 64, 84-101.
- Gilligan, C. (1982). In a different voice: Psychological theory and women's development. Cambridge: Harvard University Press.
- Goldman, N., Korenman, S., & Weinstein, R. (1995). Marital status and health among the elderly. Social Science and Medicine, 40, 1717-1730.
- Goodman, S.N. (1998). Multiple comparisons, explained. American Journal of Epidemiology, 147, 807-812.
- Gore, S. (1978). The effect of social support in moderating the health consequences of unemployment. Journal of Health and Social Behavior, 19, 157-165.
- Gottlieb, N., & Green, L. (1984). Life events, social networks, life-style, and health: An analysis of the 1979 National Survey of Personal Health. Health Education Quarterly, 11, 91-105.
- Gove, W.R. (1973). Sex, marital status and mortality. American Journal of Sociology, 79, 45-67.
- Gove, W., & Hughes, M. (1979). Possible causes of the apparent sex differences in physical health: An empirical investigation. American Sociological Review, 44, 126-146.
- Government of Saskatchewan. (1992). A Saskatchewan vision for health: A framework for change. Regina, SK: Saskatchewan Health.
- Government of Yukon. (1993, February). Yukon statistical review. Third quarter 1992. Whitehorse, YK: Executive Council Office, Bureau of Statistics.
- Government of Yukon. (1994a, March). An accounting of health: What the numbers say (Working Paper 4). Whitehorse, YK: Executive Council Office, Bureau of Statistics.
- Government of Yukon. (1994b). Yukon health status report. Whitehorse, YK: Health and Social Services.

- Grant, I., Patterson, T.L., & Yager, J. (1988). Social supports in relation to physical health and symptoms of depression in the elderly. American Journal of Psychiatry, 145, 1254-1258.
- Green, K. (1993). Social relationships and workplace health. In T. Stephens & D.F. Graham (Eds.), Canada's Health Promotion Survey 1990: Technical report (pp. 65-72). Ottawa: Minister of Supply and Services Canada.
- Green, L.W. (1970). Status identity and preventive health behavior. (Pacific Health Education Reports, 1). Berkeley, CA: University of California, School of Public Health, Honolulu, HI: University of Hawaii, School of Public Health.
- Green, L.W., Simons-Morton, D., & Potvin, L. (1997). Education and lifestyle determinants of health. In R. Detels, W.W. Holland, J. McEwen, & G.S. Omenn (Eds.), Oxford textbook of public health (3rd ed. pp. 125-139). Oxford: Oxford University Press.
- Haan, M., Kaplan, G.A., & Camacho, T. (1987). Poverty and health: Prospective evidence from the Alameda county study. American Journal of Epidemiology, 125, 989-998.
- Haines, V.A., & Hurlbert, J.S. (1992). Network range and health. Journal of Health and Social Behavior, 33, 254-266.
- Hall, A., & Wellman, B. (1985). Social networks and social support. In S. Cohen & S.L. Syme (Eds.), Social support and health (pp. 23-41). Orlando, FL: Academic Press.
- Harder, S. (1996). Poverty in Canada. Ottawa: Research Branch, Library of Parliament.
- Hart, N. (1997). The social and economic environment and human health. In R. Detels, W.W. Holland, J. McEwen, & G.S. Omenn (Eds.), Oxford textbook of public health (3rd ed. pp. 95-123). Oxford: Oxford University Press.
- Hay, D.I. (1992). An explication of the relationship between income and health. Unpublished doctoral dissertation. University of Toronto, Toronto.
- Hayduk, L.A. (1987). Structural equation modeling with LISREL: Essentials and advances. Baltimore: Johns Hopkins University Press.

- Haynes, S.G., and Feinleib, M. (1980). Women, work and coronary heart disease: Prospective findings from the Framingham Study. American Journal of Public Health, 70, 133-141.
- Heller, K., Price, R.H., & Hogg, J.R. (1990). The role of social support in community and clinical interventions. In B.R. Sarason, I.G. Sarason, & G.R. Pierce (Eds.), Social support: An interactional view (pp. 482-507). New York: John Wiley and Sons.
- Heller, K., Thompson, M.G., Trueba, P.E., Hogg, J.R., & Vlachos-Weber, I. (1991). Peer support telephone dyads for elderly women: Was this the wrong intervention? American Journal of Community Psychology, 19, 53-74.
- Hertzman, C., Frank, J., & Evans, R.G. (1994). Heterogeneities in health status and the determinants of population health. In R.G. Evans, M.L. Barer, & T.R. Marmor (Eds.), Why are some people healthy and others not? The determinants of health of populations (pp. 67-92). New York: Aldine de Gruyter.
- Hibbard, J. (1985). Social ties and health status: An examination of moderating factors. Health Education Quarterly, 12, 23-34.
- Hibbard, J.H., & Pope, C.R. (1985). Employment status, employment characteristics, and women's health. Women and Health, 10, 59-77.
- Hibbard, J.H., & Pope, C.R. (1991). Effect of domestic and occupational roles on morbidity and mortality. Social Science and Medicine, 32, 805-811.
- House, J.S. (1987). Social support and social structure. Sociological Forum, 2, 135-146.
- House, J.S., & Kahn, R.L. (1985). Measures and concepts of social support. In S. Cohen & S.L. Syme (Eds.), Social support and health (pp. 83-108). Orlando, FL: Academic Press.
- House, J.S., Kessler, R.C., Herzog, R.A., Mero, R.P., Kinney, A.M., & Breslow, M.J. (1990). Age, socioeconomic status, and health. The Milbank Quarterly, 68, 383-411.
- House, J.S., Landis, K.R., & Umberson, D. (1988). Social relationships and health. Science, 241, 540-545.
- House, J.S., Lepkowski, J.M., Kinney, A.M., Mero, R.P., Kessler, R.C., & Herzog, A.R. (1994). The social stratification of aging and health. Journal of Health

and Social Behavior, 35, 213-234.

- House, J.S., & Mortimer, J. (1990). Social structure and the individual: Emerging themes and new directions. Social Psychology Quarterly, 53, 71-80.
- House, J.S., Robbins, C., & Metzner, H.L. (1982). The association of social relationships and activities with mortality: Prospective evidence from the Tecumseh community health study. American Journal of Epidemiology, 116, 123-140.
- House, J.S., Umberson, D., & Landis, K.R. (1988). Structures and processes of social support. Annual Review of Sociology, 14, 293-318.
- Hu, Y., & Goldman, N. (1990). Mortality differentials by marital status: An international comparison. Demography, 27, 233-250.
- Hurlbert, J.S., & Acock, A.C. (1990). The effects of marital status on the form and compositions of social networks. Social Science Quarterly, 71, 163-174.
- Husaini, B.A., Newbrough, J.R., Neff, J.A., & Moore, M.C. (1982). The stress-buffering role of social support and personal competence among the rural married. Journal of Community Psychology, 10, 409-426.
- Idler, E.I., & Kasl, S.V. (1995). Self-ratings of health: Do they also predict changes in functional ability? Journal of Gerontology: Social Sciences, 50B, S344-S353.
- Illsley, R., & Baker, D. (1991). Contextual variations in the meaning of health inequality. Social Science and Medicine, 32, 359-365.
- Israel, B. (1982). Social networks and health status: Linking theory, research and practice. Patient Counselling and Health Education, 4, 65-79.
- Israel, B. (1985). Social networks and social support: Implications for natural helper and community level intervention. Health Education Quarterly, 12, 65-80.
- Johnson, R.J., & Wolinsky, F.D. (1994). Gender, race and health: The structure of health status among older adults. The Gerontologist, 34, 24-35.
- Joreskog, K.B., & Sorbom, D. (1989). LISREL user's reference guide. Mooresville, IN: Scientific Software.

- Joung, I.M.A., Stronks, K., Van de Mheen, H., Van Poppel, F.W.A., Van der Meer, J.B.W., & Mackenbach, J.P. (1997). The contribution of intermediary factors to marital status differences in self-reported health. Journal of Marriage and the Family, 59, 476-490.
- Jylha, M. (1994). Self-rated health revisited: Exploring survey interview episodes with elderly respondents. Social Science and Medicine, 39, 983-990.
- Kandrack, M.A., Grant, K.R., & Segall, A. (1991). Gender differences in health related behaviour: Some unanswered questions. Social Science and Medicine, 32, 579-590.
- Kaplan, G.A., & Camacho, T. (1983). Perceived health and mortality: A nine-year follow-up of the human population laboratory. American Journal of Epidemiology, 117, 292-304.
- Kaplan, G.A., Haan, M.N., Syme, S.L., Minkler, M., & Winkleby, M. (1987). Socioeconomic status and health. In R.W. Amler & H.B. Dull (Eds.), Closing the gap: The burden of unnecessary illness (pp.125-129). New York: Oxford University Press.
- Kaplan, R.M., Anderson, J.P., & Wingard, D.L. (1991). Gender differences in health-related quality of life. Health Psychology, 10, 86-93.
- Kaplan, R.M., & Toshima, M.T. (1990). The functional effects of social relationships on chronic illnesses and disability. In B.R. Sarason, I.G. Sarason, & G.R. Pierce (Eds.), Social support: An interactional view (pp. 427-453). New York: John Wiley and Sons.
- Kaufert, P. (1996). Gender as a determinant of health. A Canadian perspective. Developed for the Canada-U.S. Women's Health Forum, August 8-10, 1996. Internet address: <http://www.hwc.ca/canusa/>
- Kessler, R.C. (1982). A disaggregation of the relationship between socioeconomic status and psychological distress. American Sociological Review, 47, 752-764.
- Kessler, R.C., & McLeod, J. (1984). Sex differences in vulnerability to undesirable life events. American Sociological Review, 49, 620-631.
- Kessler, R.C., McLeod, J.D., & Wethington, E. (1985). The costs of caring: A perspective on the relationship between sex and psychological distress. In I.G. Sarason & B.R. Sarason (Eds.), Social support: Theory, research, and applications (pp. 491-506). Boston: Martinus Nijhoff.

- Kitagawa, E.M., & Hauser, P.M. (1973). Differential mortality in the United States: A study in socioeconomic epidemiology. Cambridge, MA: Harvard University Press.
- Koskinen, S., & Martelin, T. (1994). Why are socioeconomic mortality differences smaller among women than among men? Social Science and Medicine, 18, 1385-1396.
- Kotler, P., & Wingard, D.L. (1989). The effect of occupational, marital and parental roles on mortality: The Alameda County Study. American Journal of Public Health, 79, 607-612.
- Krause, N.M. (1987). Satisfaction with social support and self-rated health in older adults. The Gerontologist, 27, 301-308.
- Krause, N.M., & Jay, G.M. (1994). What do global self-rated health items measure? Medical Care, 32, 930-942.
- Krieger, N., & Fee, E. (1994). Social class: The missing link in US health data. International Journal of Health Services, 24, 25-44.
- Krieger, N., Williams, D.R., & Moss, N.E. (1997). Measuring social class in U.S. public health research: Concepts, methodologies, and guidelines. Annual Review of Public Health, 18, 341-378.
- Kunst, A.E., & Mackenbach, J.P. (1994). The size of mortality differences associated with educational level in nine industrialized countries. American Journal of Public Health, 84, 932-937.
- Laireiter, A., & Baumann, U. (1992). Network structures and support functions - Theoretical and empirical analyses. In H.O.F. Veiel & U. Baumann (Eds.), The meaning and measurement of social support (pp. 33-56). New York: Hemisphere.
- Lapierre, L. (1984). Canadian women: Profile of their health (Catalogue no. 82-542E). Ottawa: Statistics Canada.
- LeGrand, J. (1982). The strategy of equality: Redistribution and the social services. London: Unwin Hyman.
- Leviatan, U., & Cohen, J. (1985). Gender differences in life expectancy among kibbutz members. Social Science and Medicine, 21, 545-551.
- Liang, J. (1986). Self-reported physical health among aged adults. Journal of Gerontology, 41, 248-260.

- Liberatos, P., Link, B.G., & Kelsey, J.L. (1988). The measurement of social class in epidemiology. Epidemiologic Reviews, 10, 87-121.
- Lin, N., Ensel, W.M., Simeone, R.S., & Kuo, W. (1979). Social support, stressful life events, and illness: A model and an empirical test. Journal of Health and Social Behavior, 20, 108-119.
- Loehlin, J.C. (1992). Latent variable models: An introduction to factor, path and structural analysis. 2nd ed. Hillsdale, NJ: Lawrence Erlbaum.
- Love, R., Jackson, L., Edwards, R., & Pederson, A. (1997, July). Gender and its relationship to other determinants of health. Paper presented at the Fifth National Health Promotion Research Conference, Halifax, Nova Scotia.
- Luepker, R.V., Rosamond, W.D., Murphy, R., Sprafka, J.M., Folsom, A.R., McGovern, P.F., & Blackburn, H. (1993). Socioeconomic status and coronary heart disease risk factor trends: The Minnesota heart survey. Circulation, 88, 2172-2179.
- Lundberg, O. (1991). Causal explanations for class inequality in health - an empirical analysis. Social Science and Medicine, 32, 385-393.
- MacIntyre, S. (1986). The patterning of health by social position in contemporary Britain: Directions for sociological research. Social Science and Medicine, 23, 393-415.
- MacIntyre, S., Hunt, K., & Sweeting, H. (1996). Gender differences in health: Are things really as simple as they seem? Social Science and Medicine, 42, 617-624.
- Macran, S., Clarke, L., & Joshi, H. (1996). Women's health: Dimensions and differentials. Social Science and Medicine, 42, 1203-1216.
- Macran, S., Clarke, L., Sloggett, A., & Bethune, A. (1994). Women's socio-economic status and self-assessed health: Identifying some disadvantaged groups. Sociology of Health and Illness, 16, 182-208.
- Marmot, M.G. (1986). Social inequalities in mortality: The social environment. In R.G. Wilkinson (Ed.), Class and health: Research and longitudinal data (pp. 21-33). London: Tavistock.
- Marmot, M.G., Kogevinas, M., & Elston, M.A. (1987). Social/economic status and disease. Annual Review of Public Health, 8, 111-135.

- Marmot, M.G., Shipley, M.J., & Rose, G. (1984). Inequalities in death - specific explanations of a general pattern? Lancet, 1, 1003-1006.
- Marmot, M.G., Smith, G.D., Stansfeld, S., Patel, C., North, F., Head, J., White, I., Brunner, E., & Feeney, A. (1991). Health inequalities among British civil servants: The Whitehall II study. The Lancet, 337, 1387-1393.
- Martikainen, P. (1995). Socioeconomic mortality differentials in men and women according to own and spouse's characteristics in Finland. Sociology of Health and Illness, 17, 353-375.
- Matthews, K.A., Shumaker, S.A., Bowen, D.J., Langer, R.D., Hunt, J.R., Kaplan, R.M., Klesges, R.C., & Ritenbaugh, C. (1997). Women's health initiative. American Psychologist, 52, 101-116.
- Matthias, S. (1994). Health promotion in the Yukon Territory. In A. Pederson, M. O'Neill, & I. Rootman (Eds.), Health promotion in Canada: Provincial, national and international perspectives (pp. 206-225). Toronto: W.B. Saunders Canada.
- McDonough, P., Duncan, G.J., Williams, D., & House, J. (1997). Income dynamics and adult mortality in the United States, 1972 through 1989. American Journal of Public Health, 87, 1476-1479.
- McDowell, J., & Praught, E. (1982). On the measurement of happiness: An examination of the Bradburn Scale in the Canada Health Survey. American Journal of Epidemiology, 116, 949-958.
- McLanahan, S., Sorensen, A., & Watson, D. (1989). Sex differences in poverty: 1950-1990. SIGNS: Journal of Women and Culture in Society, 15, 102-122.
- Mechanic, D. (1978). Sex, illness, illness behaviour and the use of health services. Social Science and Medicine, 12B, 207-214.
- Millar, W.J. (1983). Sex differentials in mortality by income level in urban Canada. Canadian Journal of Public Health, 74, 329-334.
- Millar, W.J., & Wigle, D.T. (1986). Socioeconomic disparities in risk factors for cardiovascular disease. Canadian Medical Association Journal, 134, 127-132.
- Mitchell, R.E., & Trickett, E.J. (1980). Task Force report: Social networks as mediators of social support. Community Mental Health Journal, 16, 27-44.

- Moore, G. (1990). Structural determinants of men's and women's personal networks. American Sociological Review, 55, 726-735.
- Mor-Barak, M.E., Miller, L.S., & Syme, L.S. (1991). Social networks, life events, and health of the poor, frail elderly: A longitudinal study of the buffering versus the direct effect. Family and Community Health, 14, 1-13.
- Munro, B.H., & Page, E.B. (1993). Statistical methods for health care research (2nd ed.). Philadelphia: J.B. Lippincott.
- Mustard, C.A., Derksen, S., Berthelot, J.M., Wolfson, M., & Roos, L.L. (1997). Age-specific education and income gradients in morbidity and mortality in a Canadian province. Social Science and Medicine, 45, 383-397.
- Nathanson, C.A. (1980). Social roles and health status among women: The significance of employment. Social Science and Medicine, 14A, 463-471.
- National Forum on Health. (1997). Volume I Canada health action: Building on the legacy. Final report of the National Forum on Health. Ottawa: Author.
- Newacheck, P.W., Butler, L.H., Harper, A.K., Piontkowski, D.L., & Franks, P.E. (1980). Income and illness. Medical Care, 18, 1165-1176.
- Newcomb, M.D. (1990). What structural equation modeling can tell us about social support. In B.R. Sarason, I.G. Sarason, & G.R. Pierce (Eds.), Social support: An interactional view (pp.26-63). New York: John Wiley & Sons.
- Norusis, M.J. (1993). SPSS for Windows: Base system user's guide, Release 6.0. Chicago: SPSS.
- Oakley, A. (1992). Social support and motherhood. Oxford: Blackwell.
- Oakley, A., & Rajan, L. (1991). Social class and social support: The same or different? Sociology, 25, 31-59.
- O'Leary, A., & Helgeson, V.S. (1997). Psychosocial factors and women's health: Integrating mind, heart and body. In S.J. Gallant, G.P. Keita, & R. Royak-Schaler (Eds.), Health care and women: Psychological, social, and behavioral influences (pp. 25-40). Washington, DC: American Psychological Association.
- Olsen, O., Iversen, L., & Sabroe, S. (1991). Age and the operationalization of

- social support. Social Science and Medicine, 32, 767-771.
- O'Reilly, P. (1988). Methodological issues in social support and social network research. Social Science and Medicine, 26, 863-873.
- Osborn, R.W. (1973). Social rank and self-health evaluation of older urban males. Social Science and Medicine, 7, 209-218.
- Pappas, G., Queen, S., Hadden, W., & Fisher, G. (1993). The increasing disparity in mortality between socioeconomic groups in the United States, 1960 and 1986. The New England Journal of Medicine, 329, 103-109.
- Passannante, M.R.C., & Nathanson, C.A. (1987). Women in the labor force: Are sex mortality differentials changing? Journal of Occupational Medicine, 29, 21-28.
- Pedhazur, E. (1982). Multiple regression in behavioral research. Fort Worth, TX: Rinehard & Winston.
- Petchers, M.K., & Milligan, S.E. (1987). Social networks and social support among black urban elderly: A health care resource. Social Work in Health Care, 12, 103-117.
- Pilisuk, M., & Minkler, M. (1985). Supportive ties: A political economy perspective. Health Education Quarterly, 12, 93-106.
- Pilisuk, M., Montgomery, M.B., Parks, S.H., & Acredolo, C. (1993). Locus of control, life stress and social networks: Gender differences in the health status of the elderly. Sex Roles, 28, 147-166.
- Popay, J., Bartley, M., & Owen, C. (1993). Gender inequalities in health: Social position, affective disorders and minor physical morbidity. Social Science and Medicine, 36, 21-32.
- Procidano, M.E., & Smith, W.W. (1997). Assessing perceived social support: The importance of context. In G.R. Pierce & B. Lakey (Eds.), Sourcebook of social support and personality (pp. 93-106). New York: Plenum Press.
- Pugh, H., & Moser, K. (1990). Measuring women's mortality differences. In H. Roberts (Ed.), Women's health counts (pp. 93-112). London: Routledge.
- Rael, E.G.S., Stansfeld, S.A., Shipley, M., Head, J., Feeney, A., & Marmot, M. (1995). Sickness absence in the Whitehall II Study, London: The role of social support and material problems. Journal of Epidemiology and Community Health, 49, 474-481.

- Rahman, O., Strauss, J., Gertler, P., Ashley, D., & Fox, K. (1994). Gender differences in adult health: An international comparison. The Gerontologist, 34, 463-469.
- Ratner, P.A. (1995). Societal responses as moderators of the health consequences of wife abuse. Unpublished doctoral dissertation. University of Alberta, Edmonton.
- Ratner, P.A., Bottorff, J.L., & Johnson, J.L. (1998). Structural equation modeling. In P.J. Brink & M.J. Wood (Eds.), Advanced design in nursing research (2nd ed., pp. 178-209). Thousand Oaks, CA: Sage.
- Ratner, P.A., Bottorff, J.L., Johnson, J.L., & Hayduk, L.A. (1996). Using multiple indicators to test the dimensionality of concepts in the Health Promotion Model. Research in Nursing and Health, 19, 237-247.
- Ratner, P.A., Johnson, J.L., & Jeffery, B. (1998). Examining emotional, physical, social and spiritual health as determinants of self-rated health status. American Journal of Health Promotion, 12, 275-282.
- Richman, J.M., Rosenfeld, L.B., & Hardy, C.J. (1993). The social support survey: A validation of a clinical measure of the social support process. Research on Social Work Practice, 3, 288-311.
- Riffle, K.L., Yoho, J., & Sams, J. (1989). Health-promoting behaviors, perceived social support, and self-reported health of Appalachian elderly. Public Health Nursing, 6, 204-211.
- Riley, D., & Eckenrode, J. (1986). Social ties: Subgroup differences in costs and benefits. Journal of Personality and Social Psychology, 51, 770-778.
- Robert, S.A. (1998). Community-level socioeconomic status effects on adult health. Journal of Health and Social Behavior, 39, 18-37.
- Robert, S.A., & House, J.S. (1996). SES differentials in health by age and alternative indicators of SES. Journal of Aging and Health, 8, 359-388.
- Roberge, R., Berthelot, J.M., & Wolfson, M. (1995). The health utility index: measuring health differences in Ontario by socioeconomic status. Health Reports, 7, 25-32.
- Rook, K.S. (1982). Detrimental aspects of social relationships: Taking stock of emerging literature. In H. Veiel & U. Baumann (Eds.), The meaning and measurement of social support (pp. 157-169). New York: Hemisphere.

- Rook, K.S. (1984). The negative side of social interaction: Impact on psychological well-being. Journal of Personality and Social Psychology, 46, 1097-1108.
- Rook, K.S., & Dooley, D. (1985). Applying social support research: Theoretical problems and future directions. Journal of Social Issues, 41, 5-28.
- Ross, C.E., & Bird, C.E. (1994). Sex stratification and health lifestyle: Consequences for men's and women's perceived health. Journal of Health and Social Behaviour, 35, 161-178.
- Ruiz, M.T., & Verbrugge, L.M. (1997). A two way view of gender bias in medicine. Journal of Epidemiology and Community Health, 51, 106-109.
- Safran, D.G., Rogers, W.H., Tarlov, A.R., McHorney, C.A., & Ware, J.E. (1997). Gender differences in medical treatment: The case of physician-prescribed activity restrictions. Social Science and Medicine, 45, 711-722.
- Sarason, B.R., Pierce, G.R., & Sarason, I.G. (1990). Social support: The sense of acceptance and the role of relationships. In B.R. Sarason, I.G. Sarason, & G.R. Pierce (Eds.), Social support: An interactional view (pp. 97-128). New York: John Wiley & Sons.
- Sarason, B.R., Sarason, I.G., & Pierce, G.R. (1990). Traditional views of social support and their impact on assessment. In B.R. Sarason, I.G. Sarason, & G.R. Pierce (Eds.), Social support: An interactional view (pp. 9-25). New York: John Wiley & Sons.
- Savitz, D.A., & Olshan, A.F. (1995). Multiple comparisons and related issues in the interpretation of epidemiologic data. American Journal of Epidemiology, 142, 904-908.
- Savitz, D.A., & Olshan, A.F. (1998). Describing data requires no adjustment for multiple comparisons: A reply from Savitz and Olshan. American Journal of Epidemiology, 147, 813-814.
- Schaefer, C., Coyne, J.C., & Lazarus, R.S. (1981). The health-related functions of social support. Journal of Behavioral Medicine, 4, 381- 406.
- Schoenbach, V.J., Kaplan, B.H., Fredman, L., & Kleinbaum, D.G. (1986). Social ties and mortality in Evans County, Georgia. American Journal of Epidemiology, 123, 577-591.

- Schwarzer, R., & Leppin, A. (1992). Possible impact of social ties and support on morbidity and mortality. In H.O.F. Veiel & U. Baumann (Eds.), The meaning and measurement of social support (pp. 65-84). New York: Hemisphere.
- Seeman, T.E., & Berkman, L.F. (1988). Structural characteristics of social networks and their relationship with social support in the elderly: Who provides support. Social Science and Medicine, 26, 737-749.
- Segovia, J., Bartlett, R.F., & Edwards, A.C. (1989). An empirical analysis of the dimension of health status measures. Social Science and Medicine, 29, 761-768.
- Sheppard, M. (1993). The external context for social support: Towards a theoretical formulation of social support, child care and maternal depression. Social Work and Social Sciences Review, 4, 27-58.
- Shinn, M., Lehmann, S., & Wong, N.W. (1984). Social interaction and social support. Journal of Social Issues, 40, 55-76.
- Shumaker, S.A., & Brown, A. (1984). Toward a theory of social support: Closing conceptual gaps. Journal of Social Issues, 40, 11-36.
- Shumaker, S.A., & Hill, D.R. (1991). Gender differences in social support and physical health. Health Psychology, 10, 102-111.
- Shye, D., Mullooly, J.P., Freeborn, D.K., & Pope, C.R. (1995). Gender differences in the relationship between social network support and mortality: A longitudinal study of an elderly cohort. Social Science and Medicine, 41, 935-947.
- Slater, C.H., Lorimor, R.J., & Lairson, D.R. (1985). The independent contributions of socioeconomic status and health practices to health status. Preventive Medicine, 14, 372-378.
- Sorlie, P.D., Backlund, E., & Keller, J.B. (1995). U.S. mortality by economic, demographic, and social characteristics: The National Longitudinal Mortality Study. American Journal of Public Health, 85, 949-956.
- Specht, H. (1986). Social support, social networks, social exchange and social work practice. Social Service Review, 60, 218-240.
- SPSS Inc. (1993). SPSS LISREL 7 and PRELIS. Chicago: Author.

- Statistics Canada. (1992, November). Profile of census division and subdivisions in the Yukon - Part A. (Catalogue No. 95-395). Ottawa: Author.
- Statistics Canada. (1994, March). Health status of Canadians: Report of the 1991 General Social Survey (Catalogue no. 11-612E, No. 80). Ottawa: Minister of Industry, Housing, Family and Social Statistics Division.
- Statistics Canada. (1995a). National Population Health Survey overview, 1994-95 (Catalogue no. 82-567). Ottawa: Minister of Industry, Health Statistics Division.
- Statistics Canada. (1995b). Women in Canada: A statistical report (Catalogue no. 89-503E, 3rd ed.). Ottawa: Minister of Industry, Housing, Family and Social Statistics Division.
- Statistics Canada. (1997, January 16). Births and deaths, 1995. The Daily. pp. 1-4.
- Statistics Canada. (1998, April 14). 1996 Census: Education, mobility and migration. The Daily. pp. 1-15.
- Stephens, T., & Graham, D.F. (Eds.). (1993). Canada's Health Promotion Survey 1990: Technical report (Catalogue no. H39-263/2-1990E). Ottawa: Minister of Supply and Services Canada, Health and Welfare Canada.
- Stevens, J.S. (1992). Applied multivariate statistics for the social sciences (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum.
- Stronks, K., Van den Mheen, H., Van den Bos, J., & Mackenbach, J.P. (1995). Smaller socioeconomic inequalities in health among women: The role of employment status. International Journal of Epidemiology, 24, 559-568.
- Syme, S.L. (1994). The social environment and health. Daedalus, 123, 79-86.
- Tardy, C.H. (1985). Social support measurement. American Journal of Community Psychology, 13, 187-202.
- Thoits, P. (1982). Conceptual, methodological and theoretical problems in studying social support as a buffer against life stress. Journal of Health and Social Behaviour, 23, 145-159.
- Thoits, P. A. (1992). Social support functions and network structures: A

- supplemental view. In H.O.F. Veiel & U. Baumann (Eds.), The meaning and measurement of social support (pp. 57-64). New York: Hemisphere.
- Thompson, J.R. (1998). Invited commentary: Re: Multiple comparisons and related issues in the interpretation of epidemiologic data. American Journal of Epidemiology, 147, 801-806.
- Thompson, M.G., & Heller, K. (1990). Facets of support related to well-being: Quantitative social isolation and perceived family support in a sample of elderly women. Psychology and Aging, 5, 535-544.
- Townsend, P., & Davidson, N. (Eds.). (1982). Inequalities in health: The Black report. London: Penguin Books.
- Turner, H.A. (1994). Gender and social support: Taking the bad with the good? Sex Roles, 30, 521-541.
- Turner, R.J., & Marino, F. (1994). Social support and social structure: A descriptive epidemiology. Journal of Health and Social Behavior, 35, 193-212.
- Turner, R.J., & Noh, S. (1983). Class and psychological vulnerability among women: The significance of social support and personal control. Journal of Health and Social Behavior, 24, 2-15.
- Ugnat, A.M., & Mark, E. (1987). Life expectancy by sex, age and income level. Chronic Diseases in Canada, 8, 12-13.
- Umberson, D. (1987). Family status and health behaviors: Social control as a dimension of social integration. Journal of Health and Social Behavior, 28, 306-319.
- Umberson, D. (1992). Gender, marital status and the social control of health behavior. Social Science and Medicine, 34, 907-917.
- Umberson, D., Chen, M.D., House, J.S., Hopkins, K., & Slaten, E. (1996). The effect of social relationships on psychological well-being: Are men and women really so different? American Sociological Review, 61, 837-857.
- Vaux, A. (1985). Variations in social support associated with gender, ethnicity and age. Journal of Social Issues, 41, 89-110.
- Vaux, A. (1988). Social support: Theory, research, and intervention. New York: Praeger.

- Vaux, A. (1991). Let's hang up and try again: Lessons learned from a social support intervention. American Journal of Community Psychology, 19, 85-90.
- Vaux, A. (1992). Assessment of social support. In H.O.F. Veiel & U. Baumann (Eds), The meaning and measurement of social support (pp.193-216). New York: Hemisphere.
- Vaux, A., & Harrison, D. (1985). Support network characteristics associated with support satisfaction and perceived support. American Journal of Community Psychology, 13, 245-268.
- Verbrugge, L.M. (1983). Multiple roles and physical health of women and men. Journal of Health and Social Behavior, 24, 16-30.
- Verbrugge, L.M. (1985). Gender and health: An update on hypotheses and evidence. Journal of Health and Social Behaviour, 26, 156-182.
- Verbrugge, L.M. (1989). The twain meet: Empirical explanations of sex differences in health and mortality. Journal of Health and Social Behaviour, 30, 282-304.
- Verbrugge, L.M., & Madans, J.H. (1985). Social roles and health trends of American women. Health and Society, 63, 691-735.
- Verbrugge, L.M., & Wingard, D.L. (1987). Sex differentials in health and mortality. Women and Health, 12, 103-145.
- Waldron, I. (1983). Sex differences in illness incidence, prognosis and mortality: Issues and evidence. Social Science and Medicine, 17, 1107-1123.
- Waldron, I. (1993). Recent trends in sex mortality ratios for adults in developed countries. Social Science and Medicine, 36, 451-462.
- Waldron, I., Hughes, M.E., & Brooks, T.L. (1996). Marriage protection and marriage selection - prospective evidence for reciprocal effects of marital status and health. Social Science and Medicine, 43, 113-123.
- Waldron, I., & Jacobs, J.A. (1989). Effects of multiple roles on women's health - evidence from a national longitudinal study. Women and Health, 15, 3-19.
- Waldron, I., Weiss, C.C., & Hughes, M.E. (1997). Marital status effects on health: Are there differences between never married women and divorced and

- separated women? Social Science and Medicine, 45, 1387-1397.
- Walters, V., Lenton, R., & McKeary, M. (1995). Women's health in the context of women's lives. A report submitted to the Health Promotion Directorate, Health Canada
- Walters, V., Lenton, R., French, S., Eyles, J., Mayr, J., & Newbold, B. (1996). Paid work, unpaid work and social support: A study of the health of male and female nurses. Social Science and Medicine, 43, 1627-1636.
- Weinberger, M., Hiner, S.L., & Tierney, W.M. (1987). Assessing social support in elderly adults. Social Science and Medicine, 25, 1049-1055.
- Weiss, R. (1974). The provisions of social relationships. In Z. Rubin (Ed.), Doing unto others (pp. 17-26). Englewood Cliff, NJ: Prentice Hall.
- Wellman, B., & Wortley, S. (1990). Different strokes from different folks: Community ties and social support. American Journal of Sociology, 96, 558-588.
- Wethington, E., & Kessler, R.C. (1986). Perceived support, received support, and adjustment of stressful life events. Journal of Health and Social Behavior, 27, 78-89.
- Wigle, D.T., & Mao, Y. (1980). Mortality by income level in urban Canada. Ottawa: Health Protection Branch, Health and Welfare Canada.
- Wilkins, R. (1988). Special study on the socially and economically disadvantaged. Ottawa: Health and Welfare Canada, Health Promotion Studies Unit.
- Wilkins, R., & Adams, O. (1983). Healthfulness of life: A unified view of mortality, institutionalization, and non-institutionalized disability in Canada, 1978. Montreal, Quebec: The Institute for Research on Public Policy.
- Wilkins, R., Adams, O., & Brancker, A. (1989). Changes in mortality by income in urban Canada from 1971 to 1986. Health Reports, 1, 137-174.
- Wilkinson, R.G. (1986a). Income and mortality. In R.G. Wilkinson (Ed.), Class and health: Research and longitudinal data (pp. 88-114). London: Tavistock.
- Wilkinson, R.G. (1986b). Socio-economic differences in mortality: Interpreting the data on their size and trends. In R.G. Wilkinson (Ed.), Class and

- health: Research and longitudinal data (pp. 1-33). London: Tavistock.
- Wilkinson, R.G. (1994). The epidemiological transition: From material scarcity to social disadvantage? Daedalus, 123, 61-78.
- Williams, D.R. (1990). Socioeconomic differentials in health: A review and redirection. Social Psychology Quarterly, 53, 81-99.
- Williams, D.R., & Collins, C. (1995). US socioeconomic and racial differences in health: Patterns and explanations. Annual Review of Sociology, 21, 349-386.
- Wills, T.A. (1985). Supportive functions of interpersonal relationships. In S. Cohen & S.L. Syme (Eds.), Social support and health (pp. 1-82). Orlando, FL: Academic Press.
- Wingard, D.L., Cohn, B.A., Kaplan, G.A., Cirillo, P.M., & Cohen, R.D. (1989). Sex differentials in morbidity and mortality risks examined by age and cause in the same cohort. American Journal of Epidemiology, 130, 601-610.
- Winkleby, M.A., Fortmann, S.P., & Barrett, D.C. (1990). Social class disparities in risk factors for disease: Eight-year prevalence patterns by level of education. Preventive Medicine, 19, 1-12.
- Winkleby, M.A., Jatulis, D.E., Frank, E., & Fortmann, S.P. (1992). Socioeconomic status and health: How education, income, and occupation contribute to risk factors for cardiovascular disease. American Journal of Public Health, 82, 816-820.
- Wolinsky, F.D., & Johnson, R.J. (1992). Perceived health status and mortality among older men and women. Journal of Gerontology: Social Sciences, 47, S304-S312.
- Wortman, C.B., & Dunkel-Schetter, C. (1987). Conceptual and methodological issues in the study of social support. In A. Baum & J.E. Singer (Eds.), Handbook of Psychology and Health (pp. 63-108, Vol. 5). Hillsdale, New Jersey: Lawrence Erlbaum Associates.
- Wyke, S., & Ford, B. (1992). Competing explanations for associations between marital status and health. Social Science and Medicine, 34, 523-532.

## **APPENDICES**

### **Appendix A: Population weighting and sample**

## Population Weighting and Sample<sup>67</sup>

### Yukon

Population >14 years 20,177		Average weighting	Sample (weighted) (%)
Sex	Male	14.7	52
	Female	13.0	48
Age	15-24	20.6	19
	25-44	12.9	54
	45-64	12.1	22
	64+	16.6	6

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<sup>67</sup> Government of Yukon. (1994). An accounting of health: What the numbers say. A review of the methodology and the results of the 1993 Yukon Health Promotion Survey. Executive Council Office. Bureau of Statistics.

**Appendix B: Approval letter for use of Yukon Health Promotion Survey  
data set**

## **Appendix C: Yukon Health Promotion Survey questionnaire**



YUKON HEALTH

PROMOTION

RESEARCH

PROGRAM

PART 4

## HEALTH PROMOTION SURVEY

A SURVEY OF WHAT YUKONERS SAY ABOUT THE CONCEPT OF HEALTH

ASK  
WHAT THE SURVEY WILL

PART

4

## A. INTRODUCTION

The next few questions are about your current health.

A.1 Overall, how would you describe the quality of your life?

- ☐ excellent    ☐ very good    ☐ good    ☐ fair    ☐ poor

A.2 In general, compared to other people your age, would you say your health is ...

- ☐ excellent    ☐ very good    ☐ good    ☐ fair    ☐ poor

A.3 How important are the following for your overall health and well-being?

- |                                |                               |                                   |   |
|--------------------------------|-------------------------------|-----------------------------------|---|
| a) mental and emotional health | <input type="checkbox"/> very | <input type="checkbox"/> somewhat | <input type="checkbox"/> not at all important |
| b) physical health             | <input type="checkbox"/> very | <input type="checkbox"/> somewhat | <input type="checkbox"/> not at all important |
| c) social relationships        | <input type="checkbox"/> very | <input type="checkbox"/> somewhat | <input type="checkbox"/> not at all important |
| d) spirituality                | <input type="checkbox"/> very | <input type="checkbox"/> somewhat | <input type="checkbox"/> not at all important |

A.4 Would you describe your ...

- |                                   |                                    |                                    |                               |                               |                               |
|-----------------------------------|------------------------------------|------------------------------------|-------------------------------|-------------------------------|-------------------------------|
| a) mental and emotional health as | <input type="checkbox"/> excellent | <input type="checkbox"/> very good | <input type="checkbox"/> good | <input type="checkbox"/> fair | <input type="checkbox"/> poor |
| b) physical health as             | <input type="checkbox"/> excellent | <input type="checkbox"/> very good | <input type="checkbox"/> good | <input type="checkbox"/> fair | <input type="checkbox"/> poor |
| c) social relationships as        | <input type="checkbox"/> excellent | <input type="checkbox"/> very good | <input type="checkbox"/> good | <input type="checkbox"/> fair | <input type="checkbox"/> poor |
| d) spirituality as                | <input type="checkbox"/> excellent | <input type="checkbox"/> very good | <input type="checkbox"/> good | <input type="checkbox"/> fair | <input type="checkbox"/> poor |

## PHYSICAL HEALTH

The next few questions are about physical measurements.

A.5 How tall are you without shoes?

feet/inches \_\_\_\_\_ or centimeters \_\_\_\_\_

A.6 How much do you weigh?

pounds \_\_\_\_\_ or kilograms \_\_\_\_\_

A.7 At what weight do you feel your best?

pounds \_\_\_\_\_ or kilograms \_\_\_\_\_ ☐ Same as A.6 ☐ Don't know

The next few questions are about exercise. By exercise we mean vigorous activities such as aerobics, jogging, racquet sports, team sports, swimming or brisk walking.

A.8 How many times per week, on average, do you exercise? (Do not read)

- ☐ Daily    ☐ 5-6 times a week    ☐ 3-4 times a week    ☐ 1-2 times a week    ☐ Less than once a week
- ☐ Never    ☐ Don't know

A.9 How many times per week, on average, do you participate in a more leisurely form of exercise such as walking, golfing, stretching or gardening? (Do not read)

- ☐ Daily    ☐ 5-6 times a week    ☐ 3-4 times a week    ☐ 1-2 times a week    ☐ Less than once a week
- ☐ Never    ☐ Don't know

A.10 Do you feel that you get as much physical activity as you need...

- generally? \_\_\_\_\_ ☐ Yes    ☐ No    ☐ Don't know
- in the winter? \_\_\_\_\_ ☐ Yes    ☐ No    ☐ Don't know
- how about the summer? \_\_\_\_\_ ☐ Yes    ☐ No    ☐ Don't know

**A.11 Is there anything preventing you from being MORE physically active?**

☐ Yes

☐ No

☐ Don't know

What?

☐ time

☐ money

☐ motivation

☐ ability

☐ interest

☐ back problems

☐ problem with your joints

☐ other (specify) \_\_\_\_\_

**A.12 Do you feel that you get as much sleep as you need...**

• generally? \_\_\_\_\_ ☐ Yes ☐ No ☐ Don't know

• in the winter? \_\_\_\_\_ ☐ Yes ☐ No ☐ Don't know

• how about the summer? \_\_\_\_\_ ☐ Yes ☐ No ☐ Don't know

The next few questions are about your medical history.

**A.13 In the past, have you ...**

(a) had heart problems? \_\_\_\_\_ ☐ Yes ☐ No ☐ Don't know

(b) been diagnosed with any type of cancer? \_\_\_\_\_ ☐ Yes ☐ No ☐ Don't know

Was this skin cancer?

☐ Yes ☐ No ☐ Don't know

**A.14 Are you presently diagnosed as having (or have you been told by a health care professional that you have) ...**

a) high blood pressure (for women add: except when you were pregnant?)

☐ Yes ☐ No ☐ Don't know

Are you doing anything to control your blood pressure? ☐ Yes ☐ No ☐ Don't know

b) high blood cholesterol?

☐ Yes ☐ No ☐ Don't know

Are you doing anything to control your cholesterol?

☐ Yes ☐ No

What are you doing? (MARK ALL THAT APPLY, DO NOT READ)

☐ losing weight or maintaining weight loss

☐ reducing cholesterol in diet

☐ eating less fatty foods

☐ other change in diet

☐ exercising regularly

☐ controlling stress and fatigue

☐ taking prescribed medication

☐ other (specify) \_\_\_\_\_

c) heart problems? \_\_\_\_\_ ☐ Yes ☐ No ☐ Don't know

d) diabetes? \_\_\_\_\_ ☐ Yes ☐ No ☐ Don't know

e) cancer? \_\_\_\_\_ ☐ Yes ☐ No ☐ Don't know

f) arthritis? \_\_\_\_\_ ☐ Yes ☐ No ☐ Don't know

g) asthma? \_\_\_\_\_ ☐ Yes ☐ No ☐ Don't know

h) other (please specify) \_\_\_\_\_

**A.15 During the past year ...**

a) have you ever had pain or aching in your joints

(either at rest or moving) for at least one month? \_\_\_\_\_ ☐ Yes ☐ No ☐ Don't know

b) have you ever had pain or aching in your neck or

back (either at rest or moving) for at least one month? \_\_\_\_\_ ☐ Yes ☐ No ☐ Don't know

c) have you ever had pain or aching in your hip joint

(either at rest or moving) for at least one month? \_\_\_\_\_ ☐ Yes ☐ No ☐ Don't know

- d) have you ever had swelling of a joint with pain present in the joint lasting for at least one month? ☐ Yes ☐ No ☐ Don't know
- e) have you ever had stiffness in the joints or muscles when getting out of bed in the morning lasting for at least 15 minutes? ☐ Yes ☐ No ☐ Don't know

**A.16 IN THE PAST 12 MONTHS, have you been injured?**

☐ Yes ☐ No - **go to B.1**

How many times in the past 12 months have you been injured?

injuries

**A.17 On the most recent occasion, did you require...**

- a) admission to hospital? ☐ Yes ☐ No
- b) treatment by a health professional? ☐ Yes ☐ No
- c) treatment by family, friend or self? ☐ Yes ☐ No
- d) no treatment was required. ☐ Yes ☐ No

**A.17.1 Was the principal cause of this injury...**

☐ accidental? - **go to A.17.2**

☐ intentional? - **go to A.17.3**

**A.17.2 (Accidental Injury)**

Did this injury occur ...

- ☐ while you were in a motor vehicle?
- ☐ while walking?
- ☐ while riding a bicycle/motorcycle/ATV? (specify) \_\_\_\_\_
- ☐ while engaging in a sporting activity? (specify) \_\_\_\_\_
- ☐ around the home?
- ☐ on the job?
- ☐ while engaged in another activity? (specify) \_\_\_\_\_

**go to A.17.4**

**A.17.3 (Intentional Injury)**

What or who caused this injury? (Do not read)

- ☐ your spouse or partner?
- ☐ a family member?
- ☐ a friend?
- ☐ an acquaintance?
- ☐ a stranger?
- ☐ other? \_\_\_\_\_

**A.17.4 Were alcohol and/or drugs involved?**

☐ Yes ☐ No ☐ Don't know

## B. HEALTH AND SOCIAL SERVICE UTILIZATION

The next few questions are about giving or receiving care from others.

### B.1 In the past 30 days, have you helped care for ...

- a) a relative who was suffering from a physical or mental health problem? ☐ Yes ☐ No ☐ Don't know  
b) a friend who was suffering from a physical or mental health problem? ☐ Yes ☐ No ☐ Don't know  
c) a household member who was suffering from a physical or mental health problem? ☐ Yes ☐ No ☐ Don't know

### B.2 In the past 30 days, have you experienced a physical or mental health problem for which you received some care from ...

- a) a relative? ☐ Yes ☐ No ☐ Don't know  
b) a friend? ☐ Yes ☐ No ☐ Don't know  
c) a household member? ☐ Yes ☐ No ☐ Don't know

### B.3 In the past 12 months have you visited any of the following ...

- a) doctor ☐ Yes ☐ No ☐ Don't know  
b) nurse ☐ Yes ☐ No ☐ Don't know  
c) community health representative ☐ Yes ☐ No ☐ Don't know  
d) mental health professional/family counsellor ☐ Yes ☐ No ☐ Don't know  
e) physiotherapist ☐ Yes ☐ No ☐ Don't know  
f) chiropractor ☐ Yes ☐ No ☐ Don't know  
g) massage therapist ☐ Yes ☐ No ☐ Don't know  
h) traditional healer ☐ Yes ☐ No ☐ Don't know  
i) acupuncturist ☐ Yes ☐ No ☐ Don't know  
j) any other practitioner (please specify) \_\_\_\_\_

k) Yes to more than one, which did you visit most often?

### B.4 Do you have a family doctor?

- ☐ Yes ☐ No ☐ Don't know

### B.5 Do you believe you have enough choice in health services in the Yukon?

- ☐ Yes ☐ No ☐ Don't know

Why not?

### B.6 In the past 12 months have you had any of the following medical tests?

- a) cholesterol testing ☐ Yes ☐ No ☐ Don't know  
b) sexually transmitted disease testing ☐ Yes ☐ No ☐ Don't know  
c) blood sugar level ☐ Yes ☐ No ☐ Don't know  
d) other blood tests ☐ Yes ☐ No ☐ Don't know

\*female respondents only

- e) pap smear ☐ Yes ☐ No ☐ Don't know  
f) mammogram ☐ Yes ☐ No ☐ Don't know

When was the last time?

- ☐ within the last 2 years  
☐ 2-5 years ago  
☐ never

When was the last time?

- ☐ within the last 2 years  
☐ 2-5 years ago  
☐ never

**female only**

B.7 In the past 12 months have you been advised by a physician to have a mammogram?

☐ Yes ☐ No

**female**

**male**

B.8 Do you regularly perform self-examination for [breast] or [testicular] cancer?

☐ Yes ☐ No ☐ Don't know

## C. PHYSICAL ENVIRONMENT

The next few questions are about your physical environment.

C.1 How long have you lived in the Yukon?    months

C.2 Do you think that you will be living in the Yukon five years from now?

☐ Yes ☐ No ☐ Don't know

go to C.3

Do you think you'll still be living in the same neighbourhood?

☐ Yes ☐ No ☐ Don't know

C.3 Living in the Yukon, do you feel....

- |   |                              |                             |                                     |
|---|------------------------------|-----------------------------|-------------------------------------|
| a) a sense of community? _____                                  | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know |
| b) safe walking alone in the evening? _____                     | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know |
| c) isolated and alone? _____                                    | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know |
| d) the need periodically to visit larger towns or cities? _____ | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know |

C.4 Does your home have...

- |  |                              |                             |                                     |
|--|------------------------------|-----------------------------|-------------------------------------|
| a) running water? _____                        | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know |
| b) sewage or septic? _____                     | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know |
| c) electricity? _____                          | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know |
| d) laundry facilities? _____                   | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know |
| e) telephone? (personal interviews only) _____ | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know |

C.5 a) What is the approximate square footage of the living space in your home?

square feet ☐ Don't know

b) Number of bedrooms?  bedrooms

c) Do you think you have enough space in your home? ☐ Yes ☐ No ☐ Don't know

C.6 Do you, or others in your household...

- |  |                              |                             |                                     |   |
|--|------------------------------|-----------------------------|-------------------------------------|---|
| a) recycle papers, bottles, cans? _____                            | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know | <input type="checkbox"/> Not applicable |
| b) compost fruit and vegetable waste? _____                        | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know | <input type="checkbox"/> Not applicable |
| c) set the water heater thermostat at 50°C or less _____           | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know | <input type="checkbox"/> Not applicable |
| d) buy products made of recycled materials? _____                  | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know | <input type="checkbox"/> Not applicable |
| e) usually pick up litter? _____                                   | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know | <input type="checkbox"/> Not applicable |
| f) regularly use sun screen or sun protection in the summer? _____ | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know | <input type="checkbox"/> Not applicable |
| g) boil river, lake or creek water before drinking? _____          | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know | <input type="checkbox"/> Not applicable |

- C.7 During the past 12 months, do you think that environmental pollution (indoor/outdoor) has affected your health?

☐ Yes ☐ No ☐ Don't know

What kind of pollution and how has it affected your health? (open ended)

## D. MENTAL AND EMOTIONAL

The following questions are about your health and well-being.

- D.1 Would you describe your life as...

☐ Very stressful? ☐ Somewhat stressful?

☐ Not very stressful?

☐ Not at all stressful?

If very or somewhat stressful...

go to D.2

Which of the following best describes the source of your stress? (check all that apply)

- a) spouse or partner (if applicable) ☐ Yes ☐ No ☐ Don't know  
b) family ☐ Yes ☐ No ☐ Don't know  
c) friends ☐ Yes ☐ No ☐ Don't know  
d) community ☐ Yes ☐ No ☐ Don't know  
e) work ☐ Yes ☐ No ☐ Don't know  
f) school ☐ Yes ☐ No ☐ Don't know  
g) other (please specify) \_\_\_\_\_

- D.2 Here is a list that describes some of the ways people feel at different times. During the past few weeks, how often have you felt ...

- a) on top of the world? ☐ Often ☐ Sometimes ☐ Never  
b) very lonely or remote from other people? ☐ Often ☐ Sometimes ☐ Never  
c) particularly excited or interested in something? ☐ Often ☐ Sometimes ☐ Never  
d) depressed or very unhappy? ☐ Often ☐ Sometimes ☐ Never  
e) pleased about accomplishing something? ☐ Often ☐ Sometimes ☐ Never  
f) bored? ☐ Often ☐ Sometimes ☐ Never  
g) proud because someone complimented you on something you had done? ☐ Often ☐ Sometimes ☐ Never  
h) so restless you couldn't sit long in a chair? ☐ Often ☐ Sometimes ☐ Never  
i) that things were going your way? ☐ Often ☐ Sometimes ☐ Never  
j) upset because someone criticized you? ☐ Often ☐ Sometimes ☐ Never

## E. SOCIAL HEALTH

- E.1 For each of the following statements, please state if you agree, disagree, or have no opinion.

- a) I am responsible for the state of my health ☐ Agree ☐ Disagree ☐ No opinion  
b) I'm fine the way I am ☐ Agree ☐ Disagree ☐ No opinion  
c) My appearance is very important to me ☐ Agree ☐ Disagree ☐ No opinion  
d) In order to care for others, I have to look after myself first ☐ Agree ☐ Disagree ☐ No opinion  
e) I worry about what other people think of me ☐ Agree ☐ Disagree ☐ No opinion  
f) My relationships with other people are important to my health and well-being ☐ Agree ☐ Disagree ☐ No opinion  
g) I have difficulty seeing things from someone else's point of view ☐ Agree ☐ Disagree ☐ No opinion  
h) I have at least one person I can confide in ☐ Agree ☐ Disagree ☐ No opinion  
i) My spouse or partner is supportive (if applicable) ☐ Agree ☐ Disagree ☐ No opinion  
j) My family is not supportive ☐ Agree ☐ Disagree ☐ No opinion  
k) I prefer to work alone rather than with other people ☐ Agree ☐ Disagree ☐ No opinion  
l) I am involved regularly in community activities ☐ Agree ☐ Disagree ☐ No opinion

## F. SPIRITUAL

F.1 Do you consider yourself to be....

- ☐ very spiritual or religious
- ☐ moderately spiritual or religious
- ☐ not very, or
- ☐ not at all spiritual or religious?
- ☐ don't know

F.2 Do spiritual values and/or your faith play an important role in your life?

- ☐ Yes
- ☐ No
- ☐ Don't know

F.3 Are you an active member of an organized religion?

- ☐ Yes
- ☐ No

## G. SOCIO-CULTURAL

G.1 Do you consider yourself to be a First nations person (Indian, Metis, Inuit)?

- ☐ Yes
- ☐ No
- ☐ No answer

- a) Is your culture important to your health? ☐ Yes ☐ No
- b) Is eating traditional foods important to you? ☐ Yes ☐ No

G.2 Compared to other communities in the Yukon, how would you rate the overall health of your community?

- ☐ excellent
- ☐ very good
- ☐ good
- ☐ fair
- ☐ poor
- ☐ no opinion

In your opinion, what is the most important health issue in your community?

---

---

G.3 Compared to other families in your community, how would you rate the overall health of your family?

- ☐ excellent
- ☐ very good
- ☐ good
- ☐ fair
- ☐ poor
- ☐ no opinion

In your opinion, what is the most important health issue to your family?

---

---

G.4 For each of the following statements, please state if you "agree" or "disagree".

- a) I don't make time for myself ☐ Agree ☐ Disagree ☐ No opinion
- b) I have felt discriminated against ☐ Agree ☐ Disagree ☐ No opinion
- c) Someone I know in the Yukon is living in a violent or abusive family situation ☐ Agree ☐ Disagree ☐ No opinion
- d) I have recently been pushed, hit or assaulted ☐ Agree ☐ Disagree ☐ No opinion  
Was it by someone who had been drinking?  
☐ Yes ☐ No
- e) It is difficult for me to afford the basic necessities of food, clothing and shelter ☐ Agree ☐ Disagree ☐ No opinion

The next few questions are about your employment status during the past 12 months.

G.5 Which of the following best describes your principal activity during the past 12 months? Were you ...

<input type="checkbox"/> Employed? <input type="checkbox"/> Unemployed? <input type="checkbox"/> looking for work? <input type="checkbox"/> a student? <input type="checkbox"/> retired? <input type="checkbox"/> working at a traditional or subsistence activity such as hunting or trapping? <input type="checkbox"/> maintaining a household? <input type="checkbox"/> other: (please specify)     	<p>Were you mainly...</p> <input type="checkbox"/> working at a job or business? were you seasonally employed? <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> Don't know <input type="checkbox"/> self-employed? were you seasonally employed? <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> Don't know <p>Are you CURRENTLY employed?</p> <input type="checkbox"/> yes <input type="checkbox"/> no    go to G.8  (a) In what kind of business, industry or service? _____ _____ _____ (b) What kind of work do you do? _____ _____ _____
---	---

go to G.8

G.6 Did you have a job or business at any time during the past 12 months?

☐ Yes   ☐ No  
     When did you last work? 19   go to H.1

G.7 Are you CURRENTLY employed?

☐ Yes   ☐ No - go to G.8  
     (a) What kind of business, industry or service is it? \_\_\_\_\_  
     \_\_\_\_\_  
     (b) What kind of work do you do? \_\_\_\_\_  
     \_\_\_\_\_  
     \_\_\_\_\_

G.8 How many weeks did you work at a job or business during the past 12 months? (Include vacation, illness, strikes, lock-outs and maternity/paternity leave)

weeks

G.9 IN YOUR WORK, have any of the following negatively affected your health and well-being in the past 12 months...

- |   |                              |                             |                                     |   |
|---|------------------------------|-----------------------------|-------------------------------------|---|
| a) Stress and/or demands of the job             | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know | <input type="checkbox"/> Not applicable |
| b) Risk of injury or accident in the work place | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know | <input type="checkbox"/> Not applicable |
| c) Job security                                 | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know | <input type="checkbox"/> Not applicable |
| d) Hours and/or schedules of your work          | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know | <input type="checkbox"/> Not applicable |
| e) Problems balancing home and work life        | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know | <input type="checkbox"/> Not applicable |
| f) Shift work                                   | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know | <input type="checkbox"/> Not applicable |
| g) Child care                                   | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know | <input type="checkbox"/> Not applicable |
| h) Relations between workers and/or superiors   | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know | <input type="checkbox"/> Not applicable |
| i) Physical work environment                    | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know | <input type="checkbox"/> Not applicable |
| j) Other (please specify):                      | _____                        |                             |                                     |   |

G.10 In your work how much hard physical labour is required? Would you say ...

- ☐ a great deal    ☐ a moderate amount    ☐ a little    ☐ none

G.11 How many paid or unpaid vacation days have you taken in the past 12 months?

☐ Don't know

(if "0") How long has it been since you took your last vacation?   months

G.12 a) In the past year, how many days were you away from work because you were sick, injured or disabled?

days    ☐ Don't know

if "0" then go to H.1

b) in the past 30 DAYS?   days    ☐ Don't know

## H. HEALTH RISKS AND BARRIERS

H.1 Are you limited in the kind or amount of activity you can do because of a long term illness, physical condition or health problem? By long term I mean a condition that has lasted or is expected to last more than 6 months.

☐ Yes    ☐ No ----- go to H.5

H.2 Are your activities limited ...

a) At home? ----- ☐ Yes    ☐ No    ☐ Don't know    ☐ Not applicable

b) At work or school? ----- ☐ Yes    ☐ No    ☐ Don't know    ☐ Not applicable

c) In other activities (such as leisure time activities, transportation, etc.) ? ----- ☐ Yes    ☐ No    ☐ Don't know    ☐ Not applicable

H.3 How well do you feel you are coping with this limitation? Would you say ...

☐ very successful    ☐ somewhat successful    ☐ not very successful    ☐ not at all successful    ☐ Don't know

H.4 How important is each of the following in coping with your limitation? Is it "Very important", "Somewhat important" or "Not at all important"?

- |                                      |                               |                                   |                                     |                                     |
|--------------------------------------|-------------------------------|-----------------------------------|-------------------------------------|-------------------------------------|
| a) Medical treatment you received? - | <input type="checkbox"/> very | <input type="checkbox"/> somewhat | <input type="checkbox"/> not at all | <input type="checkbox"/> Don't know |
| b) Your family or friends?           | <input type="checkbox"/> very | <input type="checkbox"/> somewhat | <input type="checkbox"/> not at all | <input type="checkbox"/> Don't know |
| c) Your general state of health?     | <input type="checkbox"/> very | <input type="checkbox"/> somewhat | <input type="checkbox"/> not at all | <input type="checkbox"/> Don't know |
| d) Your own determination?           | <input type="checkbox"/> very | <input type="checkbox"/> somewhat | <input type="checkbox"/> not at all | <input type="checkbox"/> Don't know |
| e) Prayer or spiritual help?         | <input type="checkbox"/> very | <input type="checkbox"/> somewhat | <input type="checkbox"/> not at all | <input type="checkbox"/> Don't know |

The next few questions are about safety.

**H.5 Do you ride a bicycle?**

☐ Yes ☐ No

How often do you wear a protective helmet?

☐ always ☐ most of the time ☐ sometimes ☐ rarely or never

☐ don't have a helmet

**H.6 Have you ridden on an all terrain vehicle (ATV), motorcycle, or snowmobile in the past 12 months?**

☐ Yes ☐ No

How often did you wear a protective helmet?

☐ always ☐ most of the time ☐ sometimes ☐ rarely or never

☐ don't have a helmet

During the past 12 months, have you driven an ATV, motorcycle, or snowmobile after having two or more alcoholic drinks in the previous hour?

☐ Yes ☐ No ☐ Don't know

**H.7 Have you ridden in a motorboat, sailboat or canoe in the past 12 months?**

☐ Yes ☐ No - go to H.8

How often did you wear a lifejacket?

☐ always ☐ most of the time ☐ sometimes ☐ rarely or never

During the past 12 months, have you been in a motorboat, sailboat or canoe (of any kind) after having two or more alcoholic drinks in the previous hour?

☐ Yes ☐ No ☐ Don't know

**H.8 How often do you use seat belts when you ride in a car or truck?**

☐ always ☐ most of the time ☐ sometimes ☐ rarely or never

**H.9 In a car or truck do you ensure that the children with you have their seat belts fastened or are in car seats?**

☐ always ☐ most of the time ☐ sometimes ☐ rarely or never

☐ don't drive with children in car

**H.10 During the past 12 months, have you driven a car or truck?**

☐ Yes ☐ No ☐ Don't know

In the past 12 months, did you drive a car or truck after having two or more alcoholic drinks in the previous hour?

☐ Yes ☐ No ☐ Don't know

How many times in the past 30 days?

☐ Don't know

**H.11 In your household ...**

is there ...

- |   |                              |                             |                                     |
|---|------------------------------|-----------------------------|-------------------------------------|
| a) a smoke alarm that works? _____                | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know |
| b) a first-aid kit? _____                         | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know |
| c) a household member trained in first aid? _____ | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know |
| d) a fire extinguisher that works? _____          | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know |

do you ...

- |  |                              |                             |                                     |
|--|------------------------------|-----------------------------|-------------------------------------|
| e) have emergency telephone numbers posted by a telephone? _____ | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know |
| f) discard prescriptions or pills after their expiry date? _____ | <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know |

H.12 Do you have guns in your home? ☐ Yes ☐ No ☐ Don't know

Are they safely stored?

☐ Yes ☐ No ☐ Don't know

Are they locked?

☐ Yes ☐ No ☐ Don't know

H.13 Today, AIDS and other sexually transmitted diseases are a major health concern. The following questions are important in dealing with this health issue.

Have you been sexually active in the past 12 months?

☐ Yes ☐ No ☐ No comment — Go to H.14

How many people have you had sex with in the past 12 months?   people

With your current/most recent sexual partner, do you use condoms?

☐ all the time ☐ most of the time ☐ sometimes ☐ never

H.14 In the past few years have you changed your sexual behaviour due to what you have learned about sexually transmitted diseases and/or AIDS?

☐ Yes ☐ No

Have any of these changes occurred in the past 12 months?

☐ Yes ☐ No

## I. CHILDREN'S HEALTH

The next few questions have to do with children and family.

I.1 Do you have children 14 years of age or under?

☐ Yes ☒ No

Are any in daycare?

☐ Yes ☐ No

How many?

### Female Respondent

I.3 How many live births have you had?

if 0 go to I.5

I.4 Did you ever have to leave your Yukon community to give birth?

☐ Yes ☐ No

I.5 How many miscarriages have you had?

I.6 Are you currently expecting a child?

☐ Yes ☐ No ☐ Don't know

Are you planning to breast feed this child?

☐ Yes ☐ No ☐ Don't know

### Male Respondent

I.2 (only if applicable) Is your partner/spouse expecting a child?

☐ Yes ☐ No ☐ Don't know

Is she intending to breast feed?

☐ Yes ☐ No ☐ Don't know

☒ Interviewer see response in I.1 - If "no" then go to I.15

### Female/Male Respondents

I.7 Were any of your children breast fed?

☐ Yes ☐ No ☐ Don't know - go to I.8.b

I.8a Was your youngest child breast fed? ☐ Yes ☐ No ☐ Don't know  
 (Females only)  
 For what reasons did you not breast feed?  
 \_\_\_\_\_

How long was the child breast fed?  months  
 (Females only)  
 What were reasons for stopping?  
 \_\_\_\_\_

I.8b At what age was your youngest child first fed solid foods?

months ☐ Don't know

I.9 Did you usually put this child into bed with a bottle?

☐ Yes ☐ No ☐ Don't know

What was usually in the bottle? \_\_\_\_\_

I.10 How often does your youngest child usually floss his/her teeth?

☐ daily ☐ at least once a week ☐ rarely/never ☐ too young, has no teeth

I.11 How often does your youngest child usually brush his/her teeth?

☐ daily ☐ at least once a week ☐ rarely/never ☐ too young, has no teeth

I.12 In the past 12 months how many times did he or she visit a dentist?  visits

I.13 When riding a bicycle, does this child wear a protective helmet?

☐ always ☐ sometimes ☐ doesn't ride bikes  
☐ most of the time ☐ rarely/never ☐ doesn't have helmet

I.14 In the past 12 months have any of your children received care for accidental poisoning (excluding food poisoning)?

☐ Yes ☐ No ☐ Don't know

I.15 In your home, are all medications and poisons out of the reach of children?

☐ Yes ☐ No ☐ Some ☐ Don't know

I.16 Are they locked away?

☐ Yes ☐ No ☐ Some ☐ Don't know

## J. DENTAL HEALTH

The next few questions are about your dental health.

J.1 Are you in need of dental care? ☐ Yes ☐ No ☐ Don't know

J.2 Have you visited a dentist in the past 12 months?

☐ Yes

What were the main reasons for your visits?

☐ emergency treatment,  
☐ preventative (check up or cleaning),  
☐ non-emergency treatment, or  
☐ cosmetic?

☐ No

Was it because ...

☐ there was no need  
☐ no dental services available  
☐ cost  
☐ fear  
☐ other \_\_\_\_\_

☐ Don't know

J.3 Are you covered by a dental insurance plan?

☐ Yes ☐ No ☐ Don't know

J.4 How often do you floss your teeth?

☐ daily ☐ at least once a week ☐ rarely/never ☐ no natural teeth

J.5 How often do you brush your teeth?

☐ daily ☐ at least once a week ☐ rarely/never ☐ no natural teeth

## K. NUTRITION

The next questions are about nutrition.

### K.1 Are you trying to change your weight?

☐ Yes ☐ No ☐ Don't know

Are you trying to lose weight?

☐ Yes  
How?

☐ No

---

---

---

Are you trying to gain weight?

☐ Yes  
How?

☐ No

---

---

---

### K.2 In your opinion, are you eating well enough to maintain good health?

☐ Yes ☐ No ☐ Don't know

What is the major factor that influences the way you eat?

---

---

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---

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---

### K.3 In answering this question about nutrition, tell me how many servings of the following foods you ate YESTERDAY (a serving is one helping or portion of a single food).

#### Dairy Products

- \_\_\_\_\_ whole milk
- \_\_\_\_\_ 1% or 2% milk
- \_\_\_\_\_ skim milk
- \_\_\_\_\_ yogurt, pudding or ice cream
- \_\_\_\_\_ cheese or cheese products
- \_\_\_\_\_ other dairy products (specify) \_\_\_\_\_

#### Fruit and vegetables

- \_\_\_\_\_ wild plants such as berries, shoots, roots or leaves
- \_\_\_\_\_ oranges or grapefruit
- \_\_\_\_\_ orange, apple or grapefruit juice
- \_\_\_\_\_ other fresh, canned or frozen fruit (specify) \_\_\_\_\_
- \_\_\_\_\_ other fresh, canned or frozen vegetables (inc. potatoes) (specify) \_\_\_\_\_

**Meat and alternates**

- ☐ beef, lamb or pork  
☐ large game: caribou, moose or wild sheep  
☐ liver  
☐ small-game: rabbits, gophers  
☐ poultry (such as chicken or turkey)  
☐ ptarmigan, duck, grouse or geese  
☐ fish  
☐ peanut butter  
☐ eggs  
☐ dried beans, peas, seeds or nuts  
☐ other (specify) \_\_\_\_\_

**Breads and cereals**

- ☐ bread, bannock or muffins  
☐ cereal  
☐ rice, noodles or pasta  
☐ other (specify) \_\_\_\_\_

**Beverages**

- ☐ coffee or tea  
☐ colas  
☐ water  
☐ other (specify) \_\_\_\_\_

K.4 In a typical week, what proportion of the food you eat is hunted, fished or gathered?

- ☐ none      ☐ some      ☐ half      ☐ most      ☐ all

K.5 In a typical week, do you usually, sometimes or rarely...

- a) Skip breakfast \_\_\_\_\_ ☐ usually    ☐ sometimes    ☐ rarely    ☐ Don't know  
 b) Eat three meals a day \_\_\_\_\_ ☐ usually    ☐ sometimes    ☐ rarely    ☐ Don't know  
 c) Snack between meals \_\_\_\_\_ ☐ usually    ☐ sometimes    ☐ rarely    ☐ Don't know  
 d) Eat meals with your family \_\_\_\_\_ ☐ usually    ☐ sometimes    ☐ rarely    ☐ Don't know  
 e) Eat at restaurants or fast food outlets \_\_\_\_\_ ☐ usually    ☐ sometimes    ☐ rarely    ☐ Don't know  
 f) Eat fried or fatty foods \_\_\_\_\_ ☐ usually    ☐ sometimes    ☐ rarely    ☐ Don't know  
 g) Eat foods high in fiber such as whole wheat  
    or whole grain foods, raw fruits or vegetables \_\_\_\_\_ ☐ usually    ☐ sometimes    ☐ rarely    ☐ Don't know  
 h) Try to include calcium rich foods in your diet \_\_\_\_\_ ☐ usually    ☐ sometimes    ☐ rarely    ☐ Don't know  
 i) Try not to eat foods high in salt (such as ham,  
    processed meats, chips or pretzels) \_\_\_\_\_ ☐ usually    ☐ sometimes    ☐ rarely    ☐ Don't know  
 j) Buy calorie reduced food items \_\_\_\_\_ ☐ usually    ☐ sometimes    ☐ rarely    ☐ Don't know  
 k) Buy food with lowered fats and oils \_\_\_\_\_ ☐ usually    ☐ sometimes    ☐ rarely    ☐ Don't know  
 l) Read and understand nutritional information  
    on food labels \_\_\_\_\_ ☐ usually    ☐ sometimes    ☐ rarely    ☐ Don't know  
 m) Follow Canada's Food Guide when  
    planning your meals \_\_\_\_\_ ☐ usually    ☐ sometimes    ☐ rarely    ☐ Don't know  
 n) Buy pre-prepared or convenience  
    foods for meals \_\_\_\_\_ ☐ usually    ☐ sometimes    ☐ rarely    ☐ Don't know

K.6 Is there one factor that would improve the way you eat?

- ☐ Yes    ☐ No    ☐ Do not know

What is it? \_\_\_\_\_

## L. ALCOHOL AND DRUGS

The next few questions are about smoking.

L.1 Have you ever smoked cigarettes?

☐ Yes ☐ No - go to L.6

L.2 At the present time do you smoke cigarettes?

☐ Yes ☐ No - go to L.4

Is this every day? ☐ Yes ☐ No

How many?   cigarettes (daily)

L.3 Have you ever tried to quit?

☐ Yes ☐ No - go to L.6

L.4 On the most recent occasion, how long did you abstain from smoking?

months

L.5 What method did you use to quit? (specify) \_\_\_\_\_

L.6 How many of the people living in your household smoke daily? (IF SMOKER, ADD: "including yourself")

people

The next questions are about your use of drugs.

L.7 Have you ever used a needle to inject prescribed or other drugs? -----

☐ Yes ☐ No

how old were you when you first used it?

have you used it in the past 12 months? ☐ Yes ☐ No ☐ Don't know

have you used it in the past 30 days? ☐ Yes ☐ No

L.8 Have you ever used ...

☐ marijuana or hashish? -----

☐ Yes ☐ No

how old were you when you first used it?

have you used it in the past 12 months? ☐ Yes ☐ No ☐ Don't know

have you used it in the past 30 days? ☐ Yes ☐ No

☐ cocaine? -----

☐ Yes ☐ No

how old were you when you first used it?

have you used it in the past 12 months? ☐ Yes ☐ No ☐ Don't know

have you used it in the past 30 days? ☐ Yes ☐ No

☐ other drugs, such as speed, heroin, LSD (acid) or other hallucinogens (PCP, mushrooms, designer drugs) -----

☐ Yes ☐ No

how old were you when you first used it?

have you used it in the past 12 months? ☐ Yes ☐ No ☐ Don't know

have you used it in the past 30 days? ☐ Yes ☐ No

☐ solvents or other inhalants? (such as glue or gasoline) -----

☐ Yes ☐ No

how old were you when you first used it?

have you used it in the past 12 months? ☐ Yes ☐ No ☐ Don't know

have you used it in the past 30 days? ☐ Yes ☐ No

The next few questions are about alcohol.

- L.9 During the past 12 months, have you had a drink of any alcoholic beverage? By drink we mean a bottle of beer, glass of wine, or a shot of liquor, either straight or in a mixed drink.

☐ Yes — Go to L.12(a) ☐ No

- L.10 Have you ever had a drink?

☐ Yes ☐ No — Go to M.1

- L.11 Did you ever drink on a regular basis?

☐ Yes ☐ No

- L.12(a) As a result of your drinking have you ...

ever felt the need to cut down on drinking? —————	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
ever felt annoyed by criticism of drinking? —————	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
ever had guilty feelings about drinking? —————	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
ever taken a morning eye opener? —————	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know

- L.12(b) Because of your drinking, have you ...

ever been in a fight? —————	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
ever experienced a break-up of a relationship? —————	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
ever broken any bones? —————	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know
ever lost a job? —————	<input type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> Don't know

- L.13 How many times have you had FIVE or more drinks on one occasion ...

a) in the past 12 months?   if "0", go to L.14

b) in the past 30 days?

- L.14 What is the highest number of drinks you can recall having on any one occasion ...

a) in the past 12 months?

b) in the past 30 days?

- L.15 Do you usually have a drink at least once a week?

☐ Yes ☐ No — go to (a)

How many times per week do you usually drink?   times per week — go to L.16

- (a) Do you usually have a drink at least once a month?

☐ Yes ☐ No — go to (b)

How many times a month do you usually drink?   times per month — go to L.16

- (b) Do you usually have a drink at least once a year?

☐ Yes ☐ No — go to M.1

How many times a year do you usually drink?   times per year — go to L.16

- L.16 On the days that you drank, how many drinks did you usually have?   drinks

- L.17 What type of alcoholic beverage do you usually drink? ☐ Beer ☐ Wine ☐ Spirits

## M. HEALTH KNOWLEDGE

The next few questions concern sources of health information.

M.1 For each of the following statements, please state if you agree or disagree.

- a) I do not have enough sources of information about health — ☐ Agree ☐ Disagree ☐ Don't know
- b) I find it hard to know who to believe about health issues — ☐ Agree ☐ Disagree ☐ Don't know
- c) I only seek information when I have an immediate health problem — ☐ Agree ☐ Disagree ☐ Don't know

M.2 In the past 12 months, did you do something to improve your health?

- ☐ Yes ☐ No — go to M.5

What was the reason (for doing something to improve your health)?

M.3 What is the single most important change you have made in the past 12 months to improve your health? (DO NOT READ, MARK ONLY ONE)

- |  |  |
|--|--|
| <input type="checkbox"/> increased exercise, sports or physical activity | <input type="checkbox"/> managed or reduced cholesterol                    |
| <input type="checkbox"/> lost weight                                     | <input type="checkbox"/> managed or reduced stress                         |
| <input type="checkbox"/> changed diet or eating habits                   | <input type="checkbox"/> changed physical environment                      |
| <input type="checkbox"/> quit smoking/reduced amount smoked              | <input type="checkbox"/> received medical treatment                        |
| <input type="checkbox"/> reduced drug/medication use                     | <input type="checkbox"/> changed sexual behaviour or reduced risk of STD's |
| <input type="checkbox"/> drank less alcohol                              | <input type="checkbox"/> improved dental hygiene                           |
| <input type="checkbox"/> managed or reduced blood pressure               | <input type="checkbox"/> other (specify) _____                             |

M.4 Did any of the following help you to make this change?

- a) support from family and friends — ☐ Yes ☐ No ☐ Don't know
- b) increased knowledge of health risks — ☐ Yes ☐ No ☐ Don't know
- c) changes in legislation or by-laws — ☐ Yes ☐ No ☐ Don't know
- d) new policy or program at school or work — ☐ Yes ☐ No ☐ Don't know
- e) change in life situation (eg. marital status, employment, moving home, etc.) — ☐ Yes ☐ No ☐ Don't know
- f) advice or support of health professional(s) — ☐ Yes ☐ No ☐ Don't know
- (specify) \_\_\_\_\_
- g) self-help or mutual aid group (eg. AA, Weight Watchers) — ☐ Yes ☐ No ☐ Don't know
- h) other people setting an example — ☐ Yes ☐ No ☐ Don't know
- i) changes in social values — ☐ Yes ☐ No ☐ Don't know
- j) commercial products or services — ☐ Yes ☐ No ☐ Don't know
- k) prayer or spiritual guidance — ☐ Yes ☐ No ☐ Don't know

M.5 Considering the health topics we've discussed in this questionnaire, is there anything you intend to change to improve your health in the next year?  
(DO NOT READ, MARK ALL THAT APPLY) (PROBE: Anything else?)

- |   |   |
|---|---|
| <input type="checkbox"/> nothing  | <input type="checkbox"/> manage or reduce blood pressure                |
| <input type="checkbox"/> increase exercise, sports or physical activity | <input type="checkbox"/> manage or reduce cholesterol                   |
| <input type="checkbox"/> lose weight                                    | <input type="checkbox"/> learn to manage or reduce stress               |
| <input type="checkbox"/> change diet or eating habits                   | <input type="checkbox"/> change physical environment                    |
| <input type="checkbox"/> quit smoking/reduce amount smoked              | <input type="checkbox"/> receive medical treatment                      |
| <input type="checkbox"/> reduce drug/medication use                     | <input type="checkbox"/> change sexual behaviour or reduce risk of STDs |
| <input type="checkbox"/> drink less alcohol                             | <input type="checkbox"/> improve dental hygiene                         |
|   | <input type="checkbox"/> other (specify) _____                          |

M.6 In the past 12 months, has your knowledge of health risks increased?

- ☒ Yes ☐ No ☐ Don't know

Did this increased knowledge of health risks come through ...

- |   |  |
|---|--|
| <input type="checkbox"/> personal experience                    | <input type="checkbox"/> books or magazines        |
| <input type="checkbox"/> experience of family or friends        | <input type="checkbox"/> by word of mouth          |
| <input type="checkbox"/> media - television, radio or newspaper | <input type="checkbox"/> health care practitioners |
| <input type="checkbox"/> government material                    | (specify) _____                                    |
|   | <input type="checkbox"/> other _____               |

## N. FAMILY STRUCTURE

The next questions will help us build a "picture" of Yukon families.

INTERVIEWER: GO TO CONTROL FORM ITEMS 98 AND 99

## O. DEMOGRAPHIC/EDUCATION/INCOME

O.1 What is your current marital status? Are you ...

- ☐ Single (never married)?  
☐ Living with a spouse or partner?  
☐ Separated, Divorced or Widowed?

O.2 What is the highest grade or level of education you have ever attended or completed?

(MARK ONLY ONE)

- |   |  |
|---|--|
| <input type="checkbox"/> No schooling   | <input type="checkbox"/> Completed elementary  |
| <input type="checkbox"/> Some elementary  | <input type="checkbox"/> Completed secondary   |
| <input type="checkbox"/> Some secondary   | <input type="checkbox"/> Completed community college, technical college, CEGEP or nurse's training |
| <input type="checkbox"/> Some community college, technical college, CEGEP or nurse's training | <input type="checkbox"/> Completed university (e.g BA, MA, Ph. D) or teacher's college             |
| <input type="checkbox"/> Some university or teacher's college                                 |  |
| <input type="checkbox"/> Other education or training  |  |

O.3 Now, I will read a range of incomes. What is your best estimate of your total household income in 1991 before tax deductions? Was it ...

- ☐ less than \$10,000  
☐ between \$10,000 and \$20,000  
☐ between \$20,000 and \$40,000  
☐ between \$40,000 and \$60,000  
☐ between \$60,000 and \$80,000  
☐ more than \$80,000  
  
☐ Don't know

## P. POLICY SECTION

P.1 Are you a parent with children living in your household (full or part-time)?

- ☐ Yes ☐ No -- thank respondent and end.

P.2 As a parent, what do you consider is the most challenging issue you face in raising your children?

---

---

P.3 What do you do to deal with this issue?

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---

P.4 Have any of the following been useful to you in dealing with this issue?

(MARK ALL THAT APPLY)

- a) Books, articles or videos ----- ☐ Yes ☐ No
- b) Support/advice from professionals/resource people -----  
(eg. nurses, doctors, teachers, CHR's) ----- ☐ Yes ☐ No
- c) Parent groups for information support ----- ☐ Yes ☐ No
- d) Treatment services for children/families (eg. healing circles, wilderness treatment camps, counselling) ----- ☐ Yes ☐ No
- e) child care services ----- ☐ Yes ☐ No
- f) activities for children (eg. sports, camps, clubs) ----- ☐ Yes ☐ No
- g) other (specify) -----

P.5 Which has been most useful to you? -----

## **Appendix D: Ethics approval certificate**

## Appendix E: Correlation/covariance matrices

Table 1 Correlation/covariance matrix for women (final model)

	AGE	INCOME	EDUC	CHRDIS	RELIMP	CAREREC	CAREPRO	PERSUPP	SOCTIES	RELRATE	PERHLTH
AGE	1.000 174.775										
INCOME	-.158 -2.658	1.000 1.619									
EDUC	-.029 -.698	.177 .409	1.000 3.308								
CHRDIS	.434 2.615	-.183 -1.106	-.131 -.109	1.000 .208							
RELIMP	-.031 -.204	.047 .030	-.003 -.003	-.039 -.009	1.000 .249						
CAREREC	.044 .201	-.094 -.041	.038 .024	.085 .013	.061 .010	1.000 .117					
CAREPRO	-.117 -.754	.023 .014	.050 .044	-.019 -.004	-.019 -.004	.242 .040	1.000 .238				
PERSUPP	-.147 -1.236	.311 .252	.016 .019	-.119 -.035	.021 .007	-.163 -.036	.021 .006	1.000 .406			
SOCTIES	-.027 -.298	.311 .334	.175 .269	-.058 -.022	.119 .050	.026 .008	.143 .059	.416 .224	1.000 .712		
RELRATE	-.033 -.372	.011 .012	.092 .142	-.021 -.008	.183 .077	-.010 -.003	-.061 -.025	.230 .124	.243 .173	1.000 .712	
PERHLTH	.002 .019	.183 .227	.164 .289	-.196 -.087	.124 .060	-.204 -.068	-.116 -.055	.289 .179	.258 .212	.274 .225	1.000 .946

Table 2 Correlation/covariance matrix for women (validation of final model)

	AGE	INCOME	EDUC	CHRDIS	RELIMP	CAREREC	CAREPRO	PERSUPP	SOCTIES	RELRATE	PERHLTH
AGE	1.000 134.760										
INCOME	.018 .264	1.000 1.701									
EDUC	-.013 -.278	.227 .559	1.000 3.559								
CHRDIS	.216 1.134	-.065 -.038	-.055 -.047	1.000 .204							
RELIMP	-.022 -.131	.089 .060	.098 .095	.004 .001	1.000 .264						
CAREREC	-.026 -.116	-.111 -.055	.068 .049	.133 .023	.033 .006	1.000 .146					
CAREPRO	-.099 -.572	.006 .004	-.080 -.075	-.035 -.008	.038 .010	.205 .039	1.000 .246				
PERSUPP	-.073 -.486	.255 .191	.096 .104	-.168 -.044	-.032 -.009	-.074 -.016	.023 .007	1.000 .330			
SOCTIES	-.025 -.241	.176 .193	.240 .381	-.006 -.002	.075 .032	-.070 -.022	.030 .013	.351 .170	1.000 .707		
RELRATE	-.012 -.117	.141 .151	.125 .194	.003 .001	.153 .065	-.037 -.012	-.005 -.002	.266 .126	.196 .136	1.000 .678	
PERHLTH	.110 1.241	.188 .238	.090 .165	-.221 -.097	.050 .025	-.234 -.087	-.060 -.029	.055 .031	.104 .085	.360 .288	1.000 .944

Table 3 Correlation/covariance matrix for men (final model)

	AGE	INCOME	EDUC	CHRDIS	RELIMP	CAREREC	CAREPRO	PERSUPP	SOCTIES	RELRATE	PERHLTH
AGE	1.000 136.084										
INCOME	-.060 -.887	1.000 1.601									
EDUC	-.143 -3.146	.274 .655	1.000 3.574								
CHRDIS	.194 .996	.027 .015	-.079 -.066	1.000 .194							
RELIMP	.013 .086	-.008 -.006	.021 .023	-.007 -.002	1.000 .315						
CAREREC	-.136 -.479	.063 .024	.082 .047	-.009 -.001	-.037 -.006	1.000 .091					
CAREPRO	-.077 -.408	.076 .044	.134 .115	-.039 -.008	.103 .026	.181 .025	1.000 .207				
PERSUPP	-.043 -.326	.238 .196	.085 .104	-.067 -.019	.027 .010	-.091 -.018	.044 .013	1.000 .424			
SOCTIES	.085 .793	.169 .170	.195 .293	-.075 -.026	.057 .026	-.135 -.032	.076 .028	.369 .191	1.000 .635		
RELRATE	-.084 -.909	.032 .037	.104 .182	-.117 -.048	.137 .071	-.006 -.002	-.049 -.021	.103 .062	.211 .156	1.000 .860	
PERHLTH	-.054 -.612	.085 .104	.102 .187	-.230 -.098	.079 .043	-.090 -.026	.051 .023	.082 .052	.130 .100	.305 .273	1.000 .935

## Appendix F: Standardized residuals

Table 4 Standardized residuals for women (final model)

	AGE	INCOME	EDUC	CHRDIS	RELIMP	CAREREC	CAREPRO	PERSUPP	SOCTIES	RELRATE	PERHLTH
AGE	.000										
INCOME	.684	.947									
EDUC	.000	-.754	.000								
CHRDIS	-.718	.538	-.861	.000							
RELIMP	-1.146	1.556	-2.606	.052	.000						
CAREREC	.081	-1.418	.890	-.370	.962	-.247					
CAREPRO	-1.906	-.487	.699	-.166	1.907	.179	.317				
PERSUPP	-1.601	.050	-.892	-.773	-1.245	-.372	-.096	-.046			
SOCTIES	.584	.503	2.185	.178	-1.291	.426	-.583	-.278	-1.189		
RELRATE	-.269	-1.503	1.385	.282	-1.546	-.376	-1.692	-.751	2.062	.000	
PERHLTH	-.119	-.029	.542	-.156	1.332	-.040	-1.367	-.494	.557	.658	.547

Table 5 Standardized residuals for women (validation of final model)

	AGE	INCOME	EDUC	CHRDIS	RELIMP	CAREREC	CAREPRO	PERSUPP	SOCTIES	RELRATE	PERHLTH
AGE	.000										
INCOME	1.249	.000									
EDUC	.000	-1.698	.000								
CHRDIS	.623	2.361	-1.542	.000							
RELIMP	-.176	-.568	-2.023	-2.246	.000						
CAREREC	-.961	-1.717	1.193	-.599	.047	-.558					
CAREPRO	-1.590	-.117	-1.407	-.558	.944	-.886	-1.204				
PERSUPP	-1.303	1.569	.696	-2.537	-.940	-1.619	.232	2.005			
SOCTIES	-.433	-3.022	3.214	.113	-1.901	-1.141	-1.188	.322	.000		
RELRATE	-.145	1.490	1.614	.581	.102	-.696	-.357	1.616	-1.443	-.550	
PERHLTH	.741	2.105	1.092	2.574	-.596	-1.256	-.611	2.335	.436	.991	.746

Table 6 Standardized residuals for men (final model)

	AGE	INCOME	EDUC	CHRDIS	RELIMP	CAREREC	CAREPRO	PERSUPP	SOCTIES	RELRATE	PERHLTH
AGE	.000										
INCOME	-.144	.000									
EDUC	.000	-1.200	.000								
CHRDIS	-1.496	1.517	.949	.000							
RELIMP	.585	-.266	-2.128	1.227	.000						
CAREREC	-2.299	1.053	1.391	-.443	.788	.001					
CAREPRO	-1.293	.986	2.092	-.652	1.084	-2.091	-2.156				
PERSUPP	-.469	-.969	.171	-1.261	-.543	-1.282	.278	1.281			
SOCTIES	1.639	-1.561	2.449	-1.349	-3.976	-2.219	-2.007	2.135	.000		
RELRATE	-1.087	-.070	1.356	-1.302	.065	.000	-1.517	.176	1.584	1.421	
PERHLTH	-.353	-.282	1.321	-1.419	.347	.273	-.373	1.501	2.464	.022	.338