

**The Relationship of Sense of Coherence and Health Attitudes
to Health Behaviours in the Elderly**

by
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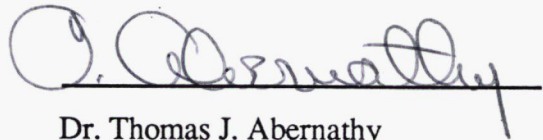
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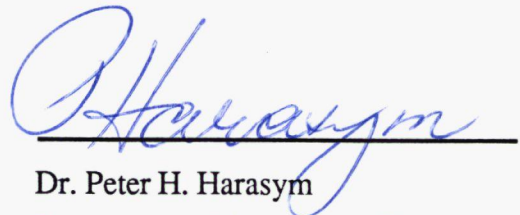
The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies for acceptance, a thesis entitled "The Relationship of Sense of Coherence and Health Attitudes to Health Behaviours in the Elderly" submitted by Carol A. Reimer in partial fulfilment of the requirements for the degree of Master of Science.



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ABSTRACT

The purpose of this study was to explain variation in the level of participation among older persons in three health behaviours (physical activity, nutrition and social interaction) in terms of specific health attitudes and Antonovsky's concept of sense of coherence. It was hypothesised that together these variables along with control variables would explain more of the variance in the health behaviours than would each acting alone.

A random sample of 100 seniors (37% males and 63% females) between the ages of 65 and 85 years old and living in the community were interviewed. Demographically they closely resembled the Calgary senior population, except that males tended to be younger in the sample than in the population.

Three health behaviours (physical activity, nutrition and social interaction), two attitudes to health behaviours (physical activity and nutrition), sense of coherence and five control variables (age, sex, marital status, education and health status) comprised the study model. Multiple indexes for each health behaviour were derived through factor analysis. Correlations and multiple regression were used to test the hypothesis.

Attitudes to physical activity and to nutrition consistently contributed to the variance in their respective health behaviours. Sense of coherence contributes little to the variance in these behaviours, but tends to predict social interaction behaviours.

The control variables, in general, did not consistently contribute to the variance in the health behaviours. However, self perceived physical health status consistently contributed to the variance in indexes of physical activity. The categories within each health behaviour also had varying patterns of association with the independent and control variables.

Implications of the findings were discussed in relation to four areas: 1) correlates of health behaviour, especially attitudes, 2) theoretical and practical applications of the Sense of Coherence concept, 3) health education and program planning, and 4) implications for health conscious seniors.

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CHAPTER 1: THE RESEARCH PROBLEM

1.1 INTRODUCTION

Health promotion is a relatively new and rapidly growing research area. Index Medicus has been indexing "health promotion" as a separate category since only 1980, but since then the number of studies listed under that topic has grown annually. However, there have been relatively few health promotion studies relating specifically to the elderly, although it is an area of growing interest.

Health promotion is defined as the maintenance and improvement of the general health of individuals, families, and communities (Edelman and Mandle, 1986). Health behaviours are those that an individual engages in to promote or maintain health or well-being. The major foci of health promotion are nutrition, physical activity, social interaction, and stress control, each of which is considered to some degree to be within an individual's control (DHEW, 1979; Oberman, 1984). This is differentiated from preventive health which seeks to change a specific health behaviour in order to prevent a specific disease entity. Health promotion, then, seeks to change a broad category of behaviours in order to enhance general

well-being.

Murray, Pinnell, Leonard and Zetner (1985) state that health promotion encompasses intellectual, spiritual, emotional, and social health in addition to physical health. Physical health promotion activities have been examined most frequently since they have an established definition of standards and common measurement techniques. Of the Canadian Cancer Society's seven "Good Health Habits" (Edelman and Mandle, 1986), three are related to nutrition, two to exercise, and the remaining two concern smoking and alcohol.

Early health promotion studies focused on two areas:

- 1) surveys of health promotional behaviours and knowledge, and
- 2) descriptions and evaluations of health promotion education programs.

Surveys of health promotional behaviours have obtained frequencies on specific behaviours such as nutrition and exercise behaviours (Leventhal and Prohaska, 1986; Fanelli and Abernethy, 1986; Langlie, 1979; Tinsley et al., 1985; Stephens, 1979; Harris and Guten, 1979). Observations from these surveys suggest that there are variable rates of participation in health behaviours by the elderly (as there are in other age groups). Previous studies of health promotion education programs report primarily on program creation.

and evaluation (Haber, 1983; Haskill and Superko, 1984).

One of the primary goals of health promotion studies, such as this one, is to determine the correlates of health behaviours. In his review of the literature, Norman (1986, p.8) commented that the research on health behaviours, such as physical activity and nutritional practices, is expanding as it has become more evident that our actions contribute to our health. Despite this, our understanding of the nature of health behaviour remains rudimentary (Mechanic, 1979, p.111). To date, researchers have focused on two categories of health behaviour correlates: demographic and attitudinal.

The purpose of this study is to contribute to knowledge of the correlates of three categories of health behaviours: physical activity, nutrition and social interaction. They are defined as being behaviours relating to health promotion by the U.S. Department of Health Education and Welfare (DHEW, 1979) since they are lifestyle factors and do not target one specific disease.

The purpose of the study has two components. The first is to test Antonovsky's (1984) hypothesis that people with a high sense of coherence will tend to be engaged in health promoting behaviour. By incorporating sense of coherence, this study will seek to add to

knowledge of correlates of health behaviours and to increase the amount of variance in participation in these behaviours that can be explained. The second component is to assess the joint effects of sense of coherence, health attitudes and demographic variables on health behaviours.

There are two reasons to target the elderly in a health promotion study. The first reason relates to the already recognised problem of the increasing proportion of elderly in the population. The proportion of elderly in Canada has increased sevenfold since the 1890s while the general population has increased only four times (McPherson, 1983). In addition, the number of years the elderly spend in poor health is also increasing (Peron and Strohmenger, 1985). Therefore the elderly are placing a growing burden on the health care system (McPherson, 1983). Since chronic diseases, which form the major contributing factor in poor health, are influenced by lifestyles, the study of health behaviours in the elderly may help ease this burden.

The second reason is less commonly recognised. It is based on the concept that, second only to adolescence, old age is the stage in life when the highest degree of change is experienced (Edelman and Mandle, 1986). Antonovsky (1987) states that stresses, such as change, produce a state of disequilibrium that make it necessary for the individual to make use of internal and external resources to

regain equilibrium. This makes the elderly an appropriate target for health education, since health education can act as a resource in these times of change. Since the resources themselves are also reevaluated at these times, a person's sense of coherence may be altered at this point. Resources that focus on healthy living may be added to other coping strategies in these times of change. The sense of coherence theory will be more thoroughly examined in the literature review.

1.2 RELEVANCE

This study is important in four ways. Firstly, testing sense of coherence in the context of health promotion will add to the knowledge of the applicability of this concept. There is also the theoretical importance of explaining the variance in health behaviour by testing the contribution that sense of coherence makes. Secondly, this study seeks to add to the knowledge of the relationship between health attitudes and behaviour. Thirdly, health educators may be able to apply results from this study to program planning and evaluation, curriculum development and target group selection. For instance, the findings can indicate who has a predisposition for participation in health behaviours and may be persuaded to join a program. Social marketers are interested in

what attitudinal triggers are related to health behaviours. Triggers are those broad concepts that facilitate the targeted behaviour. The findings on attitudes and sense of coherence may provide clues to those triggers. Fourthly, although health behaviours may not increase life expectancy, they may increase the number of "healthy years" (Shephard, 1986). Health conscious seniors therefore may wish to use the results of this study to enhance their own adaptation to aging. Only further research can establish how generalisable the findings of this study are to a broader population.

1.3 LITERATURE REVIEW

The literature review will discuss the correlates of health behaviours currently found in the literature. The first section will focus on demographic correlates of the health behaviours examined in this study; exercise, nutrition and social interaction. Following that, the literature on health attitudes and the current level of success in explaining health behaviours will be reviewed. Finally, Antonovsky's sense of coherence will be presented, along with the theory of how sense of coherence contributes to further explaining variation in health behaviour.

1.3.1 Demographic Correlates of Health Behaviours

Demographic correlates of each of the three health behaviours (exercise, nutrition and social interaction) will be reviewed separately in the following section.

Physical Activity

The 1981 Canada Fitness survey is the most comprehensive study of the physical activity level of Canadians to date (Shephard, 1986, p.8). In this survey 21,658 questionnaires were completed by individuals aged 10 to 69 (Furrie and Stephens, 1983). Although a broad age range was surveyed, a significant portion of the elderly, those aged 70 and over, were excluded from the study. They did, however, find that level of physical activity decreased with age. This confirms other studies which indicate that activity level decreases after age 65 (Shephard, 1986). Men were found to have higher levels of participation than women in intense physical activities, but not in moderate and light activities. When analysed by age, 53% of adults over 60 were classified as active (average of three hours of physical activity per week) (ibid, p.139). In the over 60 age group, the five most popular activities were found to be walking, cycling, swimming, jogging, and gardening (ibid, p.133). May to September were the months in which people were the most

active (ibid, p.118).

Significant relationships were found between exercise and a number of demographic variables (Langlie, 1979). Langlie found the participation in exercise increased with higher income, higher education, younger ages, and in men over women. Confirmation of the relationship between exercise and some of these variables was also found by Harris and Guten (1979), Leventhal and Prohaska (1986) and Goldenberg (1980). Education has been found to be the measure of socioeconomic status that is most highly associated with this and other health behaviours (Norman,1986). Those people who perceive themselves to be in better health are also significantly more likely to be involved in physical activities (ibid).

Nutrition

Results from the Canada's Health Promotion Survey (Health and Welfare Canada, 1988) greatly augment findings regarding nutritional health behaviours. Unlike the Canada Nutrition Survey (1976), which addressed nutrition at a biochemical level, the Canadian Health Promotion Survey was concerned with general behavioral questions about nutrition. Prior to the Health Promotion Survey, most nutritional studies had relatively small sample sizes. The demographic variables that were related to physical activity are

similarly correlated with healthy nutritional behaviours. Langlie (1979) found that young manual workers and poor elderly women are at the most risk for not engaging in healthy nutritional behaviour. A number of other studies found similar results, with poorer nutritional behaviour in the lower income levels (Grotkowski and Sims, 1978; Harris and Guten, 1979; Beyer and Morris, 1974), in those with less education (Beyer and Morris, 1974), and in those who are older (Beyer and Morris, 1974; Leventhal and Prohaska, 1986; McIntosh et al., 1989). Other studies have found women to be more likely than men to have positive nutritional practices (McIntosh et al., 1989). Norman (1986) found only small or insignificant differences among these variables. Of the above studies, only Leventhal and Prohaska (1986) and the Health Promotion Survey (1988) used large numbers of elderly subjects. Harris and Guten (1979) found nutritional activities are the most important health-protective behaviours reported, surpassing rest and physical activity.

Social Interaction

The presence of a strong social support network of friends, family, or even of perceived support (Wethington and Kessler, 1986) is related to an increased sense of well-being (Ward et al., 1984). Social interaction is also related positively to socioeconomic status

(Ward et al., 1984), and inversely to age (McFarlane et al., 1983). Less literature is available on the correlates of this health behaviour category (Norman, 1986). However, since health promotion programs such as Calgary's Fully Alive program (Larsen, 1988) are including teaching in this area, it is important to expand the knowledge base of social interaction as a health behaviour.

In summary, demographic variables such as age, sex, education, income, occupation, and perceived health status have been shown in various studies to have contributed in various degrees to explaining the variance in health behaviours.

Correlation Among Health Behaviours

Some health promotional behaviours have also been compared to each other. Although some studies have found that health behaviours are not inter-correlated, Langlie (1979) found that exercise and nutrition had correlated behaviour patterns in relation to each other but not to preventive health behaviours, such as dental hygiene and wearing a seat belt. Sidney and Shephard (1978) found that individuals who were more physically active tended to get adequate sleep and to eat nutritious breakfasts. Other studies have also confirmed that more active individuals have a healthier diet (Shephard, 1986, p.141). Little work has been done comparing social

support behaviours with exercise and nutrition, although Bausell and Bausell (1987) found no correlations between these two behaviours. However, in a study of cardiac rehabilitation patients, Holm et al. (1985) obtained weak correlations for the relationship between social support and participation in an exercise program.

1.3.2 Attitudes to Health Behaviours

Fishbein and Ajzen (1974) state that an attitude predisposes an individual to have consistently favourable or unfavourable actions. Since the relationship is consistent, attitudes are used as part of cognitive models to explain why some individuals actively engage in behaviours. One such behaviour is the pursuit of health. Becker has included attitudes as one of the modifying and enabling factors of the Health Belief Model (Aho, 1979).

Many studies have been done on attitudes to health, but most of the work has focused on preventive health behaviours such as screening, alcohol intake, and smoking. Recently, however, studies have been done developing attitude scales for two health behaviours: physical activity and nutrition. Researchers have developed attitude scales for only these two, since there is little consensus on the behavioral norms for other behaviours such as stress management and social interaction.

Kenyon devised an attitude to exercise scale in 1969 which has been used on a number of age groups, including the elderly (Sidney and Shephard, 1976). A moderately sized association between scores on this scale and participation in an exercise program was found. When Holm et al. (1985), O'Connell et al. (1985) and Aho (1979) examined the relationship between exercise beliefs and behaviours they found weak ($r=.31$) to moderate ($r=.41$) correlations. All three used the Health Belief Model as their framework. Conley (1969) found some personality factors to be correlates of attitude to physical activity. Sidney and Shephard (1978) found that positive attitudes to exercise or physical activity are inversely related to age, and that men are more likely to have positive attitudes to exercise or physical activity than women. Attitudes and beliefs regarding exercise were also found to be directly related to social approval (O'Connell et al., 1985), income, health status, and education level (Goldenberg, 1980), and inversely related to age (Aho, 1979).

Attitudes to nutrition reflect a similar pattern. Most attitude to nutrition surveys in the literature have used school children and teachers as their subjects (Beyer and Morris, 1974; Penner and Kolasa, 1983; O'Connell et al., 1981; and Shannon et al., 1981). These studies are found primarily in nutrition education literature. Axelson and Penfield (1983) and Grotkowski and Sims (1978) looked

at nutritional and food attitudes of older people. The former study primarily examined attitudes to food buying, preparation, storage, and use; and found that these attitudes were significantly and positively related to income and education, but not to age. Other studies confirm that income (Herrmann et al., 1984) and education (Beyer and Morris, 1974) were related directly to attitudes to nutrition. Attitude studies in nutrition are more numerous and varied than attitude studies of any other health behaviour. Attitudes to caffeine use (Guiry and Bisogni, 1986), vitamin use (Sobal and Muncie, 1985), food practices (Beyer and Morris, 1974) and salt intake (Shepherd and Farleigh, 1986) have all been studied in addition to attitudes to nutrition. Unlike the attitude to exercise study, the Health Belief Model was not used as a framework for any of these nutrition-attitude studies.

In summary, there are a number of studies describing the frequency of health promotional behaviours in the general population. This is particularly true for the physical components of health promotion such as exercise and nutrition. Few of these use the elderly as part of their sample. Literature which describe social interaction health behaviours are less frequent, but still available. Attitudes to health behaviours have also been studied infrequently. Attitude scales were found only for exercise and nutrition. Correlations between attitudes and behaviours have been found to be small to moderate.

The strength of association between attitudes and behaviours has been found to be relatively small. In one third of the studies reviewed by Hill (1981) of positive relationships between attitudes and behaviour, attitudes explained less than nine percent of the variance. In addition to these weak associations, 21% of the studies found moderate associations in that they explained 9-25% of the variance in behaviours. This clearly demonstrates the need to examine new factors in addition to those that are already shown to have relationship to health behaviours. This study will add sense of coherence to a model which includes attitudes and other demographic variables in an attempt to explain more of the variance in health behaviour.

1.3.3 Sense of Coherence (SOC)

Antonovsky (1984) hypothesises that people with a high sense of coherence tend to engage in activities that are health-promoting. Antonovsky's hypothesis has not yet been tested, although his model has been used to explain the variance in other health behaviours (Wan, 1987). He perceives sense of coherence to be an orientation to life that "expresses the extent to which one has a pervasive, enduring, though dynamic, feeling of confidence that one's internal and external environments are predictable and that there is a high

probability that things will work out as well as can reasonably be expected" (Antonovsky, 1979, p.123).

Antonovsky (1979) studied people who were coping with tremendous difficulties. The sense of coherence concept emerged from Antonovsky's desire to explain why some people diligently search for coping strategies to confront the stresses of life and overcome them. He labelled the tools that people employed to manage the stressors in their life "generalised resistance resources" or GRRs. These GRRs may include social supports, ego identity, religion, knowledge or intelligence, as well as a preventive health orientation. Health promotional behaviour, then, could be one resource that healthy people use to augment their ability to cope with life.

Central to Antonovsky's model of orientation to life (see Appendix A for diagram) is a person's sense of coherence. Antonovsky measures sense of coherence with a scale comprised of three components:

- comprehensibility
- manageability
- meaningfulness.

Individuals who have a high sense of comprehensibility feel that they understand their environment and circumstances. They have "confidence that sense and order" can be made of situations

(Antonovsky, 1984). The manageability component of sense of coherence describes a feeling of confidence that the resources available are adequate to meet the demands of life. This component is related to Rotter's concept of locus of control (1966). Antonovsky, however, recognises that one's destiny is not controlled only by one's own actions, but also by the resources at one's disposal. These resources may include God, friends, or family in addition to the individual's own inner strengths. In this way people with a strong faith, or a strong support network may have an external locus of control (since they do not feel that they can manage independently of everyone), but may rate as having a high sense of coherence if they activate their resources in a positive manner. Finally, the meaningfulness component of sense of coherence is the emotional counterpart to comprehensibility. People who rate highly on this component are caring, committed to invest energy in problems, and perceive life as a series of challenges rather than burdens.

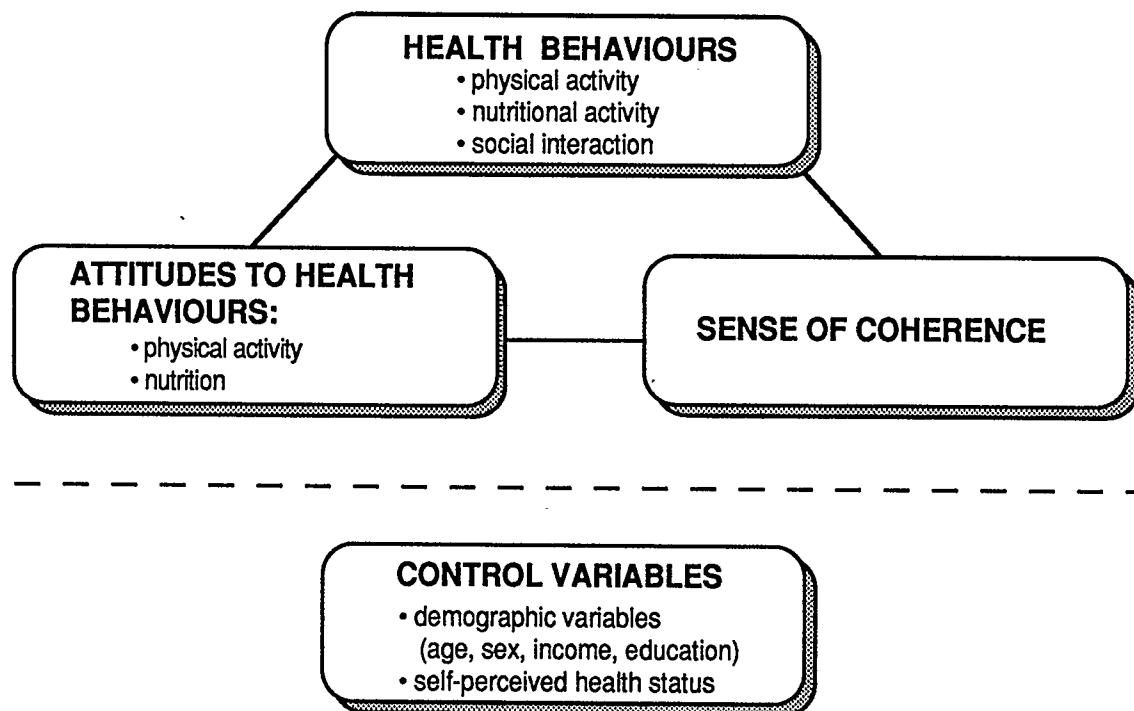
These three components comprise the sense of coherence measure, which describes quantitatively how individuals view their relationship with the world. This study will examine whether this generalised attitude has a relationship to the three health behaviours and the two attitudes to health behaviours.

1.4 STUDY PURPOSES AND MODEL

The purpose of this study is to contribute to a model which seeks to explain the variations found in the level of participation in health behaviours. Specifically, sense of coherence will be added to the attitudinal model that has already been used by other studies cited previously. Figure 1.1 summarises diagrammatically the reciprocal nature of the relationships among the three major theoretical variables of the study indicated by the literature review. The relationships between the components of this model provide the basis for the hypotheses. Correlates of health behaviour identified in the literature are presented as control variables.

Sense of coherence is hypothesised to be associated with health behaviour. A strong sense of coherence is expected to have an impact on health behaviour in predisposing individuals to engage in healthy behaviours, such as eating a nutritious breakfast or exercising. Since there are inconsistencies among health behaviours, it is expected that sense of coherence may be more closely related to some behaviours than to others. Similarly, the three components of sense of coherence (manageability, meaningfulness and comprehensibility) are each expected to have different strengths of association with specific areas of health behaviours.

FIGURE 1.1
Study Model



It is theorised that sense of coherence provides a basis for the formation of more specific attitudes. That is, an overall positive attitude to the world and one's own ability to cope with it is expected to be reflected in positive attitudes to specific health behaviours. More specifically, a person with a high sense of coherence, who has a positive view of taking action against threats to health, should have positive attitudes to the specific health behaviours that help reduce the impact of these threats to health.

Specific health attitudes are expected to interact with health behaviours. Analysis of these relationships may demonstrate inconsistencies in the pattern of health behaviours. For example, some individuals may have positive attitudes toward nutrition but not toward exercise. There may also be inconsistencies within each category of health behaviour. For example, an individual could garden and work on the lawn three times a week, but only walk once a month.

It is expected that when sense of coherence and health attitudes are jointly considered along with the control variables, variation in health behaviour will be explained more substantially than when each is considered alone.

1.5 HYPOTHESES

The hypotheses of the study which emerged from literature review are stated below. These are theoretical hypotheses and are therefore stated in the positive, although they will be tested as null hypotheses. These hypotheses will be tested by ascertaining whether the associations between the variables differ significantly from zero. Past findings of the weak association between behaviours and attitudes are to be kept in mind when anticipating

the results.

Hypothesis #1

There is a positive relationship between sense of coherence and level of participation in health behaviours.

Hypothesis #2

There is a positive relationship between sense of coherence and both attitude to physical activity and attitude to nutrition.

Hypothesis #3

There is a positive relationship between both attitude to physical activity and attitude to nutrition, and level of participation in the corresponding health behaviours.

Hypothesis #4

When combined, sense of coherence, specific health attitudes and control variables will explain more of the variance in level of participation in health behaviour than when each is considered alone.

CHAPTER 2: METHODS

This study used a cross-sectional survey method. A personal interview was used to collect data from a random sample of retired, non-institutionalised, English-speaking residents of Calgary between the ages of 65 and 85 inclusive. Interviews were conducted between August and December of 1987.

The rationale for choosing 65 as the minimum age was two-fold. First, all subjects are eligible for the same financial and social benefits. Second, 65 is a common age cut-off point in geriatric and demographic studies. The age of 85 was chosen as the maximum age in order to decrease the probability of selecting individuals with functional and mental disabilities. A 1984 study by Calgary Health Services found that the proportion of dependent elderly rises to over 60% for those over 85 years of age (Reimer and Abernathy, 1984). Restricting the sample to individuals who were retired eliminated any factors related to being presently employed.

2.1 SAMPLING TECHNIQUE

The appropriate sample size was predetermined on the basis of the study having one dependent variable (health promotive behaviour),

two independent variables (sense of coherence and specific health attitudes), and six attribute variables. A sample of 100 subjects was necessary to obtain a medium effect size (explaining 10% of the variance) at the .05 significance level with a power of 84 (Cohen, 1986, p. 414) using correlational analysis. The power for multiple regression analysis is somewhat smaller (approximately 70). A large effect size could have overlooked some of the subtle relationships common to attitude research. On the other hand, a small effect size is not feasible when dealing with attitudes, since there are many unexpected factors that may account for small variations. A power of at least 80 was necessary to validate conclusions from the data. A significance level of .05 was chosen because it is the level most commonly used in attitude research. Since complete data was to be collected on all subjects, it was not important to know the occurrence rate of the behaviours in the population before determining the sample size.

Subjects were chosen using cluster sampling techniques. Since no comprehensive list of elderly persons exists outside of municipal, provincial, and federal government records (which were not available), a simple random sample was not feasible. The three sampling units used were 1) community districts, 2) individual residences and 3) individuals within a residence. A computer-generated table of random numbers was used to select specific sampling units. Only community districts in which seniors

comprise a 20% or greater proportion of the population were included. Using this criteria, 11 out of the 134 Calgary districts were selected. The rationale for choosing only those areas which contain a 20% or greater proportion of seniors was to increase the probability of encountering a suitable subject when contacting a residence. The Chinatown district, which has 23.1% seniors, was not used in this study, because of potential language difficulties. Calgary Census information from 1983 was used in determining the percentage of seniors for each community district. Using a list of all residences in a district, a random starting point was chosen in each of the ten districts.

The interviewer contacted individuals at the door and proceeded in sequence to further residences until ten eligible subjects were interviewed. Only ten subjects per district were chosen in order to minimise sampling bias. Where there was no answer at the door, contact was attempted a second and third time. One interview per household was accepted and, in the case of couples, interviews alternated between male and female. There were no incidents where more than one person per sex resided in a residence. A random starting point was also chosen if a multiple residence dwelling was encountered. In summary, then, ten seniors were chosen from each of ten community districts, making a sample of 100 subjects.

When contacted at the door, subjects were given a covering letter (see Appendix B) explaining the nature of the study. A verbal explanation was also given and a verbal consent to be interviewed was obtained. Confidentiality and the right to refuse to be interviewed were reinforced. Although no names were recorded, a list of addresses was retained to ensure that the same household did not receive two interviews.

In order to reach the goal of a sample of 100 seniors, a total of 497 homes in the City of Calgary were approached. Twenty-five percent ($n=125$) of the homes approached were occupied by one or more seniors. Of the 125 seniors contacted, fifteen refused to participate, and an additional ten were excluded because they did not meet the eligibility requirements. The most common reasons for exclusion were language problems and exceeding the age limit of 85. The sample of 100 respondents represents an 87.7% response rate based on 115 eligible seniors contacted. This response rate varied between the ten districts surveyed from a low of 66.7% in Kelvin Grove, to a high of 100% in a few districts. Table 2.1 summarises the questionnaire response rate by district.

The response rate was found to be only slightly higher (87%) from subjects who lived alone than from those who did not live alone (83%). The response rate also differed slightly by sex, with the response rate from males at 81% and females at 89%. Level of

income had no impact on the response rate.

TABLE 2.1
Household Contacts and Response Rate
by District

District	No. of Homes Approached	% of Homes With Seniors	Response Rate (%)
Bridgeland	24	45.8	90.9
Downtown East	13	100.0	100.0
Eagle Ridge	50	24.0	100.0
Houndsfield Heights	30	33.3	100.0
Kelvin Grove	75	22.7	66.7
Meadowlark Park	44	25.0	100.0
Rideau	91	15.4	76.9
Rosedale	33	33.3	100.0
Shaganappi	53	26.4	71.4
Winston Heights	84	14.3	83.3
TOTAL	497	25.1	87.7

2.2 DESCRIPTION OF THE SAMPLE

Data presented in Table 2.2 show that the sample consisted of 37% males and 63% females, which is within 4% of the Calgary 1981 census information for those 65 years of age and over. The ages of the study sample, in which 34% were aged 65-69, and 66% were aged 70-85, also closely matched the 1981 census (within one percent). There was a sampling bias of 8% toward men in the younger age category in this study.

TABLE 2.2
Comparison of Study Sample to
1981 Calgary City Census
By Age and Sex

Sex	<u>AGE CATEGORIES</u>				TOTAL	
	65-69		70+			
	Sample	Census	Sample*	Census	Sample	Census
TOTAL	34%	35%	66%	65%		
MALE	46	38	54	62	37	41
FEMALE	27	33	73	67	63	59

* upper age limit in study sample is 85

This may have occurred because households were used as the sampling unit. The interviewer encountered a number of men aged 65-69 whose spouses were aged less than 65 and in these cases, only the men met the study criteria, and were interviewed. There was also a sampling bias of 6% toward women in the older age category. This may have occurred because single older men are more likely to be in institutional care than single older women.

The education levels of the sample group were higher than the Calgary census educational levels (Table 2.3). The census included all seniors above 65 years of age with no upper age maximum, whereas this study included only non-institutionalised seniors aged 65 to 85. The study data compares more closely to the 1981 Calgary

TABLE 2.3
Comparison of Study Sample to
1981 Calgary City Census
by Education

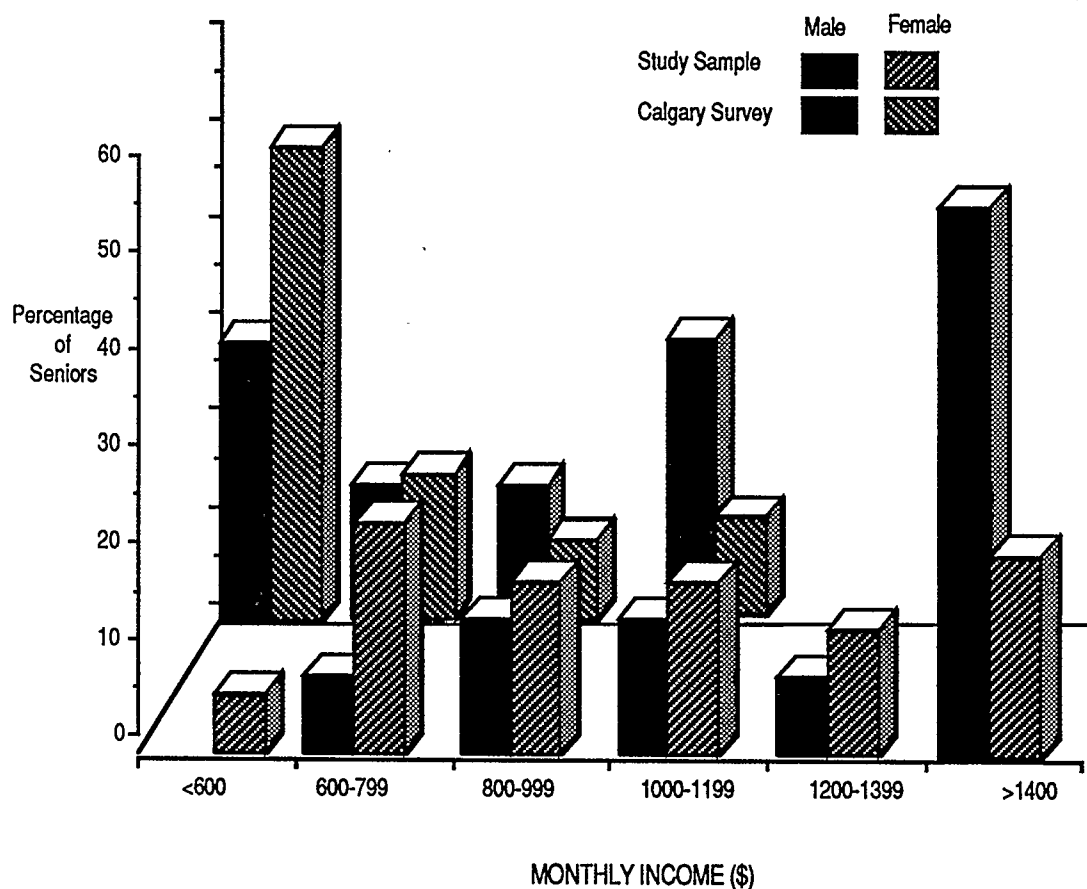
	<u>EDUCATION CATEGORIES</u>		
	Elementary & Secondary	Non Univ. Post-Secondary	University
SAMPLE (65-85)	58.0%	25.0%	17.0%
CALGARY (65+)	72.0	17.0	11.0
CALGARY (55-64)	60.0	23.0	17.0

ALBERTA (65+)	80.0	13.0	7.0
CANADA (65+)	82.0	11.0	7.0

census data for the 55-64 age group. This is an appropriate comparison since many of those individuals would be above 65 by the time of this study.

As shown in Figure 2.1, the income distribution pattern in the study sample was similar to the income distribution in a 1982 demographic profile of the elderly in Calgary (City of Calgary, 1983). In both sexes, income was distributed bimodally, with a peak near the lower income range, and a peak at the upper income range. In males, the distribution is skewed toward the upper end of the income range. In females, the opposite was demonstrated, with the

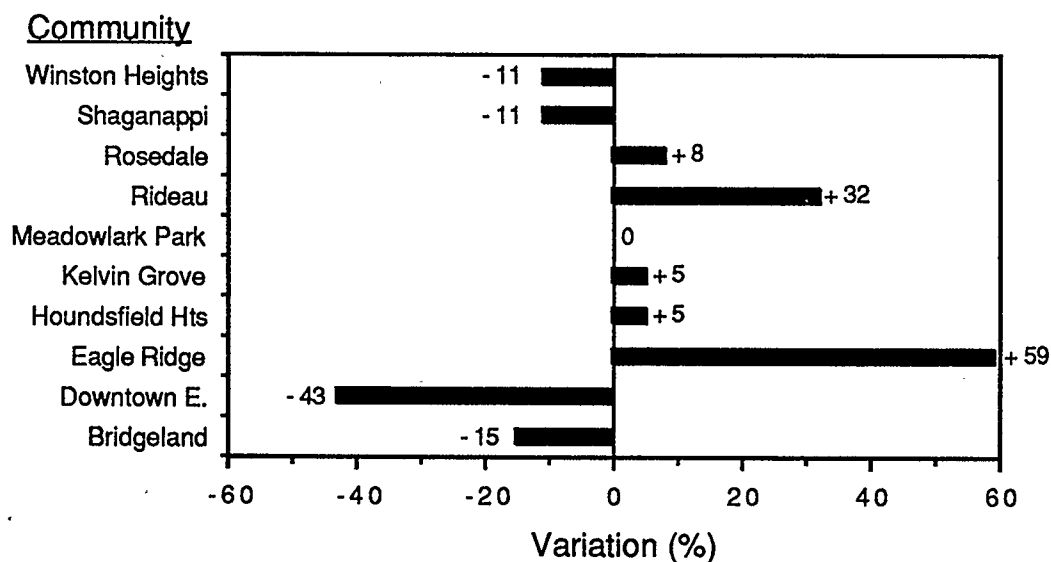
FIGURE 2.1
Comparison of Study Sample and 1982 Calgary Survey:
Monthly Household Income by Sex



largest frequency being near the lower income range, and a smaller peak at the upper income range. Although the distribution pattern was similar between the study sample and the 1982 demographic profile, the actual income levels in the study sample averaged \$300 per month higher than in the 1982 profile. This difference can be explained by calculating inflation and better pension plans during the six years between the studies.

This study's sample does not include the institutionalised elderly, a difference which likely has increased the reported average incomes. However, Figure 2.2 demonstrates that the ten districts selected represented people from districts with a variety of average income levels based on the 1982 Calgary City Census. For example, Downtown East has an average income 43% below the Calgary average, while Eagle Ridge's average income is 59% above the Calgary average.

FIGURE 2.2
Variation in Average Income of Districts
From 1982 Average Calgary Income



Source: Calgary City Census, 1982

2.3 QUESTIONNAIRE

The questionnaire (Appendix C) for this survey consisted of eight parts:

- 1) Self-Perceived Health Status
- 2) Nutritional Behaviour Inventory
- 3) Attitude to Nutrition Scale
- 4) Exercise Behaviour Inventory
- 5) Attitude to Exercise Scale
- 6) Social Interaction Behaviour Inventory
- 7) Sense of Coherence Scale
- 8) Socio-Demographic Data

The sense of coherence scale and the attitude to exercise and nutrition scales were adapted from other studies. Antonovsky's sense of coherence scale has 29 items with a seven point semantic differential format. Since 1982 it has been used in eleven studies (Antonovsky, 1985) having reliability coefficients ranging from .881 to .933 using Cronbach's alpha. It has also been evaluated for construct and criteria validity (Antonovsky, 1985). Although never before specifically tested on the elderly, the broad range of adults tested likely included some older people.

O'Connell et al. (1981) developed a "Nutrition is Important" attitude scale to test teachers' attitudes. It shows high construct validity and reliability (Cronbach's alpha = .84). Although it has only been tested on teachers and parents (Shannon et al., 1981) the vocabulary

appears fairly simple and questions are not geared to any age group. Unlike other scales, it speaks of nutrition in terms of health and therefore relates to this study. The 12-item Likert scale uses a five point format with responses ranging from strongly agree (scored as 1) to strongly disagree (scored as 5).

Only two comprehensive attitude to exercise scales were found in the literature (Kenyon, 1967; Goldberg, 1980). Although developed more recently, and specifically for seniors, Goldberg's scale was tested on only 68 individuals, and no subsequent studies were found. Kenyon's scale, on the other hand, has been used by well-known researchers in the field of exercise and physical activity research (Shephard, 1986; Sidney & Shephard, 1976; Godin & Shephard, 1986).

This scale includes six dimensions of physical activity:

- Social Purposes
- Health & Fitness
- Thrills & Excitement
- Aesthetic Experience
- Recreation & Relaxation (Catharthis)
- To Meet a Physical Challenge

Kenyon's scale was developed using 560 subjects. Since males and females were evaluated separately, a different set and order of questions was compiled for each sex. Hoyt reliability tests were strong for each dimension of the scale ($r=.72$ to $.82$). Validity could not be observed directly since attitudes are unobservable. However, each dimension, except for the aesthetic dimension, was able to

differentiate between strong and weak preference for exercise (significance < .001).

Sidney and Shephard (1976) found that seniors placed a high value on physical activity for "health and fitness" and "rest and relaxation" reasons. Since seniors do not place high value on all dimensions, and since "Attitude to Exercise" was only one part of this study, only two of the Kenyon dimensions (health & fitness, and rest & relaxation) were chosen to represent the attitude to physical activity portion of this study.

Health promotional behaviour was measured in three behavioral areas: physical activities, nutrition, and social interaction. The physical activity level score of frequency and duration is adapted primarily from the Canada Fitness Survey (Health & Welfare Canada, 1981). Many of the physical activities listed are common to other measures of exercise behaviour. This study, as evidenced by the interview questions, focused on physical activity rather than metabolic output. Rest and relaxation were other relevant physical activity behaviours recorded.

Nutrition behaviour items were taken from a number of sources. This study used the scoring method developed by Fannelli and Abernethy (1986) for a 24 hour recall study in which one point was given for each time an individual reported consuming at least the

minimum number of servings for that food group. When fewer servings than recommended had been eaten, the response number was divided by the minimum for that category. The maximum score is equal to the number of categories. Since this study examined general quality of nutritional intake as represented by the five food groups (fruit and vegetables, dairy products, cereals, meats, and empty calories) as opposed to specific nutrient intake, the 24 hour recall gives adequate information. In addition to the 24 hour recall information, the questionnaire included questions on water intake, breakfast eating habits, and questions about buying and preparing food.

Few studies have been done on determining measurement tools for social interaction. Questions for this study were adapted from the Fully Alive Evaluation Questionnaire (Larsen, 1988), Laumann's Urban Social Networks questionnaire (Laumann, 1982) and the Friends and Neighbors Questionnaire (Peterson et al., 1982). All have been tested for validity and reliability.

The self-perceived health status questions were taken from Cockerham et al. (1983). Similar questions have been commonly used to assess perceived health status in other studies (Fillenbaum, 1979; Ferraro, 1980; HPS, 1988) and were found to be a good measure of actual health for seniors living in the community.

The six control variables that were measured are sex, age, marital status, household income, education, and self-perceived health status. All were mentioned in the literature as relating to health behaviours and/or attitudes. Income scores in this study were categorised to increase willingness to disclose income.

In some sections of the questionnaire similar questions are repeated in order to test for reliability. Content validity was established by a panel of experts who critiqued the content and structure of the questionnaire. This panel included a nutritionist, a physical educator, and several social scientists involved in research on the elderly. In addition, ten test subjects were asked to comment on its structure, wording, and appearance. The questionnaire was then revised, and ten subjects piloted the questionnaire.

The personal interview survey method for data collection used in this study has several advantages over telephone or mail-in surveys. Hearing disabilities, which could make telephone interviews difficult for the elderly, were not an obstacle in personal interviews. Visual and comprehension difficulties could have made mail-in surveys difficult. Personal contact was expected to increase comprehension and willingness to participate in the study.

2.4 STATISTICAL ANALYSIS

All statistical analyses were performed using SPSS Update 7-9 (Hull and Nie, 1981). Descriptive statistical tests, such as frequencies and cross tabulations, were initially performed in order to compare the study sample to the wider Calgary population and to compare the frequencies and means with those from other studies. Comparisons of demographic characteristics between the sample and Calgary, provincial and national norms have been presented earlier in this chapter. Chapter Three will present data which compare means and frequencies between this study's sample and those of other studies of health promotional attitudes and behaviours.

Correlations were used to test the first three hypotheses and multiple regression was used to test the fourth hypothesis. Since multiple regression lends itself to analysis of data with the mix of variables present in this study, step-wise regression equations were used to determine which variables contribute to explaining the variance found in the health promotive behaviours. In order for a variable to be entered into the regression equation, a default value for the probability of F of .05 was used. Since the relationships between health promotional behaviours and attitudes are assumed to be reciprocal, each is classified as a dependent variable or an independent variable depending on the relationship being examined. The data on attitudes, physical activity, nutrition and sense of

coherence were coded as continuous variables. The various health promotional behaviour indexes are also continuous. The demographic variables include some items which are continuous and some of which are discrete. Therefore both Pearson's product moment and Spearman's non-parametric correlations were used. A significance alpha level of .05 was used for all the multivariate tests.

Factor analysis with a varimax rotation was performed on the items relating to the three health behaviours: physical activities, nutrition and social interaction. Principle components without iteration were used since no assumptions were made about the structure of the variables. Those questionnaire items that had a correlation of .3 or greater were included in the index. Factor analysis was used both to summarise the behaviours into different factors, and to reduce the number of questions used for the summary behavioral scores. Factor analysis was also used to decrease the concern of the validity of summing behavioral items and losing information (Slater and Linder, 1988). A number of indexes were derived for each of the behavioral components. Since each index was then examined for its conceptual integrity, the factors show both manifest and latent validity.

Table 2.4 describes the indexes that factor analysis derived for the three health behaviours. Physical activity was found to have five behavioral indexes: functional, exercise, walking, recreational and

sleep. Seven nutritional behavioral indexes were factored out. For ease of discussion, these indexes were grouped into three categories. These are nutritional intake patterns (general intake and breakfast), specific food groups (fruit, dairy products, empty calories), and behavioral intentions (positive and negative). Active visiting, passive visiting, satisfaction with visits and having a confidant are the four indexes that comprise the social interaction behaviours.

A brief definition of each behavioral index is given in Table 2.4. For further detail a list of each of the questionnaire items that make up the indexes are presented in Appendix C.

TABLE 2.4
Description of Health Behaviour Indexes
Derived From Factor Analysis

Health Behaviour	Index	Definition
Physical Activity	Functional Activities:	The amount of time spent doing work in the house or yard.
	Exercise:	Taking part in exercise classes or doing scheduled exercises.
	Walking:	The amount of walking, both generally and more specifically.
	Recreational Activities:	The amount of time spent engaged in physically active sports and games.
	Sleep:	Number of hours of sleep nightly.

Table 2.4 (cont.)**Nutrition**Weekly Intake Patterns

General: Quality of nutritional intake based on various food groups.

Breakfast: Quality of breakfasts eaten based on various food groups.

Food Group

Fruit: Frequency of eating fruit.

Dairy: Frequency of eating/drinking dairy products.

Empty Calories: Degree of high sugar and fats in food.

Intention

Positive: Making an effort to engage in positive nutritional health behaviour.

Negative: Making an effort to decrease negative nutritional health behaviour.

Social Interaction

Active Visiting: Frequency and satisfaction with visiting outside the home.

Passive Visiting: Amount of social contact at home.

Satisfaction: Contentment with present level of social interaction.

Confidant: The presence or absence of a confidant.

These categories are unique to this study, and therefore no comparisons can be made with other populations or samples. Discussions on the descriptive findings of the study relating to the health behaviours, then, will use questionnaire items. For example, although the hypotheses are using the seven indexes, the sample is in terms of food groups and questionnaire items relating to breakfast behaviour. Chapter three, then, will use items from the questionnaire as the basis for discussion while chapter four will use the behavioral indexes.

CHAPTER 3: DESCRIPTIVE DATA

Descriptive statistics were calculated as the first step in exploring the variables in this sample. This chapter will examine the frequencies of responses related to health behaviours, and compare them to those found in other studies. There are two purposes for reporting descriptive statistics. The primary purpose is to describe the behaviours of the sample, and thereby give a broader perspective in which to understand and apply the results relating to the hypotheses. A secondary purpose is to compare the data with those of other provincial and national studies in order to see how the elderly in Calgary are either similar to or different from those in other jurisdictions in respect to health behaviours. Specific information about health behaviour and comparative data from other areas in Canada are relevant for program planning. For instance, the analysis may suggest target groups for health promotion and provide a basis for comparing Calgary with other communities in Canada.

Each of the three categories of health behaviours (physical activity, nutrition and social interaction) will be examined both in terms of specific and more general measures of level of participation in the behaviour. In the following section, health behaviours will be examined primarily on an item by item basis. Selected items will

then be compared to provincially and nationally based surveys. Correlates of the health behaviours in some instances will be presented in relation to how they compare to other studies. Further details of the correlates of the health behaviours as they relate to the hypotheses will be addressed in the following chapter.

3.1 Physical Activity

Summary frequencies of the physical activity behaviours are presented in Table 3.1. The findings show that 44% of the seniors participate in such aerobic activities as fast walking, dancing, swimming or water exercises at least 3 times a week. This is considered by fitness experts to be regular exercise (Shephard, 1976). Fewer people are involved in deep breathing and stretching exercises. However, just over half of the individuals sampled reported that they walked at least four blocks a day and 80% reported going for walks at some time during the last year. Walking is the most common form of physical activity.

The findings stating that 44% of the seniors engage in regular aerobic exercises (participating in such activities as fast walking, dancing, swimming or water exercises at least 3 times a week) is slightly less than the national average (51%) for this age group (Shephard and Sidney, 1986). This is true despite the fact that on average, across all ages, Albertans are significantly more active

than the average Canadian (Parakulam, 1987). However, since Alberta has a young population, and younger people tend to be more active, it could be that proportionally more younger, and therefore more active people were sampled in Alberta than in the other provinces. No age specific data is available for Alberta.

TABLE 3.1
Participation in Physical Activity Behaviours:
Summary Table

Percent Agree	Behavioral Item
44	Do aerobic activities (e.g. walking, swimming) 3/week or more
24	Do stretching exercises 3/week or more
19	Do deep breathing exercises 3/week or more
52	Walk 4 or more blocks a day
	Participate in last 12 months:
46	Lawn and yard work
40	Gardening
77	Light house work
41	Heavy housework
42	Shovelling snow from walks
80	Walking
24	Bicycling
10	Swimming
12	Dancing
29	Home exercises
7	Exercise classes
28	Fishing, bowling, golfing, crosscountry skiing or climbing
65	Sleep at least 7 hours/night
26	Have trouble sleeping 1/week or more

Table 3.2 compares frequency of participation in aerobic activities between this study's sample and seniors in the Health Promotion Survey (1988) by both sex and level of education. Although the

Canada Fitness Survey found no sex-related differences in frequency of activity, both the Health Promotion Survey and this study found men to be significantly ($p < .05$) more likely to be involved in aerobic activities than women. In this study, although women are just as likely as men to go on walks, men tend to walk farther than women.

TABLE 3.2
Frequency of Aerobic Activities in Seniors by Sex and
Education:
Comparison of Study Sample (Calgary) to
Health Promotion Survey (Canada)

	Regular (3+/wk)	Occasional (1-2/wk)	Never/Seldom (<1/wk)
Calgary (by Sex)			
Total	44.0%	11.0%	45.0%
Male	48.7	18.9	32.4
Female	41.3	6.3	52.4
Canada			
Total	51.2	7.8	39.4
Male	57.2	6.2	34.4
Female	46.7	9.0	43.4
Calgary (by Education)			
Elementary	27.3%	9.1%	63.6%
Secondary	40.4	8.5	51.1
Post-Secondary	48.7	15.4	35.9
Canada			
Elementary	49.0	15.4	33.9
Secondary	56.6	18.6	24.0
Post-Secondary	58.4	20.8	20.6

There is also a positive association between level of education and frequency of aerobic exercise in the sample from this study and the Canada Fitness Survey (1986). There was no significant relationship found between income level and frequency of aerobic activity in either study. The Canada Fitness Survey found both education and income to be related to frequency of involvement in physical activity.

Most seniors (77%) do their own light housekeeping and almost half do their own heavy housework. In addition almost half of those sampled do some form of outdoor yard work or gardening. A similar percentage shovel their walks in the winter.

Over 20% of the seniors bicycle or participate in exercises at home. Swimming and dancing are also activities in which a number of seniors are involved. Among the 28% of subjects who engage in physically active sports and games, women are involved almost exclusively in golf and bowling, while the activities in which men are involved tend to span a wider range of activities including golfing, hunting, and mountain climbing.

Seniors in this study appear to sleep relatively well, as suggested by the fact that 65% sleep at least seven hours a night and only 25% have problems sleeping once a week or more.

3.2 Nutrition

Information was gathered on both general and specific dietary habits. For the purposes of this chapter, nutritional pattern will be examined item by item, as shown in Table 3.3 and by food groups, as opposed to the indexes used for the multivariate analysis in the following chapter.

TABLE 3.3
Participation in Nutritional Behaviours:
Summary Table

Percent Agree	Behavioral Item
10	Drink 8 or more glasses of water/day
70	Eat 3 meals/day
46	Snack at least once/day
55	Serving of fruit at least 2/day
66	Serving of vegetables at least 2/day
59	Serving of cereals at least 2/day
14	Serving from meat group at least 2/day
39	Serving of dairy product at least 2/day
39	In last 24 hours ate: 2 or 3 servings of fruit
36	2 or 3 servings of dairy products
43	3 or 4 servings of vegetables
41	2 servings of meats or eggs
55	3 or 4 servings of cereals
53	3 or more servings of empty calories
90	Eat breakfast every day
52	Eat high fibre food daily
18	Take a laxative at least weekly
46	Usually eat alone.
70	Attempt to limit the amount of fats in diet
68	Attempt to limit the amount of sugar in diet
72	Attempt to limit the amount of salt in diet
56	Attempt to limit the amount of caffeine in diet
79	Attempt to limit the amount of alcohol in diet
52	Usually read the ingredients on labels
50	Almost always think about food groups when choosing meals

A brief overview of nutritional behaviours is given in Table 3.3. Only 10% of seniors drink eight or more glasses of water a day. This is significant in light of the problem of constipation that pertains to at least 18% of this sample. Almost three quarters (70%) of seniors eat 3 meals a day, and half snack at least once a day. Men have more of a tendency to eat two meals a day than women (35% and 14% respectively), with women being more likely to eat three meals a day.

In general, intake patterns of the food groups seem to be consistent between the general frequency and the 24 hour recall measures. The exception to this is the meat group where substantial numbers indicated that they ate more meat yesterday (41%) than their usual dietary pattern (14%) indicates. A relatively small percentage of both men and women's usual pattern of intake of meat and of milk and dairy products follows the recommended number of servings per day (Table 3.4). When examining diet based on the 24 hour recall, however, it seems that according to Canada's Food Guide, seniors get an adequate amount of cereals but that a slight majority tend to be low in intake of the other food groups. Table 3.4 also displays that, in general, women's diets tend to follow the Canada Food Guide recommendations more closely than the men's. However, women particularly should be targeted for behaviour change in increasing dairy product intake, due to the increased risk for osteoporosis.

TABLE 3.4
Percentage of Seniors Who Consume the Recommended
Number of Servings per Day in Each Food Group
Based on Usual Pattern of Intake
By Sex

	<u>FOOD GROUPS</u>				
	Fruit	Vegetables	Dairy	Meats	Cereals
Sex					
Male	46.0	59.5	38.7	13.5	64.9
Female	60.3	69.9	39.7	14.2	55.5
Total	55.0	66.0	39.0	14.0	59.0

The measures of the adequacy of the diet by food groups are also reflected in the results of breakfast eating patterns. Figure 3.1 indicates that seniors eat breakfast regularly and that they tend to have two to three food groups at a sitting. Cereals, dairy products and fruits are the most frequently eaten foods. This reflects healthy breakfast eating habits. Other meals should therefore be the target for health education since the existing nutritional inadequacies must be associated with meals other than breakfast.

Canada's Health Promotion Survey also found that eating breakfast is a common practice for seniors. In this Calgary study, 97% of the seniors reported that they ate breakfast at least once per week. In addition the daily breakfast patterns show that 90% of the subjects

ate something for breakfast, other than just coffee or tea, every day of the week. The national survey reports similar results, with 92% of seniors in the national sample eating something for breakfast every day. Since eating breakfast is one of the seven health habits associated with good health and longevity (Edelman and Mandle, 1986), seniors in Calgary have good health habits in this area with 97% eating something for breakfast.

FIGURE 3.1
Intake of Food Groups for Breakfast
in Days per Week

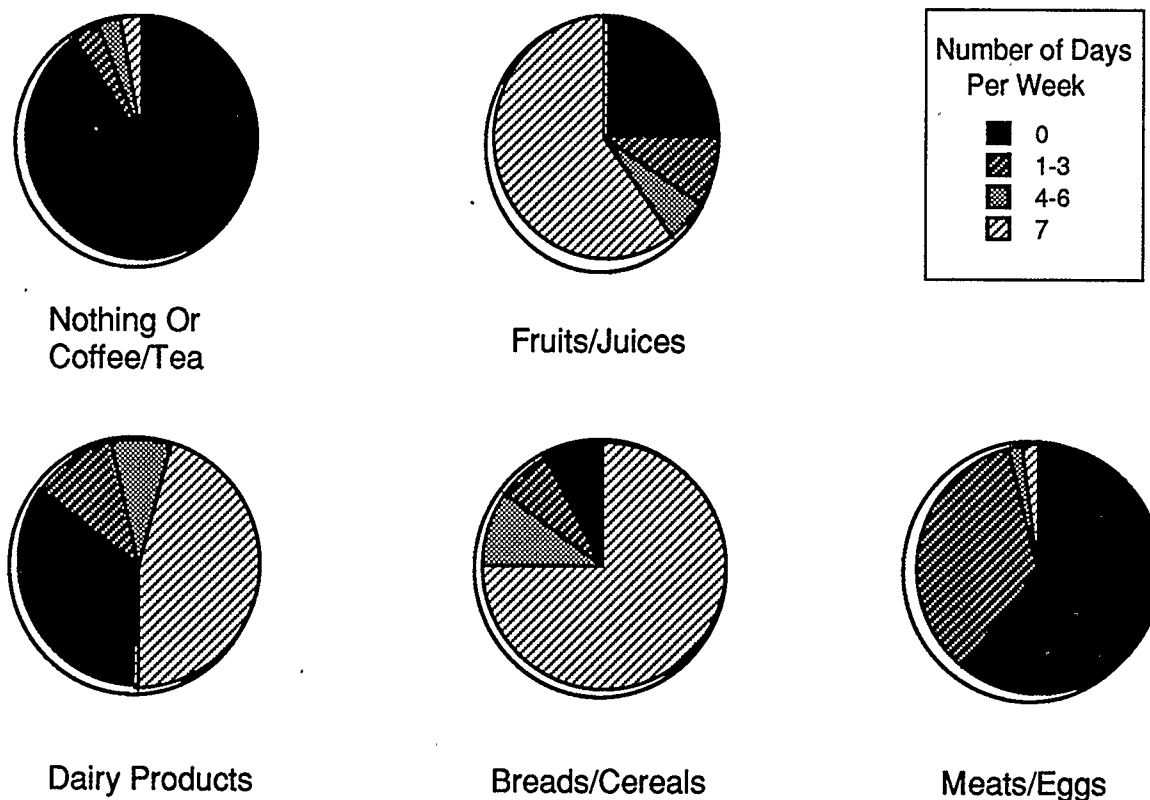


Table 3.5 shows that for both this study and the Canadian Health Promotion study breads and cereals were the most frequently eaten breakfast food group, and meat was the least frequently eaten group. In general, the percentage of seniors eating different food groups for breakfast varied only slightly between the two study groups.

TABLE 3.5
Seniors Intake of Food Groups for Breakfast:
Calgary Survey (1987) and the
Canada Health Promotion Survey (1988)

	<u>Eat from Group at Least Once a Week</u>		
	Calgary	Canada Health Promotion (65+)(all ages)	Food Group
Fruit/Juices	60.0%	61.0%	43.0%
Dairy Products	46.0	52.0	43.0
Breads/Cereals	75.0	72.0	50.0
Meat/Eggs	2.0	13.0	9.0
Nothing or Coffee/Tea	3.0	8.0	18.0

Where the two samples differed is the "meat and eggs" food group. Seniors in other parts of the country appear to be more likely to eat meat for breakfast than their peers in Calgary. Although the Canada Health Promotion survey did not collect data on what food groups comprised breakfasts, the report speculated that they were primarily cereals and fruit. That speculation appears to be

supported in this study.

In addition to differences between the national and local samples, Table 3.5 indicates that there is a difference between older and younger populations. People 65 years and older ate breakfast more often than younger subjects surveyed in the Canada-wide study. Although direct comparisons between the senior age category and the all ages (on average, younger) category in the Canadian Health Promotion sample can only yield tentative speculations, it is interesting to attempt to address the issue of cohort versus maturation changes. In general, cohort changes would suggest that those who are now in the 65+ age group were always breakfast eaters and have continued that pattern to old age, although subsequent generations differ from them in not eating breakfast. The presence of maturation changes, on the other hand, would suggest that as younger persons these individuals did not eat breakfast regularly, but changes in their lifestyle have caused them to eat breakfast more often as they grew older. In the early 1980's 14% to 15% of Canadians of all ages indicated that they did not eat breakfast regularly. This is compared to 18% in 1987 (Canadian Health Promotion Survey, 1988). Since these percentages have remained relatively constant, it may be that the observed differences in behaviour between older and younger age groups can be explained by maturation changes. This is an area where further research is needed as it has implications for long term health

education planning.

In contrast to the Canadian Health Promotion Survey, which found that most nutrition behaviours do not differ between different income and education levels, this study found that income and education affect a number of nutrition behaviours. For instance, income has a significant effect on how many servings of vegetables are eaten in a day. Almost twice the proportion of people who earn \$1,400.00 or more monthly eat two or more servings of vegetables daily as people who earn less than \$800.00 per month (70.6% versus 37.5% of the respective groups). There is a similar but not as strong tendency with increasing education.

Two other nutritional behaviours that increase with increasing income are intake of high-fibre food and the number of meals that are eaten with others. Sixty-eight percent of those in high income groups eat high fibre foods daily, compared with 32% of those in the low income group. The poor frequently eat alone (77% of the time) while those with a higher income rarely do (12%).

Over half of the seniors make an effort to be consciously monitoring their diet in terms of decreasing the amount of negative food choices (see Table 3.3). They also attempt to improve their eating patterns by being conscious of food groups and looking at labels. Further analysis showed that women tend to display stronger

positive intentions to act in accordance with nutritional standards. Sixty-two percent of women usually read food labels and 59% think about choosing meals composed of the four food groups always or almost always. This compares with 35% of men who engage in each of these behaviours. The Health Promotion Study (1988) also found that women generally express greater concern over food choices than men. This greater interest on the part of women may occur because women are usually the primary caretakers of the dietary needs of the family. Intending to decrease negative health behaviours is positively related to both education and income.

TABLE 3.6
Rank Order of Foods to Limit or Avoid
From Most to Least Important

	Calgary Sample	Canada Health Promotion Sample
	"Make a conscious effort..."	"Most important to..."
Total	Salt, Fat, Sugar, Caffeine	Fat, Cholesterol, Sugar, Salt
male	Fat, Salt, Sugar, Caffeine	Fat, Cholesterol, Sugar, Salt
female	Salt, Fat, Sugar, Caffeine	Fat, Cholesterol, Sugar, Salt

Table 3.6 compares Calgary and national samples' responses to limiting intake of unhealthy food products. It is interesting to note

that although salt is the item that is most often controlled, it is thought to be the least important to control by seniors in the national study. Specifically, while only 13.6% of older Canadians think that limiting their salt intake is the most important food decision to make, 70% of the seniors in the current study make an effort to limit their salt intake. Lack of standardisation of questions make these comparisons weak. The approaches to this question in the two surveys were not entirely the same. In the Calgary sample each item was listed, while in the national study respondents were asked to state the foods that they avoid. In the Calgary sample the range of responses to the individual items was 56-72%. Caffeine was limited the least often while salt was limited most frequently.

3.3 Social Interaction

Most of the seniors surveyed in this study have regular social contacts. In the sample, 60% and 47% respectively, either go out, or have visitors in their homes more than once a week. For each of the three measures of satisfaction, over 80% of respondents indicated that they are satisfied with their social contacts. Table 3.7 also indicates that 88% of the seniors have a confidant and 67% see their friends as frequently as they would like. Although men and women tend to have fairly similar social interaction patterns, women tend to visit more with their neighbours. They are also significantly

more likely to talk on the telephone and to be satisfied with the amount of visiting they do by phone.

TABLE 3.7
Participation in Social Interaction Behaviour:
Summary Table

Percent Agree	Behavioral Item
60	Go out to visit more than once a week.
85	Satisfied with going out to visit.
47	Having visitors in more than once a week.
82	Satisfied with having visitors in.
54	Talk on the telephone almost everyday.
93	Satisfied with visiting on the telephone.
67	See friends as much would like.
88	Have a confidant.
50	Frequently visit with neighbours.

People with more education visit with their neighbours more frequently and go out of the house to visit with friends or family more often than those with less education. Income level seems to have little effect on most social interaction behaviours, but does relate to satisfaction with visiting. Education and income are both significantly related to having a confidant in that those with higher education and those with higher income are more likely to have a confidant.

In conclusion, the descriptive data regarding the three health behaviours, physical activity, nutrition, and social interaction, appear to be quite similar to those of other provincial and national studies. A few exceptions to this similarity were noted in this chapter. These exceptions indicate the need for local normative data to plan health programs specific to Calgary seniors.

CHAPTER 4: RESULTS OF HYPOTHESIS TESTING

4.1 RESULTS

4.1.1 Hypothesis One

There is a positive relationship between sense of coherence and level of participation in health behaviours.

This hypothesis is tested in relation to 15 specific health behaviour indexes (Table 4.1). The data show that, for the total SOC score, the hypothesis is supported in relation to eight of the indexes. Total SOC was significantly correlated with one out of five (20%) physical activity indexes, four out of seven (58%) indexes related to nutritional behaviours, and three out of four (75%) of the social interaction behaviour indexes. The significant correlations ranged in size from $r=.17$ to $r=.31$.

One index of physical activity, walking, is correlated with the total score of the sense of coherence scale and with only the meaningfulness component of sense of coherence. The other measures of physical activity: functional activities, home exercises and recreational activities, are not significantly related to the total SOC score or to any component of sense of coherence.

TABLE 4.1
Correlation (r) Between Sense of Coherence Scale
and Health Behaviour Indexes

<u>Scale</u>	<u>Total</u>	<u>Components of Sense of Coherence</u>		
	SOC score	Manageability	Meaningfulness	Comprehensibility
<u>Behavioral Indexes</u>				
<u>PHYSICAL ACTIVITY</u>				
Functional	-	-	-	-
Exercise	-	-	-	-
Walking	.17	-	.21	-
Recreation	-	-	-	-
Sleep	-	-	-	-

<u>NUTRITION</u>				
Intake				
General	.23	.26	.17	.19
Breakfast	.17	.20	-	-
Food Groups				
Fruit	-	-	.22	-
Dairy	.24	.19	.17	.18
Empty Calories	.18	.18	-	-
Intention				
Positive	-	-	.25	-
Negative	-	.22	-	-

<u>SOCIAL INTERACTION</u>				
Confidant	.26	.25	-	.26
Active Visiting	.25	-	.23	.24
Passive Visiting	-	-	-	-
Satisfaction	.31	-	.37	.20

only Spearman correlations significant at the 0.05 level are reported

As expected, the total SOC score and each of the sense of coherence components has differing relationships with the various indexes of nutritional behaviour. All seven of the nutritional behaviour groups are correlated significantly with at least one of the sense of coherence components. General nutritional intake, breakfast, dairy products, and empty calories are significantly correlated with the total sense of coherence scale. General nutritional intake and dairy product consumption are the only indexes out of the seven nutrition indexes and eight other indexes that are correlated with all three components of SOC. The other five nutritional behaviour indexes are correlated with only one component of SOC. Eating healthy breakfasts, refraining from eating empty calories, and negative nutritional intention are correlated with the manageability component of SOC. Fruit consumption and positive nutritional intention are each correlated with the meaningfulness component of SOC. The manageability and meaningfulness components of SOC are correlated with five and four nutrition indexes, respectively, while comprehensibility is correlated with two indexes.

As reported in Table 4.1, having a confidant, involvement in active visiting, and level of satisfaction with social contacts are correlated with both the total sense of coherence scale and at least one of its three components. All three of these categories of social interaction are correlated with the comprehensibility component of SOC. Having a confidant is correlated with manageability, while

active visiting and satisfaction with visiting are correlated with its meaningfulness component. Passive visiting is not correlated with either the total sense of coherence scale or any of its components.

4.1.2 Hypothesis Two

There is a positive relationship between sense of coherence and both attitude to physical activities and attitude to nutrition.

The results depicted in Table 4.2 indicate that SOC is positively correlated with both the physical activity attitude scale and the nutritional attitude scale; therefore the hypothesis is supported. The correlation coefficients are .18 and .23 for physical activity and nutritional attitudes respectively.

The attitude that being physically active is for health and fitness purposes is correlated to total SOC, whereas, the attitude that being physically active is for the purpose of relaxation is not related to total SOC.

Attitude to physical activity, both in total and in its two dimensions, is correlated to the meaningfulness component of SOC. It is not correlated with either the manageability or the comprehensibility components of SOC.

TABLE 4.2
Correlation (r) Between Sense of Coherence and
Attitudes Towards Health Behaviours

<u>Scale</u>	<u>Total</u>	<u>Components of Sense of Coherence</u>		
	SOC score	Manageability	Meaningfulness	Comprehensibility
ATTITUDE				
Physical Activities				
Total	.18	-	.30	-
Health and Fitness	.18	-	.27	-
Relaxation	-	-	.29	-

Nutrition				
Total	.23	.21	.33	-

Only correlation coefficients significant at the 0.05 level are reported

Attitude to nutrition is related to both the manageability and meaningfulness components of SOC. As with the attitude to physical activity scales, attitude to nutrition is not related to the comprehensibility component of SOC.

4.1.3 Hypothesis Three

There is a positive relationship between both attitude to physical activity and attitude to nutrition, and level of participation in the corresponding health behaviours.

Table 4.3 demonstrates that this hypothesis is supported for most categories of health behaviour. Both of the attitude scales are significantly correlated with a majority of the corresponding health behaviour indexes.

Of the five categories of physical activity, four are significantly positively associated with the total score of attitude to physical activity. Amount of time spent on functional activities and level of participation in exercises are both positively correlated with the attitudes of being involved in physical activities for the purpose of health and fitness. Walking and having physically active recreational pursuits are correlated with the attitude that involvement in physical activity is important for relaxation (catharsis). The index of sleep activity is not significantly related to any of the physical activity attitude dimensions.

There are statistically significant correlations between attitude to nutrition and all but two of the nutrition behaviours (Table 4.3). Both the measures of usual patterns of overall dietary intake are correlated with attitude to nutrition. There is a positive correlation between attitude to nutrition and eating fruit, and an inverse correlation between attitude to nutrition and the intake of empty calories. The latter is an inverse relationship because eating less empty calories is the positive health behaviour.

TABLE 4.3
Correlation (r) Between
Health Behaviours and Attitudes

ATTITUDE	BEHAVIORAL INDEXES						
<u>PHYSICAL ACTIVITIES</u>							
	Functional	Exercises	Walking	Recreational	Sleep		
Total	.18	.35	.22	.25	-		
Health/Fitness	.20	.49	-	-	-		
Catharsis	-	-	.26	.30	-		

<u>NUTRITION</u>							
	Overall Intake		Food Groups			Intentions	
	general	breakfast	fruit	dairy	empty calories	positive	negative
Total	.28	.30	.49	-	-.30	.50	-

Only correlation coefficients significant at the 0.05 level are reported

The data show no significant correlation between attitude to nutrition and the intake of dairy products. A correlation was found between attitude to nutrition and positive intention, but not with negative intention to have healthy nutritional behaviours.

4.1.4 Hypothesis Four

When combined, sense of coherence, the specific health attitudes and the control variables will explain more of the variance in level of participation in health behaviours than when each is considered alone.

The hypothesis is supported as the regression model containing sense of coherence, the specific health attitudes, and the significantly contributing control variables, does explain a significant amount of the variance of most of the indexes of the three health behaviours (Table 4.4). There are two different relationships demonstrated in Table 4.4: 1) the total amount of variance in health behaviour that is explained when all the independent variables that were entered into the equation, and 2) the amount of variance explained by SOC, specific health attitudes and the significantly contributing control variables individually, given that the other variables are in the model. The effects of the independent variables on each behaviour (physical activity, nutrition and social interaction) will be examined individually. The regression equations for the behavioral indexes are included in Appendix E.

The regression method of analysis permits the assessment of the relative strength of all the variables in relation to each other. Partial correlations are used to describe the strength of the

contribution that the independent variables make to total variance explained. This test measures the incremental variance that is explained by the new variable.

The amount of variance explained by each model ranges between 10% and 34% for physical activities and 9% and 42% for nutritional behaviours. The range in the variance for social interaction is 11% to 23%. While most of these variances are not considered large, they are consistent with those predicted by the literature and hypothesised when the sample size was determined. It was hypothesised that a moderately sized relationship would be found, which is a relationship of explaining approximately 15% of the variance. It can be said, then, that this hypothesis held true for most categories of the health behaviours.

The control variables that were used in the model are both demographic variables and self-perceived health status. The demographic variables are age, sex, marital status, income and education. The composite variable, self-perceived health status, includes physical health, emotional health and peer comparative measures. The independent antecedent variables used in the multiple regression are derived from the study model developed in the conceptual phase of this study. All of the these variables were included in the regression model for analysis in order to test the strength of the study model in explaining the variance in the health

TABLE 4.4
The Percentage of Variance in Health Promotive Behavioral
Indexes Explained by the Total Regression Model
and by the Partial Correlations of Sense of Coherence,
Health Attitudes and other Significant Control Variables
 (Control variables in the model are age, sex, marital status, education, income and
 physical and mental self-perceived health status (SPHSP, SPHSM))

BEHAVIORAL INDEXES	Total Variance	SOC	Partial Correlations	
			Attitude	Control Variables
<u>Physical Activities</u>				
Functional	-	-	-	-
Exercise	22.5%	-	12.9%	SPHSP(3.4),education(4.8)
Walking	33.5	-	6.8	SPHSP(6.9)
Recreation	20.7	-	6.3	age(6.7)
Sleep	9.9	-	-	SPHSP(4.3)

<u>Nutrition</u>				
Intake				
General	19.9	8.3	6.5	-
Breakfast	21.0	-	5.5	-
Food Groups				
Fruit	34.2	-	20.2	sex(3.6)
Dairy	9.0	4.6	-	-
Empty Calories	17.7	-	4.6	-
Intention				
Positive	41.5	-	21.1	SPHSM(4.9), sex(5.8), age(3.0)
Negative	14.0	-	-	education(5.5)

<u>Social Interaction</u>				
Confidant	22.7	13.6		age(4.4)
Active Visiting	20.1	7.1		marital status(7.6), age(3.7)
Passive Visiting	17.3	-		age(6.0), sex(6.2)
Satisfaction	11.0	-		income(6.8)

Only results significant at the 0.05 level are presented

behaviours. For all the physical activity behavioral indexes except functional activities the model explains a statistically significant amount of the variance.

Sense of coherence is not a significant contributor to the model for any of the physical activity behaviours. However, attitude to physical activity contributes to explaining variance for three of the physical activity indexes; exercise, walking, and recreation. Functional activities and sleep are not significantly affected by attitude to physical activity. Exercise, walking, and sleep are affected by physical self-perceived health status, while exercise and recreation are affected by education and age respectively.

All of the nutrition behavioral indexes are significantly explained by each of the regression models (Table 4.4). The range of the variance in behaviour explained by the models is 9.0% to 41.5%. Sense of coherence contributes significantly to two of these behaviours; general nutritional intake, and consumption of dairy products. Attitude to nutrition contributes significantly to five of the seven nutritional behavioral indexes. The exceptions are dairy product consumption and negative behavioral intentions. Sex contributes to explaining the variance in two nutritional behaviours, while mental self-perceived health status, age, and education each contribute to a different nutritional behaviour index model.

Apart from the influence of the attitudes, there appears to be little pattern to which variables are significant predictor of the nutritional behavioral indexes. General nutritional intake is affected by both sense of coherence and attitude to nutrition. Consumption of dairy products is significantly affected only by sense of coherence, while breakfast behaviour and consumption of empty calories are affected only by attitude to nutrition. Fruit intake and positive nutritional intention are both affected by at least one control variable. In addition, fruit intake is affected by sex, while positive nutritional intention is also affected by mental self-perceived health status and age. Negative nutritional intention is affected only by education.

The regression models explain a statistically significant amount of the variance in all four of the social interaction behavioral indexes. Sense of coherence contributes significantly to two of these indexes. At least one control variable contributes to each of the four social interaction behaviours. Age contributes to three indexes, while marital status, sex, and income level each contributes to a different social interaction behaviour. Having a confidant and active visiting are both affected by SOC and age, but active visiting is also affected by marital status. Passive visiting and satisfaction with social interaction are not affected by SOC. Passive visiting is affected by age and sex, while satisfaction with visiting is affected by income level. Having a confidant is the only behaviour where a

variable that does not have a simple correlation with the behaviour is a significant predictor in the regression model. In this instance, age is important only after it has been controlled for by sense of coherence.

4.2 DISCUSSION

Examining the role of sense of coherence and increasing the ability to explain which variables determine seniors' participation levels in specific health behaviours were the purposes of the study. The discussion will focus around the regression modelling.

Sense of coherence was not as strong a contributor to the models of health behaviour as was expected. When the contribution of SOC in explaining the variance in level of participation in most of the health behaviours was examined relative to the other variables, little or no additional predictive strength was gained. One possible explanation for this is that the correlations between sense of coherence and the health behaviours were relatively weak at the univariate level.

A second explanation is that since SOC is correlated with most of the control variables, (i.e. marital status, income, sex and self-perceived health status) these variables could have confounded

the relationships in the univariate analysis. For example, when it acts alone, sense of coherence has a correlation (r) of .17 or a variance (r^2) of 3% for the walking index. When the other factors are entered into the model, however, this effect is eliminated. In other words, even though it achieves statistical significance independently, when sense of coherence is examined in light of other influences on a person's level of participation in walking, it no longer plays as significant a role. On the other hand, people with a high sense of coherence are more likely to be actively involved in relationships, regardless of sex, income, education, marital status or self-perceived health status. Where SOC has a significant influence on nutritional behaviour, none of the control variables are predictive of the behaviour. The relationships observed for nutritional behaviour support Antonovsky's theory that sense of coherence should transcend socio-demographic influences.

A third explanation for why the effect of SOC is weak is a more theoretical one. Some researchers into attitudes have postulated that higher level or more global attitudes have smaller influences on a behaviour than more specific attitudes. For this reason SOC remains a significant predictor of the general quality of dietary intake, but has little effect on more specific nutritional behaviours. This finding is reflected here in that the attitudes to the health behaviour are generally more consistently correlated to the behaviour than is sense of coherence.

Attitudes to health behaviours appear to be relatively consistent predictors of health behaviour, even when the effect of other variables are controlled. As was seen with the simple correlations, associations tend to be weak to moderate. The specific attitude to physical activity plays a significant role as a correlate of physical activity even in competition with other influences. The attitude that being physically active is important to health and fitness, then, plays an important part in determining level of participation in exercises. Belief that physical activity is important to relaxation plays a significant role in walking and pursuing active recreational activities despite the influences of sex, income and marital status. In the same way, people who feel that nutrition is important, for example, are more likely to eat fruit and be proactive in planning their dietary intake.

For each of the three health behaviours, physical activity, nutrition and social interaction, the regression model was found to explain a significant amount of the variance. The model, however, is not a strong one in that the explaining power is not large and the additional variables added to the model did not substantially increase the prediction power for most indexes. With the wide range in the amount of variance that is explained by the models, some categories of each of the three health behaviours are quite adequately explained using the variables that were studied in the model, while others were not.

One physical activity category, functional activity, is not explained significantly by the model. One explanation for this may be that the correlates of functional activities may be unrelated to health factors and more strongly associated with other lifestyle variables such as values relating to the out-of-doors, or skill levels in games. Since a large component of the exercise that seniors get comes from this category, it would be valuable to discover what its predictors are.

As stated earlier, each of the control variables are a significant predictor of at least one of the health behaviour indexes. A few interesting issues stand out. The first observation is that self-perceived health status, in conjunction with attitude, is the most consistent predictor of participation in physical activity. The second observation is that, although the subjects are from a limited age group, age is still a significant predictor for five of the 15 the health behaviour indexes. This may indicate that this age group is not a homogeneous group. There may be a need for studies to define the older age groups more specifically. Since education is a predictor of only three and income a predictor of just one health behaviour index, socioeconomic factors do not seem to be important predictors of most health behaviours when attitude and self-perceived health status are controlled.

Of all the variables, specific health attitudes are the strongest contributors to explaining the variance in physical activity and nutritional health behaviour. Age and sense of coherence were the strongest contributors to social interaction behaviour while physical self-perceived health status was the control variable most consistently related to level of participation in physical activity.

CHAPTER 5: IMPLICATIONS AND CONCLUSIONS

In this study two tenets of health promotion were supported: 1) that attitudes and behaviours are related to each other; and 2) that demographic and other control variables have a significant impact on health behaviour. In addition, it was found that sense of coherence explains some of the variance in health behaviour. The findings of this study further indicate the importance of 1) exploring the effect of additional concepts in order to increase the amount of the variance in health behaviour that can be explained, and 2) controlling for the effect of a number of variables in order to predict who will participate in health behaviour.

Two aspects of the study results will be discussed in this chapter. First, the implications and the relevance of the study results will be discussed. Second, further research questions suggested by this study will be explored.

5.1 IMPLICATIONS

There are numerous implications of the study results for health promotion practice and theory. The implications explored here are

based on the four purposes raised in the relevance section of Chapter 1. Specifically, these are: 1) to contribute to an understanding of the theoretical relationship between health behaviour and attitudes and other correlates; 2) to integrate the concept of sense of coherence into health promotion programs; 3) to provide information regarding health education and program planning, and 4) to suggest practical applications of the study for health conscious seniors.

5.1.1 Health Behaviour and Its Correlates

Few other studies were found that looked at both attitudes and control variables as correlates of health behaviours. This study, however, replicated the results of other studies which found that different health behaviours have different correlates, and that the different aspects of each health behaviour also have different correlates. This study also showed that attitudes consistently strengthen the explanatory power of a model of health behaviour.

As was found by studies cited in the literature review, attitudes consistently explained a small to moderate amount of the variance in physical activity and nutrition behaviour. This suggests that the development of attitude scales for other specific health behaviours would be of help to other investigators who seek to explain variance in such health behaviours as social interaction and stress

management.

Trends found in the relationships between the control variables and the health behaviours are notable because of their implications for health promotion program planning. After accounting for the effect of attitudes, self-perceived health status was the most significant predictor of level of physical activities. However, this variable did not play a significant role in predicting nutrition or social interaction behaviours. In addition, education appeared to be the most important measure of socioeconomic status. Unlike other measures of socioeconomic status it was related to at least one aspect of each of the health behaviours. This could imply that education is a better measure of socioeconomic status in the elderly. Two factors that are known to decrease income are common to this age group; 1) all the subjects are retired, and 2) a number of the women are widowed. Therefore, income level may not adequately reflect social status in the elderly.

This study, unlike other studies, addressed the cumulative weight of all the variables. Despite the attention given to examining the combined weight of the control variables, sense of coherence, and specific health attitudes, the model explains only a moderate amount of the variance in the health behaviours. A range of 9.0% to 34.2% of the variance in health behaviours was explained by the

study models. This indicates that external factors explain more of the variance than those variables contained in the model. In order to increase significantly the amount of explained variance in health behaviour, additional types of correlates should be sought. Values, beliefs and peer support are correlates that could be added to the model. Further items relating to behavioral intention could also be considered.

Further attempts to explain health behaviours using new correlates should include the significant correlates identified by this study to be significant predictors of health behaviours. Self-perceived health status in particular, should be retained in further studies, as it is featured in this study as an important correlate of several indexes of health behaviour. In addition, a more expansive measure of health status may assist in determining how health status acts on physical activity and on other health behaviours. The WHO report on epidemiological studies of the elderly (1984) suggests autonomy, chronic illness and use of health services as further measures of health status.

5.1.2 Sense of Coherence

In general, sense of coherence was not shown to be a significant correlate of most health behaviours when other variables examined

in this study were controlled. However, sense of coherence did explain a significant amount of the variance in four of the specific indicators of health behaviours measured. There are two general observations to be made about the relationships of sense of coherence to the other variables. The first observation is based on Antonovsky's (1987,p.16) supposition that comprehensibility is the core concept of sense of coherence. This statement is supported by the findings of this study since SOC was a significant predictor of health behaviour only if the comprehensibility component of the scale was significantly correlated with the behaviour. It would seem that believing that life is predictable affects participation in health behaviour. Taking action to prevent health problems may depend on being able to see life as having order.

Secondly, sense of coherence was correlated with all of the control variables except age. The control variables present in the multivariate analysis may account for the minimal effect of SOC on health behaviours. Antonovsky's Salutogenic Model of Health (Appendix A) seems to support this in that Antonovsky has theorised that SOC transcends socioeconomic factors. Alternatively, since most attitudes scales are correlated with these control variables, this finding could serve to enhance the validity of the SOC scale. This alternative explanation may hold where such resources as commitment, control and stability are related to socioeconomic

status.

While comprehensibility appeared to be the most important factor in determining influence of sense of coherence on a behaviour, the meaningfulness component of sense of coherence was most consistently associated with the attitudes to health behaviour. This finding may be accounted for in that attitudes and the meaningfulness component of SOC are both contain emotional dimensions. This may indicate that meaningfulness is the true attitudinal component of SOC. If one is targeting attitudinal changes, using SOC messages as a trigger to change could be helpful. For example, in designing messages to change someone's nutritional attitudes, the messages should be based on relationships, support systems, or meaningfulness in life.

Sense of coherence was more consistently correlated with social interaction than with the other two health behaviours studied. This finding is in line with Antonovsky's Salutogenic Model of Health (Appendix A). Social interaction may therefore have a more direct effect as a general resistance resource, which in turn strengthens SOC. However, since there was no attitude scale used with this behaviour, the relative impact of the specific attitude is unknown. The relationship between sense of coherence and social interaction is important in terms of mental health. Since having a confidant and

regular social contact are conducive to good mental health, the concept of SOC may be appropriately used in efforts to encourage these behaviours.

Although sense of coherence was not a significant contributor to physical activity, sense of coherence appears to be related to at least one global measure of nutritional health behaviour. This could be seen to support the assumption that global measures of attitude relate to global measures of behaviour. An example in this study is that SOC is a predictor of the general quality of nutritional intake. When addressing the influence of SOC on health behaviour, perhaps broad general measures should be used. If a cumulative global measure of the health behaviours was devised, it may be found to have a stronger relationship with SOC than found in this study. Individuals who have a higher SOC may be more consistently involved in health behaviours overall.

5.1.3 Health Education and Program Planning

Implications for health planning will be discussed in terms of attitudes, sense of coherence and control variables. The relationship between sense of coherence and specific health behaviours was shown to be weak and infrequent compared to the relationship of the specific health attitudes and to their

corresponding health behaviours. For social marketers and health educators, this implies that campaigns should be targeted to specific attitudes, rather than trying to influence a presumed global perspective on life. The most consistent predictor of health behaviour is attitude. Therefore, focusing efforts on modifying specific attitudes should have a significant impact on health behaviours.

For social marketers and health educators, the reinforcement of the relationship between attitude and behaviour is important. The findings of this study confirm that health-related seminars, or health television or print messages that are directed toward specific attitudes have potential benefits for changing behaviour. For instance, one of the strongest links between attitude and nutritional behaviour is intention to engage in positive nutritional behaviours. Since one of the factors in this category is "label reading", messages in stores which encourage this behaviour could be effective.

Another important aspect of the relationship between health attitudes and behaviours revealed by this study is the specificity of that relationship. This is illustrated in that the two dimensions of attitude to physical activity (i.e., "health and fitness" and "relaxation") are associated with different aspects of physical

activity. Having a positive attitude toward physical activity as a method of promoting health and fitness is related to having a regular exercise routine and to being involved in physically active functional activities. On the other hand, having a positive attitude to physical activities as a method of emotionally relaxing, is associated with going for regular walks and being active in physical recreational activities. Therefore, health programs encouraging seniors to walk more should focus on the relaxation benefits of being physical active rather than on the health and fitness benefits.

Similarly, if program planners wish to target attitudes toward nutrition, then the behaviours which should be measured to gauge individual and program success should be those categories of nutrition behaviour that have strong correlations with the specific attitudes measured. For example, a nutrition class targeted to improving seniors' attitude to nutrition should use positive nutritional intentions and intake of fruit as outcome measures. Other outcome behaviours to be used for evaluation could be type and frequency of breakfast eaten, and number of empty calorie servings eaten in a day.

Socail marketers suggest (Ben-Sira,1982) that it is more effective to recruit audiences for health education from previously defined target groups who are more likely to become involved in the desired

behaviour. These target groups could include specific demographic groups. For example, people with higher education and income tend to have positive attitudes to health behaviours. They would therefore tend to be more involved, and more willing to become involved in health oriented programs than people with lower education. On the other hand, if the object of a program is to target pockets of seniors with low participation in health behaviours, then it would be more efficient to design programs which attract low income and low education segments of the senior population. The value of this study is that it allows groups to be more specifically targeted to those variables that are significant predictors of the behaviour. For example, a nutrition program may focus on either increasing good shopping and meal planning behaviour or on decreasing intake of harmful foods. The findings of this study suggest that groups should therefore be targeted based on either attitude, mental health, and sex, or on education, depending on the behavioral focus.

Since no Calgary-specific data on health behaviours in seniors has been collected previously, program planning for health promotion among seniors in this city has relied on national and provincial data. This study could aid program planning in Calgary as it provides data on seniors specific to this area. For example, it was found that Calgary seniors tend to be slightly more sedentary, and that their

health behaviours tend to be more influenced by educational level than their peers nationally. Knowing this, health educators can focus programs to address this specific need and use local normative data for future evaluation.

Finally, although the elderly seem to expect the least health gains from exercise, they stand to gain the most particularly in the short term (HPS,1988). Because of this low expectation of success, it may be difficult to recruit seniors into exercise programs. Efforts in recruiting could emphasise this expected improvement. Since functioning is greatly affected by involvement in even moderate exercise, this group should be motivated by their improved functioning to continue with a program. Furthermore, since participation in an exercise program was related to the "health and fitness" aspect of attitude to physical activity, the focus of health education for the elderly should be on those activities which they believe will improve health.

5.1.4 Implications for Seniors

There are further implications from the findings of this study which may assist seniors to examine their own behaviours in terms of self-help. These implications relate to how seniors can improve their level of participation in health behaviour through enhancing

their own attitudes and perspectives on life.

Seniors can aim toward more participation in healthy behaviours by working on their specific attitudes. For example, to aim toward better nutritional intake, they could attend a seminar or read material focusing on developing health-conscious nutrition attitudes. Seniors could also improve their mental health as a method of improving their intention to have positive nutritional health habits. Self-help programs may be an appropriate vehicle for these issues.

Although the impact of SOC on the behaviours is small, there is some indication that it influences some health behaviours of seniors, especially if the seniors rate high on the comprehensibility component of SOC. Being involved in a self-help program, church group, or relationship that enhances the perception or attitude that the world is predictable, understandable and orderly may increase the probability that a senior would engage in positive health behaviours. This is particularly true concerning the social interaction behaviours.

Social interaction plays an important role in a senior's outlook on life and is the behaviour that is most strongly influenced by SOC. Being socially active may contribute to a person feeling that life

has meaning and purpose. Having a close friend, making an effort to be socially active, and going out, all appear to contribute to a person's feeling that life has order, can be understood and is predictable.

Although most of the control variables are not subject to change, this may not be true for self-perceived physical health status. Steps taken to improve how physically fit and healthy a senior feels may increase the amount of physical activity he or she engages in. Conversely, being involved in physical activity may serve to improve self-perceived health. Since this indirect measure of health is linked to illness outcomes, it is important to develop methods to improve involvement in physical activity.

5.2 FURTHER RESEARCH

A number of questions for further research arise from this study. These include the need to 1) expand the observed correlates of health behaviour, 2) explore further the applicability of SOC, and 3) improve the methods and design of studies of health behaviour.

Other potential correlates of health behaviours need to be added to the current model in order to increase the amount of variance explained. This is particularly important for functional physical

activities, as none of the variables significantly predicted the variance in this behaviour. These possible correlates could include intentions, beliefs, and knowledge of health behaviour. Experiential factors could also be added to the model. For example, in studies of the elderly, it may be informative to study their behaviour patterns throughout life, rather than observing the present time frame only. Examining childhood and younger adult values and behaviours could also help to differentiate between cohort and maturation influences on health behaviour. It would also be valuable to include possible non-health correlates. This could involve looking at other motivations associated with health behaviours, such as concern about appearance.

As sense of coherence did not appear to be strongly correlated with health behaviours in the community sample of seniors, its value in association with health should be examined under different conditions. Firstly, SOC was associated with global nutritional behaviour. It should, therefore, be further assessed in relation to other global health behaviours to see if the relationship continues to be upheld. Secondly, since it was related to only one of the two nutritional intention measures, its relationship with other health behaviour intentions should be explored further. Thirdly, since sense of coherence deals with managing one's resources, it may be that examining people in more crisis oriented situations may help to

further clarify the role that sense of coherence might have. Since it was incidentally found to be associated with more illness-related behaviours, such as insomnia, SOC may be more closely related to adaptation to illness. SOC then, may be more easily observed when current coping measures are challenged as in illness. Fourthly, the effect of SOC on different age groups should be examined to see if relationships found continue to hold true, as the findings of this study relate only to the elderly. Finally, the importance of comprehensibility as the key predictor of the role of SOC in predicting level of participation in health behaviour should be examined further.

As mentioned earlier, there are a number of methodological issues that should be addressed by future studies. Future studies may find "happiness" to be a more valid term than "mental or emotional health" in the wording of the question for self-perceived mental health. As happiness was the concept measured in such national studies as the HPS, this would also have increased the comparability of the findings with those of other studies. In addition, the personal interviews may have encouraged a social desirability response bias. The attitude scales were the only sections where questions were balanced for acquiescence. This may be reflected in the tendency of subjects in this study to have slightly higher means. For example, seniors in this study have higher mean responses to the SOC scale

than those reported by Antonovsky (1987). Since there is such variability in the correlates of health behaviours, it would be valuable to develop attitude to health behaviour scales for other health promotional behaviours such as social interaction. This would enable the correlates of social interaction to be examined more completely, and would make comparisons with nutrition and physical activity behaviours more equitable. More precise and standardised measures of health behaviour would also increase the validity and generalisability of findings from various studies.

Other limitations of the survey method that should be addressed in further research include those associated with retrospective cross-sectional surveys. Retrospective recall could be a problem as data was collected during late summer, fall and winter. A longitudinal study will eliminate the problem of seasonal changes to participation on various behaviours. Although the multivariate analysis assumed that SOC attitudes and the control variable predict variance in health behaviour, cause and effect relationship can not be determined by a single observation. An experimental design would have to be employed in order to determine the direction of the relationships.

5.3 CONCLUSION

The findings of this study are significant in that they 1) contribute to theoretical knowledge of the correlates of health behaviours, 2) aid health educators and program planners, 3) aid seniors in their search for a healthier old age, and 4) expand the investigation of the role of sense of coherence in health promotion.

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