PARTICIPATION IN ADULT LEARNING ACTIVITIES AND THE RELATIONSHIP BETWEEN SOCIAL STRESS AND HEALTH

by

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ABSTRACT

The purpose of this study was to explore the relationship between stress, participation in learning activities and health to test the proposition that active learners maintain their health in stressful environments while non-active learners in stressful environments experience decrements in health. A randomly selected sample of adults between eighteen and sixty-five years of age was selected from a population of patients who had sought health care from a family physician. The study used a panel design with two data collection periods approximately nine months apart. A total of 263 patients completed the first interview and 226 completed the final interview.

Ten theoretical propositions derived from a review of related literature were incorporated into a model with proposed causal paths and was tested using path analysis procedures. The theoretical propositions posited that: (1) high social stress would be associated with low levels of health functioning and with decrements in health over time; (2) participation in learning would be influenced by social stress; (3) participation in learning would be associated with high levels of health functioning and with improvements in levels of health over time; (4) subjective stress would be associated with levels of social stress and the decision to engage in learning activities; (5) perceived stress would influence levels of

health functioning and the decision to engage in learning activities. Additionally participation in learning activities would be affected by: (6) generalized expectancy for control over the social environment; (7) personality; (8) attitudes toward adult education; (9) age, sex, income and years of schooling and (10) participation in formal social organizations would be associated with levels of health functioning.

Health status was quantified by a scale which assessed health from the perspective of a person's ability to function socially and in his or her regular employment. Additional health data gathered included severity of illness, health change, number of visits to the physician's office and number of days spent in hospital. Five measures of stress were used in the study with social stress being quantified by the Social Readjustment Rating Scale, a scale consisting of 43 life events which demand social readjustments on the part of an individual when experienced. Participation in learning activities and attitude towards adult education were quantified by scales developed for use in this study.

Factor analyses were conducted to test the construct validity of the health and stress variables and the results obtained provided strong support for the validity of each of the variables as individual measures of the constructs of health and stress. To test the validity of the learning activity and attitude towards adult education scales the scale scores were correlated with five criterion variables. Collectively, the observed inter-correlations supported the validity of the two scales. Hoyt reliability coefficients were calculated for each of the seven psycho-metric scales

used in the study and the coefficients obtained ranging from .69 to .87 indicated acceptable levels of reliability for those study instruments.

The results of a series of path analyses were examined to determine whether or not each of the ten theoretical propositions could be supported on the basis of the path coefficients obtained. Overall, the hypothesized relationships between the stress and health variables, and the socio-demographic variables and participation in learning activities were confirmed. The analyses provided no evidence to support the propositions that participation in learning activities was influenced by levels of subjective stress, perceived stress, or locus of control. One unexpected finding was that participation in formal social organizations had decremental effects upon health although it was positively associated with participation in learning. Modest support was obtained from the analyses for the proposition that participation in learning activities promotes levels of future health although no effect of participation in learning activity upon health change was observable.

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CHAPTER I

INTRODUCTION

Society today is in an unprecedented state of social, political, economic and technological change. The fundamental structure of society is in a state of flux with practically every individual being affected by seemingly uncontrollable alterations in his daily life. Evolving from these changes is a social state of increased complexity and impermanence. Observers such as Drucker (1968) and McLuhan (1964, 1967) have described the pervasiveness of these changes and have sought to identify the demands made upon man to cope with social change. In 1965 the term "future shock", was introduced by Toffler to describe "the shattering stress and disorientation that we induce in individuals by subjecting them to too much change in too short a time" (Toffler, 1970, p. 2).

For many years researchers have been accumulating evidence through laboratory and epidemiological studies to

show that stress and change are precursors of illness (McQuade and Aikman, 1974; Lazarus, 1966; Wolff, 1953; Levi, 1967 and 1971; Engle, 1962). During the last twenty years there has been an acceleration in the rate of accumulation of evidence linking social stress to the onset of illness. It is now apparent that there are many stress-induced diseases throughout the western world. In a working paper prepared to stimulate debate on future health concerns, the Minister of National Health and Welfare drew attention to the importance of the relationship between social change and health:

> One of the most important but least understood environmental problems is the effect of rapid social change on the mental and physical health of Canadians. Some of the social change is due to technological innovation, such as the introduction of television, but significant disorientation and alienation arise as well from the crumbling of previous social values and their replacement by others whose long term effect is still unknown. When a society increasingly pursues private pleasure by sacrificing its obligations to the common good, it invites stresses whose effects on health can be disastrous (Lalonde, 1974, p. 18).

Background to the Problem

Although the evidence has been derived from widely divergent populations, a wide range of medical institutions, and both epidemiological and experimental studies, the strength and causal nature of the relationship between social stress and illness has not been satisfactorily explained. Recognition of the fact that some but not all individuals exposed to stressful environments become ill has initiated a search to identify the specific behaviours, skills and characteristics which might enable people to maintain their health or to develop immunity to stress-induced illness. If such coping strategies

can be identified, it is possible that they can be analysed, taught, and learned. This study is an investigation of one posited strategy for coping with stress, participation in learning activities.

Recognition of the value of learning in the practice of preventive medicine can be seen in the recent literature on crisis theory and family medicine. Increasing attention is being given to the management of crises by health professionals (Caplan, 1963; Taplin, 1971) and interventions into crises are likely to increase as the practice of preventive and family medicine increases (Vincent, 1973). The treatment currently being advocated in this field is the adoption of a learning approach to human problems, and in particular learning how to cope with life changes (Vincent, 1973). However, little is known at present about the ways in which individuals learn to adapt to change in order to avoid the onset of illness or to minimize its severity if it occurs.

It is also possible that the actual process of learning, rather than the outcomes of learning, may itself be a coping strategy. If so, active learners will be healthier than non-learners regardless of the knowledge and skills they learn. Certainly, the better educated in our society suffer fewer illnesses and have greater life expectancies than the under-educated, although the accepted reasons are socio-economic (related to nutrition and housing) rather than psycho-social (related to participation in learning or social activities).

Moss (1973) has presented a radical hypothesis that illness stems from communication network incongruities because they produce stress which, if prolonged, lowers resistance to

disease. A communication network is defined by Moss as "a configuration of interacting people transmitting and modifying a body of information" (1973, p. 242). While the information that is conveyed within a communication network is seen to be effective for dealing with and accurately describing the environment, individuals who are network members will remain identified with the network and there will be information congruity. However, should the information received invalidate part of an individual's information bank, a mis-match of information to current perception occurs and this is termed information incongruity. According to Moss the physiological processes involved in information processing alter susceptibility to a wide array of disease. Society can reduce illness by either preventing information incongruities from arising, or by responding to those which do arise by increasing the effectiveness of communication networks. Two concepts presented by Moss in the development of his theoretical model are of particular pertinence to this study, the concepts of immunity from illness through congruity with an information network and immunity gained by direct experience with the milieu.

Immunity by congruity has two non-exclusive constituent parts. One is the degree of correctness of the actual information taught to the information network's participants about the environment. The second part is the effectiveness of the training received by the network participants, to provide them with the skills and knowledge required to act appropriately in the environment. Immunity by direct experience refers to the development of knowledge and skills required to act in the environment, through trial and error experiences.

The two categories, immunity by congruity and immunity by direct experience, have parallels in the two types of settings in which learning occurs, the formal instructional setting and the natural societal setting (Verner, 1964). In the formal instructional setting learning is not left to chance as an educational agent systematically designs and manages the instruction. This would appear to be the setting in which Moss envisages his examples of desirable knowledge and skills for immunity by congruity being learned:

> The value of a liberal arts education must be reassessed and serious consideration given to instruction on how to do things such as investing; buying insurance; using the law, courts, and lawyers; utilizing health resources; knowledge of government agencies' services rendered; practicing first aid; practical knowledge of the flora and fauna of the area; awareness of how factories work and the problems of technology; the nature of various substances, including synthetics; raising children, what to expect in marriage; and so forth...We suspect that more complete and correct instruction on how to live in a modern society would sharply reduce the amount of illness of all kinds and prove a preventive health measure as effective as innoculation (Moss, 1973, p. 219).

Learning in the natural societal setting occurs largely by chance or accident rather than by design. In the natural societal setting, as Moss (1973) suggests, adults would learn to handle the environment as a result of trial-and-error experience.

The literature of adult education is replete with references to the role of adult education in meeting the challenges of social change. During the sixties, Verner (1964, p. 4) identified the dominant theme of contemporary adult education to be that of adjustment, "to help adults accommodate

the rapid technical and social changes so characteristic of our time." The knowledge explosion, the growth of new technologies, the rapid pace of social change and the feeling of loss of identity have all been referred to as major factors determining the need for adult education (Knowles, 1962; London, 1963, 1964; Verner, 1964; Miller, 1970).

Bryson, Hallenbeck and Verner have each identified several fundamental functions that adult education performs in our society. Bryson (1936) listed five functions of adult education: remedial, occupational, relational, liberal and political. The relational functions as conceived by Bryson included, "studies of emotions, attitudes, and psychological habits which are designed to help us better to understand ourselves and our relations with other persons." (Bryson, 1936, p. 30)

Hallenbeck (1960) also identified five functions of adult education: to expand communication skills, to develop flexibility, to improve human relations, to facilitate participation, and to expedite personal growth. Hallenbeck's developing flexibility function was based upon the belief that, "the ability and willingness to change in a changing world is essential," and that adults must learn to become and to remain flexible (Hallenbeck, 1960, p. 36).

According to Verner (1964) the social forces and factors that create the need for continuous learning through adulthood can be seen as creating four functions of adult education - expansional, participational, integrational and personal. The expansional function describes the provision of learning opportunities to assist adults expand their competencies to

meet current life stage needs such as from vocational or professional to parental or citizenship needs. According to Verner learning opportunities to develop knowledge and skills in government and civic participation is a participational function of adult education. Through adult education Verner describes adults as synthesizing knowledge, transferring knowledge from one area to the solution of problems in other areas and integrating knowledge with experience. This function of adult education Verner called integrational. Finally the personal function describes the purpose of adult education in assisting adults to achieve maturity, assist with social change and enable the individual to be personally congruent with his social milieu.

The functions of adult education, as described above, have been concerned with the need to promote learning opportunities that will enable individuals to maintain their socio-economic positions in society, to improve their relationships with others, to solve their own problems and generally to gain satisfaction from life in a changing world. These views limit the function of adult education to dealing with specific social symptoms of change. They do not recognize that learning is inextricably associated with other internal processes such as attitudes and emotions which are also thought to be related to receptivity to disease and illness. If learning is identified as a strategy for coping with change, that is, if individuals who are active learners do not suffer stress-induced illnesses when others similarly at risk do suffer such illnesses, a new function for adult education might be identified - the function of promoting homeostasis of physiological and

psychological health.

The research literature has not previously identified the promotion of health as a reason for participating in adult education. The literature about motivation for participation at the time this study was developed, said little about the effects of social change on individual decisions to participate. Investigations in this area have generally been psychological studies utilizing respondents' self-reported responses to items on instruments prepared by the investigator, for example Boshier (1971), Burgess (1971), and Morstain (1974). The factor analytic models used to analyse the data from these studies impose limitations for discovery as they produce explanatory factors which are products of the inputs to the analytic model. The investigators using these models can only extract what is entered into the analysis, and what is entered into the analysis is only what the investigator chooses to enter (Kerlinger, 1964).

It is possible that motivations to participate operate at the sub-conscious level and respondents' stated reasons for participation at the conscious level are societal and normative rationalizations for an otherwise unexplainable drive. An investigation of the relationship between learning activities and health is needed to test such a proposition.

It is known that social change contributes to illness onset, (Holmes and Masuda, 1973; and Dohrenwend, 1974) and it is a function of adult education to assist people to learn how to solve problems generated by social change. Consequently, it might be expected that those who are active participants in adult learning activities will suffer fewer stress-induced

illnesses than those who are not active learners. At present the identity, magnitude and sequence of linkages between contributing variables in this hypothesized chain are relatively unknown.

Purpose of the Study

Given the proportions of stress-induced illnesses prevalent in Western societies today, there is a growing need to identify coping strategies. In adult education it is important that investigations of the function of adult education in promoting homeostasis of physical and psychological health be conducted. The purpose of this dissertation is to explore the relationship between stress, participation in learning and health to test the proposition that active learners maintain their health in stressful environments while non-active learners in stressful environments experience decrements in health.

Definition of Terms

At the present time there are no universally accepted definitions of stress, health, or learning and the definitions of those constructs are based to a major extent on the instruments selected and developed for data collection, hence they are primarily operational definitions.

Stress - The construct 'stress' was defined as the psycho-physiological outcomes of readjustments and adaptive efforts required of the adult when experiencing life crises or life change events. The empirical indicator for this construct was the Social Readjustment Rating Scale (Holmes and Rahe 1967).

Subjective Stress - 'Subjective Stress' was defined as self-reported cumulative feelings of anxiety, tension, threat, pressure and nervous strain brought about by social forces experienced in daily living. This construct was quantified by the Subjective Stress Scale (Chapman et al 1966) and by responses on a magnitude estimation scale designed to quantify levels of self-defined stress through a non-numerical technique.

Perceived Stress - Although not originally described as a measure of stress, the Neuroticism scale of the Eysenck Personality Inventory was selected as a measure of 'perceived stress'. Neuroticism, as defined by Eysenck, is the general emotional over-responsiveness typified by individuals who appear anxious, aggressive and moody as compared to stable individuals who are calm, even tempered and easygoing (Eysenck and Eysenck 1966).

Health - The construct 'health' was defined as the ability to carry on those daily activities which are usual for a person's age and social role. To the extent that a person cannot carry out normal living activities he or she is in a state of dysfunction, or deviation from well being quantifiable by the Bush Health Status Index (Bush et al 1972).

Learning - Gagne's (1977) definition of 'learning' as a more or less permanent change of behaviour or disposition brought about by central nervous system processes other than those induced by maturation, is

used in this study.

Active Learner - While 'learning' as defined above defies precise quantification, an adult who intentionally seeks to learn in the natural societal setting and/or the formal instructional setting is identified by scores above the median score on the Subjective Estimation of Adult Learning Scale (Blunt, 1977). Conversely an adult who does not intentionally seek to learn in either the natural societal setting or the formal instructional setting is identified by scores below the median score on the scale.

Plan of the Report

The study is reported in six chapters, with this first chapter being an overview of the study problem, a statement of the purpose of the study, a definition of terms and a plan of the report. A review of the literature comprises the second chapter which has major sections on stress, life events and health, social learning theory and intrapersonal factors influencing participation in learning. On the basis of that review a theoretical framework is developed with axioms and propositions which form the basis for the analytic model.

A detailed description of the study methodology forms the third chapter. In addition to a description of the study design, sampling procedures and data collection methods, this chapter describes the instruments used to gather the data and details the steps taken to test the validity of the major measures. Two scales developed specifically for use

in the study, a magnitude estimation scale of participation in adult learning activities and a Thurstone scale to quantify attitudes toward adult education, are also reported.

Chapter four consists of a description of the study sample in terms of selected socio-demographic characteristics, health and stress characteristics, personality characteristics, and participation in learning activity and attitude toward adult education characteristics. The data analysis procedures and the results of the analysis are reported in the fifth chapter.

The sixth and final chapter of the study consists of a summary of the study, the conclusions drawn from it and a discussion of the implications and possibilities for further research. All of the study instruments and information on the development of measures for use in the study are included as appendices.

CHAPTER II

REVIEW OF RELATED LITERATURE

This study is typical of many exploratory investigations in adult education where: (i) there is little research to guide the selection of variables for inclusion in the study, (ii) given the complexity of the system to be modelled many potential explanatory variables must be omitted to ensure that the model is sufficiently simple to be operationalized, and in addition, (iii) there are few data collection instruments readily available with recognized validity to quantify either those variables selected for inclusion or those which might be proposed as alternatives. A literature search was conducted to identify variables likely to be of assistance in the development of a model to assess the effects of engagement in learning in mediating the decremental effects of social stress on health. Four major constructs were selected for inclusion in the model in addition to the constructs of stress,

participation in learning and health. The four additional constructs are: (i) subjective or perceived stress, (ii) internal-external locus of control, (iii) personality, and (iv) participation in formal social organizations. In addition several socio-demographic variables likely to influence the effects of the major variables within the model were selected for inclusion as exogenous variables.

This review of the literature is organized in seven parts: (i) a short discussion on the concept of stress, (ii) the relationship between social stress (life change events) and health, (iii) the relationship between perceived stress, social stress and health, (iv) the effects of generalized expectancy for control over the social environment on engagement in learning activities, (v) the influence of personality on perceived stress, participation in learning and health, (vi) the effects of attitudes toward adult education on participation in learning activities, and (vii) the effects of certain socio-demographic variables on the model's major variables.

Stress

The term 'stress' has been used to describe a large number of physiological, psycho-social, and psycho-somatic constructs. There is no consensus in the research literature regarding a universally acceptable definition of stress, and many theoretical models of stress have been developed (Selye 1956; Lazarus 1966; Appley and Turnbull 1967; Levine and Scotch 1970; Hinkle 1957; Dohrenwend and Dohrenwend 1974).

Moss (1973) has identified three broad categories of stress research models; stress as a physiological response to physical, chemical and organic agents; stress as a physiological

response to social-psychological stimuli; and stress as a behavioural response to social-psychological stimuli.

Stress as a physiological response to physical, chemical and organic agents. Hans Selye's work (1956, 1975) is the most widely known in the area of stress as a physiological response to physical, chemical and organic agents. Through his laboratory experiments inducing disease in rats, Selye identified the General Adaptation Syndrome (GAS), observed the corresponding clinical conditions in man, and derived his theory of diseases of adaptation. The theory states that many common diseases are the result of inappropriate biological responses to stressful conditions rather than to the direct effect of germs, poison, or other external agents.

Stress according to Selye (1956) is the non-specific response of the body to any demand upon it. A stressor can be almost any kind of stimulus including exercise, disease, heat, cold, hunger or psychological shock. The GAS has three stages, an alarm reaction, resistance and exhaustion. During the alarm reaction the stressor is recognized by the body and the pituitary-adrenal cortical system responds by producing arousal hormones. The heart rate increases, blood sugar levels rise, breathing quickens, pupils dilate, perspiration commences and the digestive process slows down.

In the adaptive or resistance stage the body modifies the initial reactions and repairs any damage while the physical symptoms of stress decline. If the stress continues the adaptive process may be interrupted and the body will work to maintain its bio-defence systems. Should the stress be prolonged the capability of the body to respond effectively

declines, leading to exhaustion. During this third stage (exhaustion) diseases of adaptation can occur such as emotional disturbances, schizophrenia, migraine headaches, asthma, cardio-vascular diseases, renal diseases and many others.

Recent challenges to Selye's theory have been based upon experimental evidence that stress is specific rather than non-specific, and that physically dangerous or damaging stress reactions are more often the direct result of psychological rather than physical stressors. (Moss 1973; Trotter 1975) One apparent paradox in Selye's theory is that, "Stress is part of life. It is a natural by-product of all our activities" (Selye 1956, p. 299), yet there are no specific physiological responses to social-psychological events that are comparable to the specific events accompanying bodily contact with various physical, chemical or organic events (Moss 1973).

One question that Selye does not address is: why, if every life event is stressful, do some life events affect some individuals and not others? Variability among populations regarding perceived stressfulness and the effectiveness of coping mechanisms have not been investigated by Selye. (Dohrenwend and Dohrenwend, 1974)

Stress as a physiological response to social-psychological stimuli. The model of stress as a physiological response to social-psychological stimuli is best typified by the research of Wolff (1953, 1968). Stress according to Wolff, is the "internal or resisting force brought into action by external forces or loads." (1953) The capability of the body to withstand external forces determines whether illness will result.

However, not all responses to external forces are appropriate. Physiological defences normally used to resist physical forces may be used as defences against symbolic or social-psychological forces and may actually cause bodily harm by inducing illness. As Wolff noted:

> It is suggested that man, confronted by threats, especially as they involve values and goals, initiates responses inappropriate in kind as well as in magnitude. Such reactions integrated for one protective purpose and inappropriately used for another can damage or destroy him. When a culture changes rapidly or deteriorates, the anxiety-resolving systems break down before the culturally engendered anxieties become attenuated. It is not the particular nature of the forces, pressures and preferences that engender a threat for the individual in any particular society, but how they are perceived and the amount of conflict directly or indirectly engendered. (Wolff 1953, p. 12)

In applying his theory of stress, Wolff identified specific body organ systems, such as the lungs and the stomach, that could be directly influenced by social-psychological factors resulting in increased susceptability to disease and irreversible damage through hyper-activity or other changes in the functioning of organ systems.

Stress as a behavioural response to social-psychological stimuli. There are many examples of research studies which can be classified into the third of Moss' categories of stress models. The element that these studies have in common is that the stressors are primarily social in nature: "major social stressors...are objective events that disrupt or threaten to disrupt the individual's usual activities" (Dohrenwend and Dohrenwend, 1970, p. 120). The stressors need not necessarily be native, and the extent to which the stressor induces crisis

is dependent upon the characteristics and behaviours of the individual.

The quantification of this concept of stress began with the advocacy of the life chart as an instrument for medical diagnosis by Adolf Meyer in the 1930s. The concept is in popular usage today in the life-change research of Holmes (1967), Rahe (1964), Mechanic (1974) and Dohrenwend and Dohrenwend (1974). However, there are wide variations in the extent to which individual researchers share concepts of measurement, methodology or the social-psychological linkages (Moss 1973).

Certain researchers place emphasis on the cognitive process as the determinant of whether or not an event is a stressor (Lazarus, 1966); others emphasize the importance of knowledge, skills and previous experience (Moss 1973). There is evidence from some studies that clusters of life events have significance as contributing to the cause and time of illness onset (Holmes and Masuda, 1973). Other studies indicate that pre-disposing factors are primary, and that life events play a secondary role with respect to the onset of certain illnesses. For example, Hinkle noted that "systematic occupational and social changes in the American populations have not produced major episodes of illness, except among those who were especially susceptible " (Hinkle, 1964, p. 15). Several investigators support the proposition that perception of stressors does not influence the effects of stress upon health (Holmes and Masuda, 1973). Studies using the Social Readjustment Rating Scale of Life events (Holmes and Rahe, 1967) have shown that life

changes thought to be positive - such as a vacation or an improvement in one's relations with a spouse - are quantitatively related to the causation, time of onset and severity of illness. Negative life changes such as getting a traffic ticket or experiencing a worsening in relations with one's spouse are similarly related to illness (Mendels and Weinstein, 1973; Holmes and Holmes, 1970).

There is widespread lack of agreement in the literature concerning models of stress. While no single model has been generally accepted, one broadly stated model has become dominant in recent research - stress as a behavioural response to social-psychological stimuli. For the purposes of this study, stress is operationally defined in terms of what may well be the single most widely used instrument within this category of stress models, the Social Readjustment Rating Scale (SRRS; Holmes and Rahe, 1967).

The scale consists of forty-three items which can be categorized as:

> ...indicative of the life style of the individual and...of occurrences that involve the individual. Evolving usually from ordinary, but sometimes from extraordinary social and interpersonal transactions, these events pertain to major areas of dynamic significance in the social structure of the American way of life. These include family constellation, marriage, occupation, economics, residence, group and peer relationships, education, religion, recreation and health. (Holmes and Masuda, 1973, p. 162)

Respondents are asked to indicate whether they have experienced each of the forty-three life-events during the previous six months. For each positive response a scale value indicating the magnitude of that particular life change event is assigned

to the respondent, and the values assigned are summed over all forty-three life events to produce a single scale score for each respondent.

Social Stress and Health

A great deal of evidence has been accumulated to show that a temporal and presumed causative relationship exists between the experiencing of increases in life change events and the onset of illness. Further, the magnitude of the life change events experienced has been observed to be strongly related to the probability of disease onset and to the seriousness of the illness experienced (Holmes and Masuda, 1973). Even when changes of less magnitude than those included on the SRRS are observed daily, subsequent health changes are observable although they are of less consequence and do not normally require medical attention (Holmes and Holmes, 1970).

Retrospective studies conducted in Sweden have shown a positive relationship between increasing life change and sudden cardiac death (Rahe and Lind, 1971), and the time of onset of myo-cardial infarction (Rahe and Paasikivi, 1971; Theorell and Rahe, 1971). A study using an instrument other than the SRRS produced similar results confirming a relationship between the experiencing of life change events and myo-cardial infarction (Edwards, 1971). The occurrence of fractures and increasing amounts of life change were found to be related by Tollefson (1972). Even minor health changes including cuts, bruises, headaches, stomachaches, backaches and colds which do not cause time lost from work or medical intervention have

also been shown to be related to the clustering of life change events (Holmes and Holmes, 1970). Prospective studies have been used to predict illness among groups such as physicians (Holmes and Masuda, 1973) and naval personnel (Rahe, 1968), and to predict injury among college football players (Holmes, 1970).

A linear relationship between the mean illness rate of naval personnel and the magnitude of life change has been demonstrated (Rahe, et al, 1970), and through the use of a scale developed in a similar way to the SRRS, Wyler, Masuda and Holmes (1970) found a significant relationship (Spearman rho = 0.648) between life change magnitude for the two years prior to the onset of illness and the seriousness of the chronic disease.

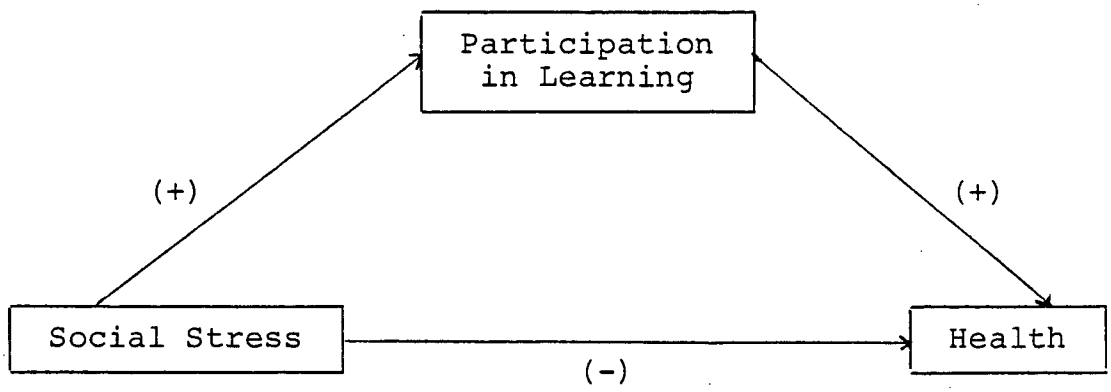
Holmes and Masuda conclude a summary of their research on the relationship between life change events and health as follows:

> It is postulated that life-change events, by evoking adaptive efforts by the human organism that are faulty in kind and duration, lower 'bodily resistance' and enhance the probability of disease occurrence. (Holmes and Masuda, 1973, p. 182)

It is taken as a basic a priori assumption in this study that a high magnitude of social stress life change events among a sample will cause the onset of illness for a large proportion of the sample placed at such risk. Further, it is hypothesized that participation in learning will be a factor which will reduce the risk and hence the occurrence of illness among those who experienced a high magnitude of life change. (See Fig. 1)

Figure 1.

BASIC ELEMENTS OF THE
THEORETICAL MODEL



Three axioms or propositional statements were derived from the hypothesized relationships which comprised the basic model. These relationships are mediated by additional variables described later in this chapter.

Proposition 1

High social stress will be associated with low levels of health functioning and with decrements in health over time.

Proposition 2

Participation in learning will be influenced by social stress, with highly stressed individuals participating in learning activities to a greater extent than individuals experiencing little social stress.

Proposition 3

Participation in learning activities will be associated with high levels of health functioning, and improvements in levels of health over time.

Perceived Stress and Health

In the late 1950's Hinkle and Wolff (1957, 1958) concluded that reaction to stress that was perceived but not directly experienced tended to heighten susceptibility to illness because of the physiological changes evoked during attempts to adapt to the threats perceived. From a review of thirty major research papers and books in the field, Graham and Stevenson (1963) concluded that only those stressful events towards which the patient develops certain attitudes are of significance in stimulating a disease process. Almost thirteen years after the Hinkle and Wolff studies, Thurlow (1971) observed that the variability with which a person rates the perception of his environment is significantly related to the number of subsequent illnesses experienced. Thurlow's study controlled for previous illness and sick role tendency. The conclusion drawn was that a person's perception of change may be of greater relevance to his or her health than are the changes themselves.

Holmes (1973) and his colleagues have found that both desirable and undesirable life change events contribute towards the onset of illness and they do not subscribe to the belief that perception of the environment influences the extent to which life change events are stressful. However, there are a number of studies which have been conducted specifically to test the proposition that some but not all life change events adversely affect health. Myers et al (1971, 1972) have shown that both desirable and undesirable events are related to psychological health with undesirable events being more strongly associated

with psychiatric impairment than desirable events. In a study of the relationship between life events and depression, Paykel et al (1969) reported that events generally thought to be undesirable, and in particular those involving losses or departures from the social group, distinguished depressed patients from the controls. The conclusion was drawn that the life change model by itself was not adequate to explain the onset of depression and that other factors, including psychological and symbolic factors, were important.

Spilken and Jacobs (1971) found that the presence or absence of illness among college students during a one year period was not related in any systematic way with changes in life-crises scores. The investigators speculated that if the life experiences had been pleasurable the students might have ignored the symptoms or treated themselves.

The conclusion drawn from the study was that life stress does not lead to illness but to treatment-seeking behaviours, and the symptoms which develop are used as 'calling cards' by the students.

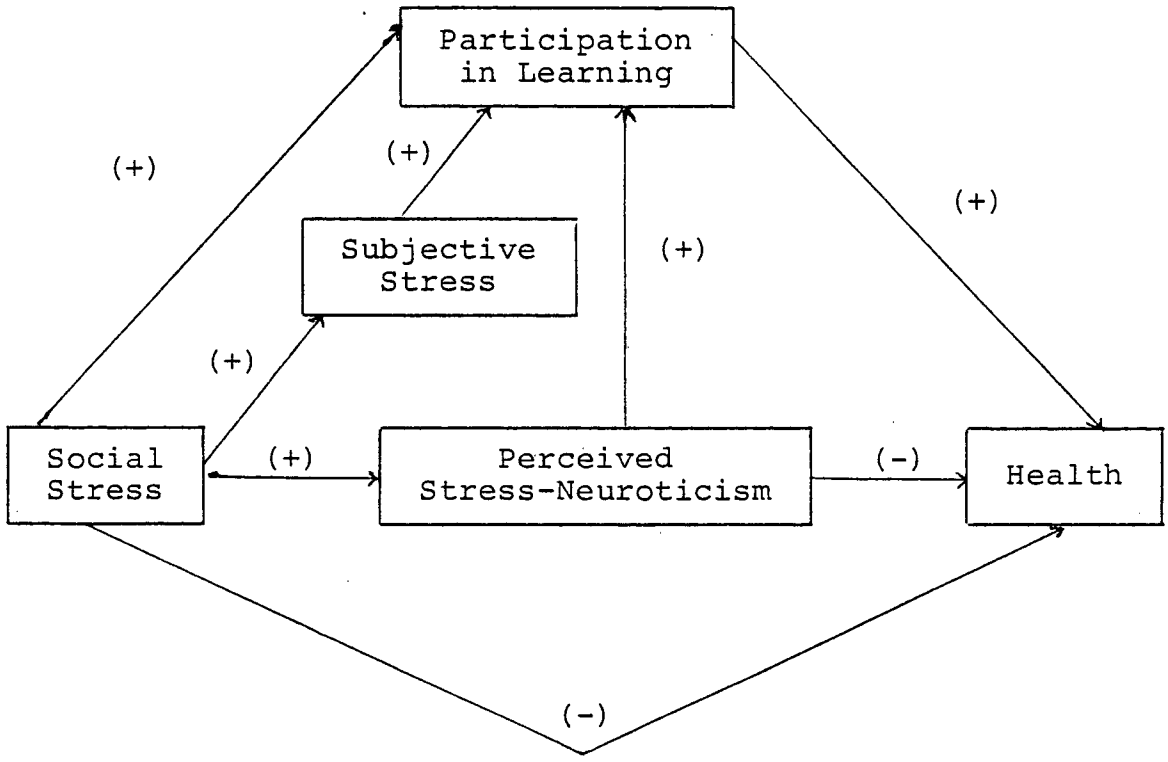
In recognition of the possibility that individuals' perceptions of stress may influence their health, it is taken as an a priori assumption in this study that such a relationship may indeed exist and must be reflected in the structure of the model.

Two concepts of perceived stress can be identified. One is a subjective assessment of the extent to which one feels or is aware of the effects of psycho-social stressors referred to in this study as subjective stress, and the second is the

less subjectively discernible pattern of behaviours adopted in response to a threatening environment that are collectively referred to by Eysenck as neuroticism. Each form of perceived stress was thought to have implications in the model. Subjective stress was quantified by the Subjective Stress Scale developed by Chapman et al (1966) and perceived stress was quantified by the neuroticism-stability scale in the Eysenck Personality Inventory (1966). (See Fig. 2)

Figure 2.

THE RELATIONSHIPS AMONG PERCEIVED STRESS AND THE ELEMENTS OF THE BASIC MODEL



Proposition 4

Levels of subjective stress will be directly related to levels of social stress and will influence the decisions to engage in learning activities.

Proposition 5

Perceived stress as measured by the personality dimension of neuroticism-stability will directly influence levels of health functioning and decisions to engage in learning activities.

Social Learning Theory

Social learning theory is based upon the proposition that "the unit of investigation for the study of personality is the interaction of the individual and his meaningful environment" (Rotter, 1954). Rotter, one of the originators and a leading proponent of this theory, argues that "the occurrence of a behaviour of a person is determined not only by the nature of importance of goals or reinforcements but also by the person's anticipation or expectancy that these goals will occur" (Rotter, 1954). When applied to a learning situation, the theory predicts that a person acquires new behaviours when rewarded or when a reward is expected, and fails to acquire new behaviours when rewards are not received or expected.

One important development from research into social learning theory has been the refinement of the notion of the control of reinforcement as being either internal or external to the individual. That is, if the individual's perceptions of the likelihood of rewards are that they are within his control or dependent upon his personal skills he is judged to be internally controlled. If the individual's perceptions of the likelihood of rewards are that they are within the control of others or dependent upon chance he is judged to be externally

controlled.

The internally controlled person is one who believes what he or she has experienced, is experiencing and is likely to experience within the social milieu is directly related to what he has done, is doing and is likely to do. When 'good things' happen it is because of the actions, skills, capabilities and experience of the person that ensure the outcomes are good. When 'bad things' happen it is because the person did not try hard enough, did not act appropriately or was incapable of making the outcome a good one. Internally controlled individuals feel equally responsible for the good and bad outcomes of situations in which they were involved.

The externally controlled individual believes that what he or she has experienced, is experiencing or is likely to experience in the social milieu is unrelated to his actions, skills, capabilities and experience. 'Good things' happen when one is lucky and 'bad things' happen when one is unlucky. Failure to achieve a goal is ascribed to anything but the individual's activities. Externally controlled individuals feel that they are not responsible for either the good or bad outcomes of situations in which they are involved.

The construct of internal-external control has been of great interest to researchers since its introduction by Rotter. In 1966 Lefcourt (1966) reviewed fifty-seven research papers dealing with the construct of internal and external control of reinforcement. The studies utilized situational manipulations of locus of control or involved differential predictions to given situations based on measures of the internal-external

control dimension. Lefcourt reported that in both types of investigation locus of control was found to be predictive of different social behaviours, learning performances, and levels of achievement-related activities. In 1971 Throop and MacDonald (1971) published a bibliography of 339 articles in the area, with 206 of the articles having been published since 1966.

Internally controlled learners have been found to be inner-directed and autonomous, choosing to study subjects they personally consider to be interesting and important while externals tend to be other-directed and study subjects others consider to be important (Butterfield, 1964). Active participants in a social action group investigated by Strickland (1965) were found to be more internally controlled and had a greater understanding of events affecting them than a control group not involved in social action.

Some studies have supported the utility of locus of control as a measure predicting the type and degree of commitment behaviour manifested to influence social change (Gore and Rotter, 1963). Phares found internals to be more effective than externals in attempting to change the attitudes of other subjects (1965); internals were more effective in the utilization of information (1968) and internals to a greater degree than externals actively seek information that will be useful in the future (Davis and Phares, 1967).

Seeman has conducted a series of studies over two decades investigating the relationship between alienation and social learning. The version of alienation in which Seeman has been most interested is powerlessness, which he quantifies by use

of a modified Rotter internal-external control of reinforcement scale (Seeman, 1959). One qualification of alienation made by Seeman is that the applicability of the concept be limited to expectancies that have to do with the individual's sense of control over socio-political events rather than more personal and intimate needs such as for affection or status. The effects of alienation on personal needs, Seeman argues, require further empirical investigation before being accepted (Seeman, 1959).

Seeman (1962), using a quasi-experimental design in a study of tuberculosis patients, found that among patients matched on several socio-economic characteristics and hospital experience, those who scored high on a powerlessness scale (externals) had less objective knowledge about their condition, and that the low powerlessness group (internals) expressed the most satisfaction with the information process in the hospital ward. These findings indicate that "...the individual's sense of personal control is a factor in determining the level of interest and the degree of knowledge he will possess concerning his affairs" (1962, p. 782).

Similar results were obtained in a study of prisoners in a reformatory where the learning of information relevant to parole was found to be related to the individual prisoner's expectancies for control (Seeman, 1963). The study design enabled the attribution of the findings to intelligence or criminal history to be discounted. The inmates did not differ on all kinds of learning. They differed on knowledge of parole which implied control of the prisoner's life outcomes, but where non-parole reformatory information was involved no

differences in learning between locus of control groups was found.

Peters (1969) studied a sample of penitentiary inmates and confirmed that internals retained more information than did externals. Data from this study, however, failed to support Seeman's findings that the difference was dependent upon the perceived relevancy of the information to control. Internal control was also judged to effect inmates' willingness to learn or engage in activities to increase chances of control over the environment such as preparation for future employment.

Political knowledge has also been shown to be related to the individual's expectation for control over events (Seeman, 1966). Both manual and non-manual workers who scored high on a powerlessness measure (externals) scored low on an objective test of political knowledge. Education, income and social class were controlled in the study. A similar study conducted in Sweden produced findings in support of the hypothesis that levels of powerlessness correlate negatively with control-relevant information scores, but not with all information scores. In this case the low powerlessness subjects (internals) scored high on the control-relevant nuclear war and political knowledge test, and there was no difference between the two groups in their scores on a cultural knowledge test (Seeman, 1967b).

Seeman's last study in this area was a controlled occasion for seeking information about improved work opportunities. Two forms of alienation, the sense of powerlessness (internal-external control) and work alienation were hypothesized as operating independently as factors influencing a knowledge search behaviour. "The prediction

was that these alienations operate independently - high work alienation being an index of 'need' for information and powerlessness as an index of low 'expectancy' concerning its likely utility" (Seeman, 1972, p. 16).

The more alienated workers were found to be the most active in seeking work-related information after controlling for education differences. Manual workers with nonalienating jobs and white collar workers in alienated work who scored low on powerlessness sought work information as expected. However, with manual workers high in alienated work, those highest in powerlessness sought the work information most heavily. Education was thought by Seeman to be influential in this unexpected and otherwise unexplained relationship.

Suicide is perhaps the most extreme response to unresolved life crises and externally oriented subjects have been found to score higher on a measure of suicide potentiality than internally oriented subjects (Williams and Nickels, 1969). In the same study, accident proneness scale scores were found to correlate with externality. That externals tend to be relatively high in anxiety and neuroticism (Feather, 1967) is further evidence that relationships between perception of social environment and locus of control are potentially valuable variables in the investigation of the complex inter-relationships surrounding health status and life change.

Research in locus of control supports the thesis that an individual's expectancy for control of his outcome (i.e. his sense of powerlessness) governs his attention to and acquisition of information available in the environment. If

individuals consider the generalized changes occurring in their lives to be partially within their control (internals), it is possible that they may actively seek information through learning experiences to deal with those changes and may consequently be less likely to suffer detrimental changes in health status. Alternatively, those who view the changes occurring in their lives as uncontrollable (externals) may not actively develop coping mechanisms based upon information gained from learning experiences and may suffer ill health as a result.

This study has been designed in part on the assumption that the generalized expectancy for control over the social environment is a factor influencing the decision to participate in learning activities. (See Fig. 3)

Proposition 6

Generalized expectancy for control over the social environment is a factor influencing the decision to engage in learning activities.

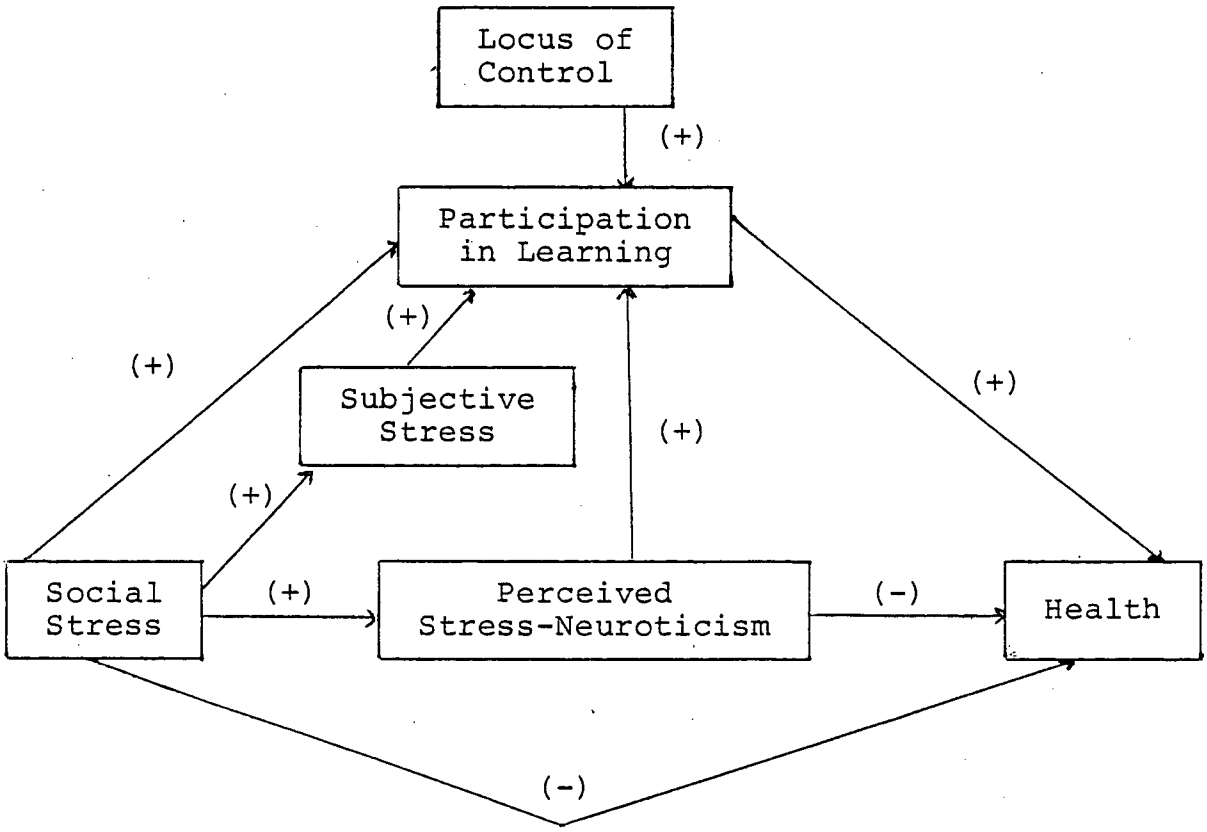
Personality

An individual's behaviours are determined by the decisions he or she makes. Those decisions, according to Eysenck, are functionally related to the dimensions of personality (Eysenck and Eysenck 1966). Decisions regarding responses to specific life change events will be influenced by personality orientations, as will decisions regarding the selection of coping strategies over extended periods of time. The identification of specific personality characteristics or traits enables a selective analysis of their efforts on the decision to participate in learning activities to be made. In addition the differential

effects of personality in the application of learning as a coping strategy can also be identified.

Figure 3.

THE RELATIONSHIP AMONG LOCUS OF CONTROL, PERCEIVED STRESS AND THE ELEMENTS OF THE BASIC MODEL



Eysenck (1968) has identified two independent personality dimensions which appear worthy of investigation in relation to their association with life change events, learning and health status. The two dimensions are extraversion - introversion (E) and neuroticism - stability (N).

In a review of the personality literature Wiggins (1968) identified extraversion and neuroticism as holding the position of central status in current investigations of personality structure. One indicator of the widespread research interest

in Eysenck's personality research can be found in the Seventh Mental Measurements Year Book (Buros, 1972), which contains 174 references to studies using the Eysenck Personality Inventory (EPI) during the period 1966 to 1970.

Extraversion is typified by outgoing, uninhibited, impulsive and sociable behaviours, and introversion by reserved, inhibited, careful and considered behaviours. Neuroticism is the general emotional over-responsiveness typified by people who appear anxious, aggressive and moody as opposed to stable individuals who are calm, even tempered, considerate and easy going (Eysenck and Eysenck, 1966).

The E.P.I. has been found to have utility in many areas of social psychology and education where influences such as group activities, suggestion, persuasion, risk situations, interpersonal contact, time and others act differently on extraverts and introverts, and upon neurotic and stable individuals to modify subjects' reactions and behaviours (Eysenck, 1971). Writing of learning performance in particular, Eysenck claims a major role for personality factors as explanatory variables:

> For decades, psychologists investigating educational problems and making predictions of academic success or failure have concentrated on cognitive measures; yet personality factors, particularly extraversion and neuroticism are obviously responsible for a good part of the total variance. (Eysenck, 1971, p. 3)

The following review of some of the E.P.I. utilization literature will be brief and highly selective as no literature was identified on the use of the E.P.I. exclusively in adult studies of life change or stress. The findings reported serve only to identify the potential utility of this particular personality

measure for the present study.

Educational attainment has been shown to be related to E.P.I. scores with extraversion having detrimental effects on educational attainment both previous to university entrance (Lynn, 1959) and at the university level (Savage, 1962; Kline, 1966). Findings regarding the influence of neuroticism on educational attainment are ambiguous with two effects being postulated. Neuroticism may create a detrimental effect on learning and performance in stressful situations. Alternatively, neuroticism may produce a facilitating effect as it motivates sustained work efforts with the latter effect frequently compensating for the former effect (Lynn, 1959).

In problem solving and test situations extraverts work significantly faster initially, score less than introverts toward the end of tests, and take longer to complete questions at the end of tests (Eysenck, 1959; Farley, 1966). Positive and significant relationships between introversion and persistence at a mental task have been reported (Lynn and Gordon, 1961). Farley (1966) noted a curvilinear relationship between neuroticism and problem solving time with mid-level neurotics performing significantly faster than low and high-level neurotics who did not differ by the time taken to solve problems. These results were not attributable to differences in age, verbal intelligence or sex.

In a study of personality and group decisions involving risk, subjects with high neuroticism scores tended to isolate themselves from group processes (Lim, 1964). High extraversion subjects participated actively in group processes and appeared to be more sensitive to social cues. Prestige also appears to

be more influential in changing the judgments of extraverts than introverts (Sinha and Ojha, 1963).

Eysenck (1971) cites the investigations into individual differences in learning which reveal an interactive relationship between task difficulty and neuroticism as supporting the findings of earlier studies that anxiety facilitates the learning of easy tasks and disrupts the learning of more complex tasks.

Differences between the vocational interests of extraverts and introverts have also been found. First year university student introverts expressed preferences for professional, scientific, and teaching vocations while extraverts were oriented towards social service and sales careers (Bendig, 1963). A strong relationship between sensation-seeking scale scores and extraversion was found in a study of 150 navy men (Eysenck, 1971). The sensation-seeking scale was designed to measure the individual's level of stimulus need in terms of preferences for extremes of sensation (heat, cold, noise, taste, colour, etc.); for the new and unfamiliar, as opposed to the old and familiar; for irregularity as opposed to regularity and routine; and for the enjoyment of danger and thrills.

Overall the extravert to a greater degree than the introvert, takes a personal interest in other people and their problems, and prefers occupations where more social skills and academic knowledge and ability are required. To a greater extent than the extravert, the introvert is able to resist boredom, to stay in a job for a longer period of time, and continue to work on a task for long periods of time. Extraverts - particularly those with high neuroticism scores - are more likely than introverts to commit anti-social and

criminal acts (Eysenck, 1971).

The E.P.I. manual (Eysenck and Eysenck, 1968) cites several research studies which used the inventory in clinical diagnostic situations. Relationships between extraversion, neuroticism and many health problems are reported including the presence of acne vulgaries, of pregnancy among un-wed mothers, the incidence of traffic accidents, and of lung cancer among male patients. Differences in extraversion and neuroticism scores between smokers and non-smokers, alcoholics, and non-alcoholics, and those with and without psychosomatic diseases are also reported. Many of the reported findings are indicative of responses to stressful societal conditions interacting with personality dimensions. The occurrence of acne, pregnancy, accidents and psychosomatic illness together with the use of tobacco and alcohol have all been found to be related to the occurrence of stressful life changes and crises.

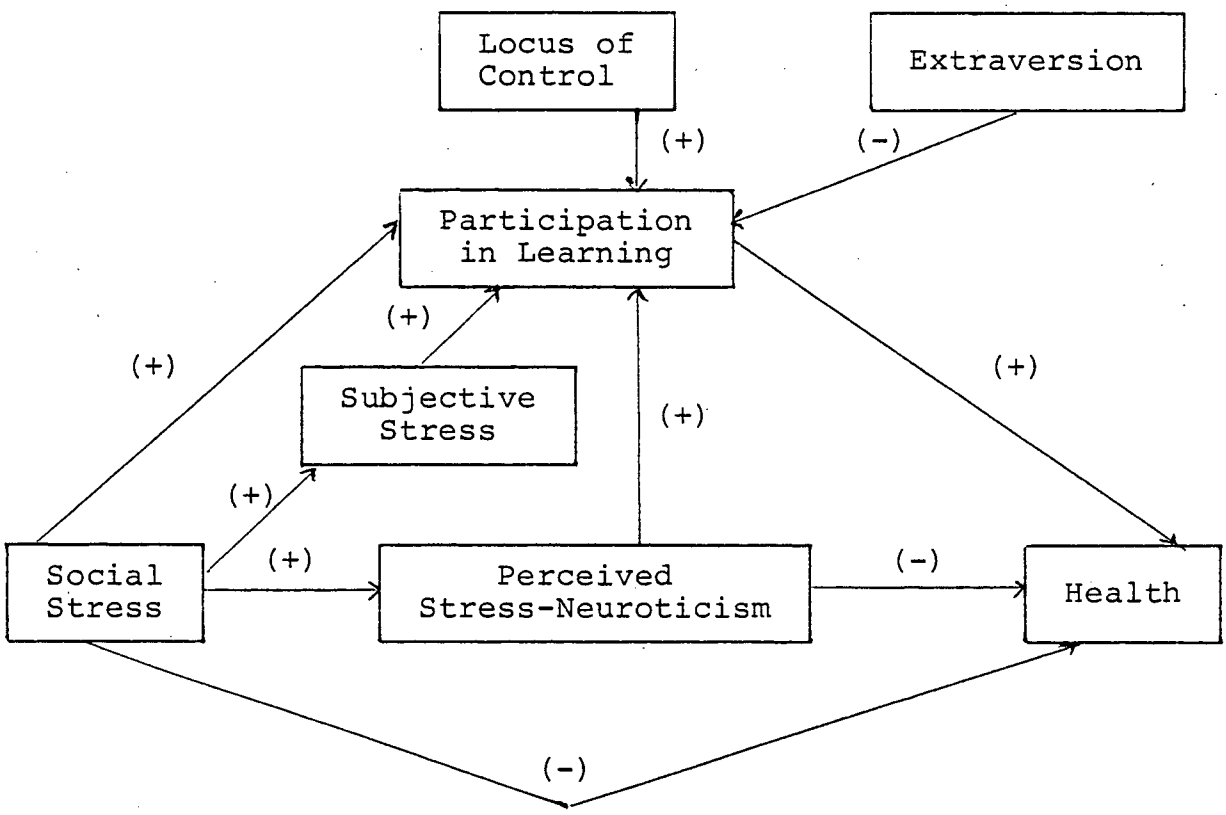
Personality factors appear to influence learning performance and the decision to engage in learning. If the adoption of coping strategies which are based on engagements in learning activities is dependent in some degree upon personality factors, individuals in high stress environments with similar socio-economic backgrounds (including formal education experience) who differ in personality will differ in levels of health experienced. Strong support for this proposition can be found in the research on heart disease by Freidman and Rosenman (1974) who classified individuals into two behavioural types - Type 'A' and Type 'B' - to identify

potential victims of heart disease.

The two personality dimensions of Extraversion-Introversion and Neuroticism-Stability are included for investigation in this study because extraversion may influence behaviours which directly influence decisions to engage in learning activities; and neuroticism may influence the perception of social stress experienced and thus affect subsequent levels of health. (See Fig. 4)

Figure 4.

THE RELATIONSHIPS AMONG PERSONALITY, LOCUS OF CONTROL PERCEIVED STRESS AND THE ELEMENTS OF THE BASIC MODEL



Proposition 7

The personality dimension of extraversion-introversion will directly influence participation in learning activities

with introverts participating to a greater degree than extraverts.

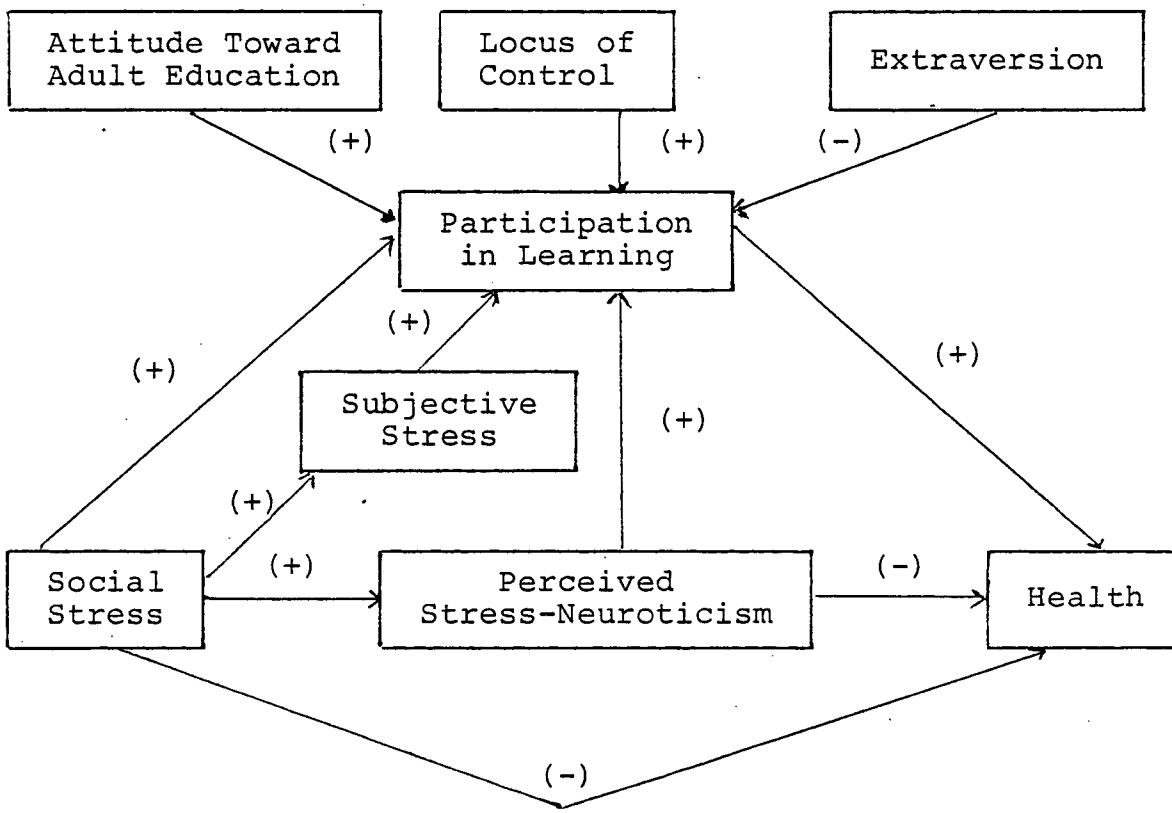
Attitude Toward Adult Education

The importance of attitude research in adult education was referred to by Brunner (1959) over twenty years ago. Since then the growth in adult education participation and opportunities for adult learning have increased dramatically. However there have been few studies which have attempted to quantify attitudes toward adult or continuing education and the study results have been relatively unrewarding. Seaman and Schroeder (1976) in one of the few published studies investigating the relationship between attitudes toward adult education and participation stated that attitudes are not always reflected in the extent of educative behaviour.

Attitude towards adult education was selected for inclusion in the theoretical model as an exogenous variable to participation in learning activities in recognition of the fact that openess or receptiveness to formal adult learning opportunities was not measured by any other variable and little is known about the effects of attitudes upon decisions to engage in learning. Seaman and Schroeder (1976) concluded that other more powerful variables affect the influence that attitudes have on the extent of educative behaviour. Their model was designed to indicate whether locus of control, personality, stress or socio-demographic factors were more powerful predictors of the decision to engage in learning activities than a belief in the value of adult education. (See Fig. 5.)

Figure 5.

THE RELATIONSHIPS AMONG PERSONALITY, LOCUS OF CONTROL PERCEIVED STRESS, ATTITUDE TOWARD ADULT EDUCATION, AND THE ELEMENTS OF THE BASIC MODEL



Proposition 8

Attitude towards adult education will be a factor positively influencing participation in adult learning activities.

Socio-Demographic Variables Related to Participation

No model of the effects of participation in learning would be valid without paying recognition to the socio-demographic factors known to be related to participation. Research in adult education has revealed that many factors - including sex, previous educational experience, occupation, income and age - contribute to the identification of adult education

participants (Brunner, 1959; Verner and Newberry, 1958).

According to Verner and Newberry (1958), research confirms that sex is a determining factor in participation in relation to age, social status, and location. Women of high socio-economic status living in urban areas participate to a far greater extent than women of low socio-economic status living in rural areas. Several extensive studies have determined that frequently the ratio of the sexes enrolled in public school adult education classes is about 65 per cent males to 35 per cent females (Johnstone and Rivera, 1956; Mizruchi and Vanaria, 1960).

Marital status has also been reported to be related to participation, with married adults participating to a greater extent than single adults. Stage in the family cycle also affects the participation of women, particularly in rural areas (Verner and Newberry, 1958).

The most reliable predictor of participation appears to be the extent of prior formal educational experience as measured in terms of years of schooling completed. A great many studies have determined that the greater the number of years of schooling completed, the greater the probability of an adult participating in adult education programs (Brunner et al, 1963; Verner and Newberry, 1958). It is generally recognized that this is not a simple cause - effect relationship, rather it is a complicated complementary evolving process with educational experience developing an individual's awareness of the value of knowledge, an awareness which in turn becomes an incentive to seek additional educational activities. The educational levels of adult education participants has been found to be related to

types of educational institutions and programs (Verner and Newberry, 1958). Those participants with a high school education or less tend to enroll in public school programs, while the higher education institutions attract those with post high school educations.

Goard and Dickinson (1968) investigated the influence of education and age on participation in rural adult education and reported that participants and non-participants held different attitudes toward change. Their findings with regard to the influence of previous education complemented London's (1968) analysis that those with higher levels of education have experienced success with change, hence they will have more favourable attitudes towards change. Faced with social stressors (life change events) demanding varying levels of personal adjustment, adults with previously high involvement in educational activities might therefore be more likely to utilize adult education activities as a strategy for coping with change than adults with little previous educational experience.

Occupational status and income have both been identified as important factors contributing to a description of adult education participants (Brunner et al, 1959; London et al, 1963; Verner and Newberry, 1958). Public school programs attract participants from a wide range of occupations; however, white collar workers, professionals and housewives participate to a far greater extent than their representation in community populations (Verner and Newberry, 1958).

Age is strongly associated with participation in adult education activities, with participation being high from the late twenties to the early fifties, when a decline in

participation occurs. Proportionately more younger adults and fewer older adults participate in public school programs than their representation in the community (Verner and Newberry, 1958). Community social participation is also known to be a signficant predictor of participation in adult education activities. According to Verner and Newberry (1958), approximately 40 per cent of the adult population participate in the formal organizations of their communities. Informal participation in social organizations is more prevalent in rural areas while formal participation occurs more frequently in urban areas (Brunner et al, 1959).

According to Booth (1961) non-participation is most likely to occur among that portion of the population which is 45 years of age and over, has less than a high school education, and which is in the lowest socio-economic categories of the labour force. In addition to the above generalizations, Booth (1961) also stated that there appeared to be tendencies for non-participants to be females rather than males regardless of their educational achievement, to be those who did not complete high school or college rather than those who did, to be rural rather than urban, and to be non-white rather than white.

In recognition of the findings of previous research in the area of participation, four socio-demographic variables were selected for inclusion in the model as factors likely to influence participation in learning activities. The variables selected were sex, age, years of schooling completed, and income.

While participation in formal social organizations and participation in adult education activities have been known to

be associated for many years, there is no discussion in the literature as to which might be the antecedent of the other or if they are in fact causally interrelated. It was thought possible that participation in formal social organizations could be an alternate coping strategy to participation in learning activities for dealing with the illness inducing effects of social change. Therefore, with the extraversion and participation in learning activities identified as exogenous antecedents, participation in formal social organizations was included in the model with a direct effect being postulated on health.

Proposition 9

The socio-demographic factors of age, sex, income and years of schooling completed will directly effect participation in learning activities.

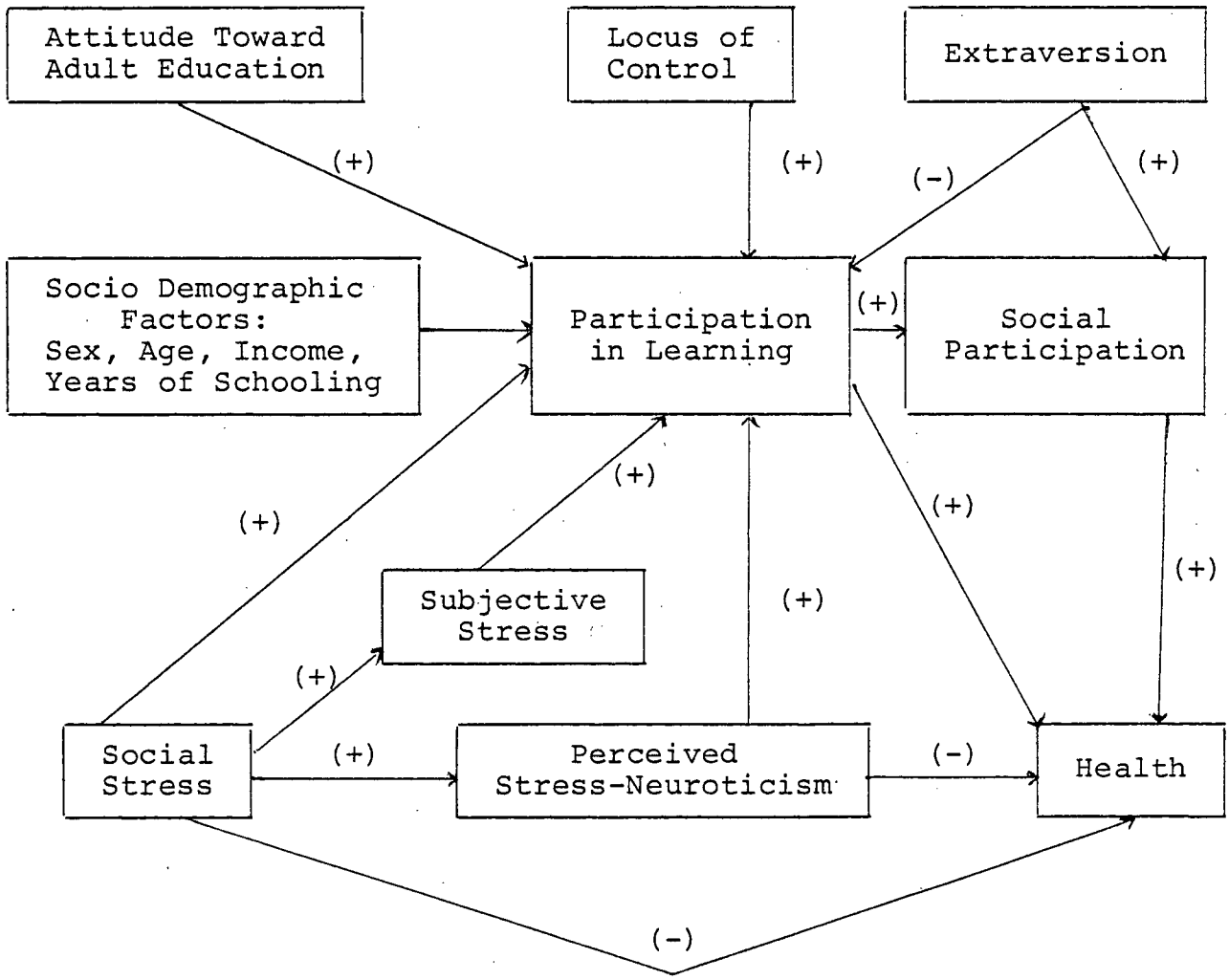
Proposition 10

Participation in formal social organizations will be associated with high levels of health functioning at the end of the study period, and improvements in levels of health over the study period.

A theoretical framework was developed based upon ten propositions derived from a review of the related literature. The constructs selected for inclusion in the model were those thought to have explanatory potential in an investigation of the effects of engagement in learning activities in mediating the decremental effects of social stress upon health. In addition to the constructs of stress, participation in learning

Figure 6.

THE THEORETICAL MODEL



activities and health, the model incorporated the constructs of subjective stress; internal-external locus of control; personality; participation in formal social organizations; attitude towards adult education and selected socio-demographic variables.

CHAPTER III

METHODOLOGY

This chapter describes: 1) the procedures followed to develop data collection instruments to quantify participation in learning activities and attitude toward adult education, 2) the data collection instruments selected to quantify all of the other major constructs in the study, 3) the procedures followed to gather the data, 4) the validation procedures utilized with the health, stress and learning variables, and 5) the reliability of the psychometric scales used in the study. The chapter is organized into ten sections. The first three sections describe the study design, the sampling procedure and the data collection methods. Sections four and five deal with the measures of health and stress selected, and their validity. Similarly, sections six and seven are concerned with the development of the learning activity and attitude to adult education measures, and their validity. The final three

sections are concerned with the personality measures selected, the socio-demographic variables and finally the reliability of the psychometric instruments.

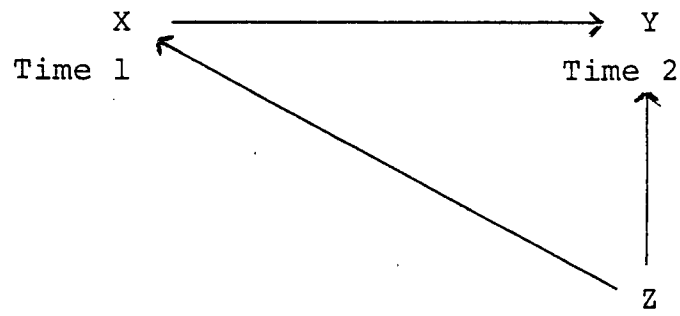
The Study Design

The study used a sample which had been randomly selected, in a panel design with two major data collection periods eight months apart, and with monitoring of health status over an eleven month period. The advantages of the design are 1) randomization reduces the likelihood of biased and non-normal distributions being included in the sample, 2) the design enables changes in health status to be measured, and 3) it eliminates direct contamination by data collection methods as a potential source of error.

To study the effect of life events (X) on subsequent health (Y), prospective rather than retrospective research procedures are required. Events that have already occurred - such as the loss of a job or a spouse - can be established retrospectively once a person has become ill. However, such data may be subject to direct contamination, that is through the measurement procedure the two variables are found to influence each other. Measurement of 'X' at Time 1 is influenced by knowledge of 'Y' at Time 2 as a result of the investigator 'Z' at Time 3. (See Fig. 7)

Figure 7.

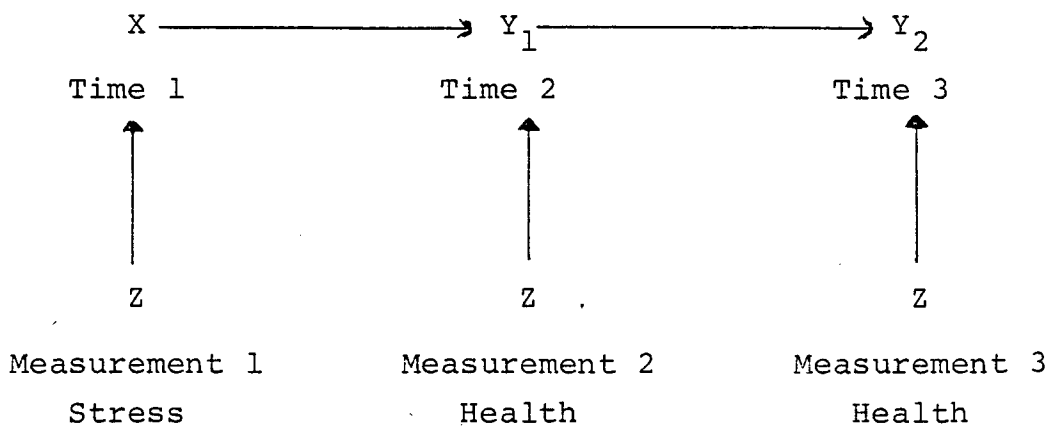
DIRECT CONTAMINATION



Such contamination means that correlations between 'X' and 'Y' cannot be used to indicate causality. To combat direct contamination, life events (X) in this study were measured prior to changes in health status (Y) occurring. Consequently, the implementation of a causal model for analysis of the relationships between the variables was made possible. (See Fig. 8)

Figure 8.

AVOIDANCE OF DIRECT CONTAMINATION
BY THE PANEL DESIGN



Sampling Procedure

The population from which the sample was selected

consisted of all patients over the age of eighteen and below the age of sixty-five, who had sought health care during the preceding twelve months from a family physician's practice in East Vancouver, British Columbia. Each patient was mailed a copy of the Social Readjustment Rating Scale (SRRS) with a letter, signed by the physician, describing the general nature of the research project and requesting their cooperation in completing the form and returning it in a stamped addressed envelope provided.

Of 867 forms mailed, 506 (58.4%) were returned fully completed, 28 (3.2%) were returned partially completed, and 109 (12.6%) were returned to the physician's office due to patients having moved without leaving forwarding addresses. The non-returns totalled 224 (25.8%). Of the 758 forms which were received by patients the rate of response was 72 per cent, with 66.8 per cent appropriately completed.

From the 506 fully completed SRRS forms a sample of 300 patients was selected using a computer-generated list of random numbers. Each patient in this sample was contacted by telephone and asked to participate in the study. An appointment was then made for the patient to visit the physician's medical office. During this visit a consent form to release medical records to the investigator was signed, and the first interview was undertaken.

Several patients had difficulty in communicating in English and were excluded from the study. Some individuals were unable to keep their appointments, and some chose to withdraw from the study citing reasons which included insufficient time, invasion of privacy, and an intention to

leave the area before the end of the study. A total of 263 patients completed the first interview. Eight months later 226 completed the final study interview.

Data Collection Methods

The data collection periods and the duration of observations are shown in Figure 9. Responses on the Subjective Readjustment Rating Scale (SRRS) were obtained by a mailed questionnaire. All of the remaining study data was collected by the use of structured interview schedules or retrieved from the patient's medical records by the physician.

During the first interviews (which commenced during the first week of February and concluded during the last week of April, 1976) the following data was collected from the participants:

(i) Bush Health Status Pre-Test Scores (BHS)

(ii) Perceived stress scores, using the neuroticism-stability scale of the EPI, the Subjective Stress Scale (SSS) and the subjective estimation of stress magnitude estimation procedures.

(iii) Learning estimates, using the Subjective Estimation of Adult Learning Scale (SEALS) and attitudes towards adult education using a Thurstone scale developed for this study.

(iv) Eysenck Personality Inventory (EPI) scores.

(v) Socio-demographic data.

The second set of interviews began during the first week of October and ended during mid-December 1976. During these intervals the following data were collected:

(i) Bush Health Status (BHSS) Post-Test Scores.

(ii) Subjective estimations of stress, using the magnitude estimation procedure.

(iii) Locus of Control (Rotter) scores.

(iv) Income and number of years residency in Vancouver.

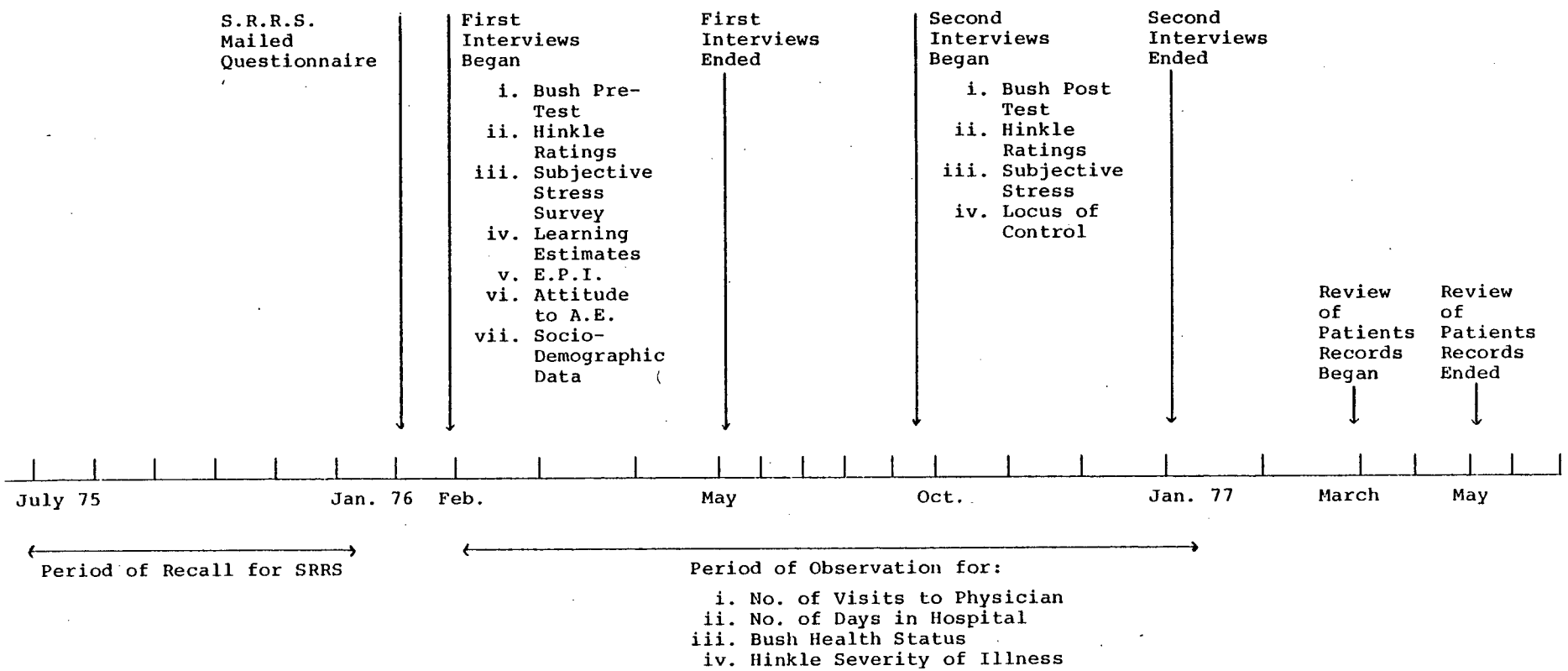
Following each of the two interviews the subject was examined by the physician. Knowledge of the patients' scores and responses to the interview schedule generally was withheld from the physician. However, patients frequently chose to discuss their social, familial and economic concerns with the physician to a greater degree than normal during their consultation. On those occasions when patients in the study sample sought medical care between the pre-test and post-test data collections they were interviewed and assigned a Bush Health Status Scale (BHS) score prior to being examined by the physician.

Beginning in March 1977, the records of each subject were reviewed by the physician to identify, 1) the number of visits made to the physician's office between February and December, and 2) the number of days each patient had spent in hospital during that time period. In addition, Hinkle Severity of Illness Rating Scale Scores assigned by the physician to patients on each visit to the practice or on each stay in hospital were reviewed. This review of patients' records ended in early May 1977.

The first interviews were conducted by a nurse-practitioner (50% of interviews) who had previously been employed in the practice, a graduate nurse (30%) enrolled as a graduate student in adult education, an ex-medical student (10%) and the writer (10%). The 263 interviews lasted a minimum of

Figure 9

TIMETABLE OF DATA COLLECTION PERIODS AND DURATION OF OBSERVATIONS



approximately one hour and a maximum of one hour and forty-five minutes.

For the second data collection period a professional interviewer with some experience in health care delivery in underdeveloped countries (60% of interviews) and the writer (40%) conducted 226 interviews with durations ranging from twenty to forty-five minutes.

Prior to conducting interviews, each interviewer conducted practice interviews with graduate students in the Department of Adult Education and with patients not in the study sample, while being observed by one other study interviewer. Two weeks were devoted to interviewer training prior to the first data collection period and one week was assigned to interviewer training prior to the second data collection period. Regular meetings of the interviewers were convened to discuss difficulties, procedures and the elimination of those patients with language difficulties from the study. All interviews were conducted in the examination rooms at the physician's office.

Health and Stress Measures

The concepts of health and illness have traditionally been viewed from a variety of perspectives, and the development of scales to quantify health and illness have met with varying degrees of success (Sullivan, 1966; Moriyama, 1968). In view of the theoretical and empirical difficulties inherent in the quantification of health, a decision was made when planning the study to use alternate measures of the construct of health.

The two instruments selected were 1) a scale developed by J.W. Bush and associates (Bush and Fanshel, 1970; Patrick,

Bush and Chen, 1973) to assess levels of health from the perspective of social function, and 2) a rating scale developed by Hinkle (Hinkle, 1960) to record physician's assessments of the severity of illness in terms of the disability produced by an episode of illness.

Bush defines health in terms of the individual's ability to function in normal daily activities. A healthy person is one who shows little or no decrement in ability to carry out daily activities normal for a given age, sex and social role. Conversely, an individual who reports being unable or unwilling to carry out his normal activities while experiencing certain symptoms of health problems is less than healthy. The scale is designed to provide a score between 1.00 (perfect health), and 0.00 (death), for each of eight days immediately preceding the interview. For the purposes of this study a single score was derived by calculating the average of the eight daily scores for each of the assessment periods.

The scores were generated by a computer-based scoring program at the University of California by Dr. Bush and his associates. In addition to generating health scores, the program checked the data for internal consistency, for logical errors due to keypunch or coding errors, and for missing data.

The Hinkle rating scale consists of a five-category range of severity of illness, defined as "the degree of disability which an episode of illness produces." Disability as defined by Hinkle is "the extent to which a person is unable to carry out his full social role and maintain his normal bodily functions because of disease." The five categories of severity of illness originally used by Hinkle were expanded to ten categories for

the purpose of this study, where variablity of measurement was thought to be particularly important. A rating was assigned to each patient on each visit to the physician's office, and for those patients who were hospitalized a rating was assigned for each period hospitalized.

In addition to the scores derived from the Bush and Hinkle measures a record of the number of visits made by each patient to the physician's office to seek care, and the total number of days each patient spent in hospital during the study period, were recorded.

The following health status scores were derived for each patient:

1. Bush Health Status, Pre-Test; mean score for eight day period preceding first interview.

2. Bush Health Status, Post-Test; mean score for eight day period preceding final interview.

3. Bush Health Status, Low Score; the single lowest mean score for an eight day period during the study period.

4. Bush Health Status, Pre-Post Residuals; the normalized residuals obtained from a regression of post-test against pre-test scores.

5. Hinkle Severity of Illness Mean Score; the mean of all Hinkle rating scale scores obtained during the study period.

6. Hinkle Severity of Illness High Score; the single highest rating scale score for an episode of illness during the study period.

7. The total number of days spent in hospital during the study period.

8. The total number of visits made to the physician's office to seek care.

The principal measure of stress used in this study was the Social Readjustment Rating Scale (SRRS) developed by Holmes

and Rahe (1967). This scale consists of 43 items, or life events, each of which, when experienced, demands a degree of social readjustment on the part of the subject. The SRRS was developed by Holmes and Rahe using the psycho-physical technique of magnitude estimation as proposed by Stevens (1957; 1966).

Several studies have been conducted to determine whether the SRRS scale values are culture free. Although certain individual item values are influenced by the social beliefs and values held by members of cultural groups, overall there is support for the use of the scale with such diverse populations as white Americans and Japanese (Masuda and Holmes, 1967); Negro, Mexican and white Americans (Komaroff, Masuda and Holmes, 1968); Western Europeans (Harmon, Masuda and Holmes, 1970); Spaniards (Celdran, 1970); and Swedes (Rahe et al, 1971). The consistency of recall of the scale items, a factor which may negatively influence the internal validity of the scale, was tested using a group of resident physicians. The results obtained substantiated the saliency of the life events and the consistency of recall over a nine month period (Casey, Masuda and Holmes, 1967).

The reliability of the SRRS has been examined using the test-retest procedure. Spearman's 'p' reached the value of 0.988, and no significant differences on item test-retest scores were evident following analysis using a Mann Whitney "U" test. (Wyler, Masuda and Holmes, 1970.) One study aimed at duplicating the SRRS scale values produced item values which correlated at 0.93 with the original SRRS item values (Mendels and Weinstein, 1972).

To assess the validity of the SRRS in this study, and to

provide three additional measures of stress, subjective estimates of each patient's levels of stress were obtained. Responses were sought on the Subjective Stress Scale developed by Chapman et al (1966) for the Los Angeles Heart Study. The scale consists of four items with a four category Likert scale which the respondent uses to identify whether the items describe him very well, fairly well, not very well, or not at all:

1. In general, I am unusually tense or nervous.

2. I experience a great amount of nervous strain connected with my daily activities.

3. At the end of the day, I am completely exhausted, mentally and physically.

4. My daily activities are extremely trying and stressful.

Studies conducted by Reeder et al (1973) and Schaar et al (1973) have shown scores on the Subjective Stress Scale to be positively related to measures of psycho-social stress, neuroticism, tensions in family life and dissatisfaction with the work environment.

The second method of quantifying subjective estimations of stress was through the use of a magnitude estimation technique. Magnitude estimation scaling techniques were pioneered by Stevens (1957) and basically consist of asking a subject to evaluate a stimulus, condition or state on the basis of a provided reference. This technique was used by Holmes and Rahe (1967) to develop the SRRS and by the writer to develop a scale to quantify adult learning experiences (SEALS) for the purpose of this study (Blunt, 1977).

On the first interview each patient was presented with a line five centimetres long representing his or her average

levels of stress over the last five years. The patient was then instructed to draw a line below the referent line indicating his or her present level of stress in comparison with the average levels of stress previously experienced. Thus a line drawn ten centimetres would indicate the patient assessed his current personal level of stress to be twice his or her own average level over the last five years. During the final study interview the referent line was presented as the average level of stress experienced by those persons with whom the respondent was in close daily contact. The comparison line to be drawn by the patient was to represent his or her level of stress in comparison to that of close associates.

Although not designed as a measure of response to stress per se, the Neuroticism Scale of the Eysenck Personality Inventory (EPI) has frequently been found to have many relevant correlates in clinical studies. Neuroticism as defined by Eysenck is the general emotional over-responsiveness typified by people who appear anxious, aggressive and moody as compared to stable individuals who are calm, even-tempered, and easy-going (Eysenck and Eysenck, 1966).

The EPI has been widely used and data supporting the reliability and validity of the scale is quite extensive (Buros, 1972). Test-retest reliability coefficients ranging from 0.84 to 0.94 for the complete test and 0.80 to 0.97 for the separate forms are reported in the EPI manual (Eysenck and Eysenck, 1966). As anticipated, the Neuroticism Scale scores in this study correlated with the stress measure and with the major health measures, and were included in this section of the study to assist in the validation of the health and stress

measures.

Accordingly, five measures of stress were computed for each patient:

1. Subjective Readjustment Rating Scale Scores, mailed questionnaire for six month period prior to selection of sample.

2. Subjective Stress Scale, first interview.

3. Subjective Estimation of Stress, first interview (present vs past stress).

4. Subjective Estimation of Stress, final interview (personal vs daily associates stress).

5. E.P.I., Neuroticism Scale Score, first interview.

The Validity of the Health and Stress Measures

All of the health measures were found to be correlated at statistically significant levels, as were the stress measures (Table 1).

This shared variance between the measures of each of the two constructs provides initial support for the validity of the measure. In addition, the major measures of health and stress were correlated, supporting the findings of previous research that health and stress are related.

To test the validity of the health and stress measures, factor analyses were conducted to assess the extent to which each variable contributed to the purported theoretical constructs. Table 2 reports the results of a two-factor solution with orthogonal rotation, using only the variables on which data was collected by the interviewers in a clinical setting. The two factors labelled Health and Stress together contribute 46.1 per cent of the variance. The factor loadings of the health

variables on the stress factor and the relatively low percentage of the variance explained by this solution indicates that the two factor constraint, although statistically acceptable, does not present the best solution.

A second solution was obtained by including the S.R.R.S. scores with the stress variables, excluding the Bush Health Status Index Pre-Test scores in order to avoid the problem of multi-collinearity and with a new variable 'health change' as quantified by the normalized residuals obtained from a regression of Bush Post-Test on Bush Pre-Test scores. The analysis was conducted without factor constraints and with orthogonal rotation to yield four factors which contributed 61.8 per cent of the total variance (Table 3). The four factors were labelled Stress, Severity of Illness, Health Function and Health Change.

The first factor, Stress, which contributed 17.4 per cent of the total variance, consisted of all five of the stress variables. Severity of Illness, the second factor, contributed 16.3 per cent of the variance and consisted of the two Hinkle Scale Scores, a mean score of the severity of illness ratings over the duration of the study and the highest single severity of illness score obtained. Health Function, the third factor, was comprised of the Bush Health Status Index Post-Test score and the lowest Bush Index score observed over the duration of the study. It explained 14.8 per cent of the variance accounted for in this factor solution. Finally, the fourth factor, with 13.3 per cent of the variance was Health Change, which consisted of three variables, the Bush Health Status Index Pre-Post Residuals, the number of visits to the physician, and the number of days spent in hospital. Each factor presented a clear,

unambiguous interpretation of the underlying constructs represented by the data. With 61.8 per cent of the variance accounted for, there is strong support for acceptance of the validity of the health and stress measures used in the study. It should also be noted that the standard errors of measurement obtained for all of the health and stress variable scores indicate desirably low levels of measurement error within each scale (Table 4).

Learning Activity Measurement

Although a large number of studies of adult education have investigated the phenomena of participation, these studies have typically classified individuals as participants or non-participants in one or more types of adult education activity. The physical act of participation has not been related in those studies to the single most important concern of adult educators, to learning. To quantify the extent to which adults have engaged in learning, the psychometric technique of magnitude estimation was used to develop a ratio scale of subjective estimates of adult learning that occurs in a variety of adult learning activities (Blunt, 1977).

Originally developed by psycho-physicists to measure perceived increases in the magnitudes of such variables as loudness, brightness, and heaviness, magnitude estimation has been found to have utility in the quantification of social norms, opinions and attitudes. Examples of the successful application of magnitude estimation can be found in the diverse areas of aesthetic value of handwriting (Ekman and Kunnapas, 1962), seriousness of the offences of juvenile delinquents

Table 1

PRODUCT MOMENT CORRELATION COEFFICIENTS OF HEALTH AND STRESS VARIABLES

	1	2	3	4	5	6	7	8	9	10	11	12
1. No. of Visits to Physician	1.0											
2. No. of Days in Hospital	.38*	1.0										
3. Hinkle Severity of Illness Hi Score	.52*	.26*	1.0									
4. Hinkle Severity of Illness Mean Score	.30*	.21*	.80*	1.0								
5. Bush Health Status Index Pre Test	-.37*	-.22*	-.30*	-.25*	1.0							
6. Bush Health Status Index Post Test	-.31*	-.19*	-.31*	-.30*	.38*	1.0						
7. Bush Health Status Index Lo Score	-.39*	-.21*	-.41*	-.36*	.67*	.81*	1.0					
8. Subjective Readjustment Rating Scale	.09	.10	.14	.19*	-.21*	-.19*	-.23*	1.0				
9. Subjective Stress Scale	-.09	-.04	-.19*	-.18*	.22*	.13	.20	-.28*	1.0			
10. Neuroticism Scale Score	.13	.05	.10	.09	-.29*	-.15*	-.28*	.29*	-.36*	1.0		
11. Stress Estimation Pre Test	.03	-.01	.02	.00	-.13*	-.05	-.09	.21*	-.27*	-.23*	1.0	
12. Stress Estimation Post Test	.03	.09	.09	.05	-.17*	-.17*	-.23*	.28*	-.33*	.19*	.29*	1.0

*p < .01

Table 2

HEALTH AND STRESS VARIABLE FACTOR LOADINGS
AFTER TWO FACTOR SOLUTION WITH ORTHOGONAL ROTATION

Variables (Harmonic Mean of Sample Size 250)	I Health	II Stress	H^2 Communality
1. Hinkle Severity of Illness High Score	.80*	-.01	.6401
2. Bush Health Status Index Low Score	-.74*	-.36	.6772
3. Hinkle Severity of Illness Mean Score	.72*	.00	.5184
4. No. of Visits to Physician	.69*	-.25	.4761
5. Bush Health Status Index Post Test	-.65*	-.38	.4850
6. Bush Health Status Index Pre Test	-.58*	-.38	.4808
7. No. of Days in Hospital	.49*	-.03	.2410
8. Subjective Stress Scale Score	-.11	-.66*	.4427
9. Stress Estimation Post-Test	.03	.64*	.4105
10. Stress Estimation Pre-Test	-.09	.63*	.4050
11. Neuroticism Scale Score	.12	.63*	.4113
Eigen Values	3.23	2.30	5.53
Variables	31.0	15.1	46.1

* All factor loadings significant at .01 level.

Table 3

HEALTH AND STRESS VARIABLE FACTOR LOADINGS AFTER
NO CONSTRAINT FOUR FACTOR SOLUTION WITH ORTHOGONAL ROTATIONS

Variables (Harmonic Mean of Sample Size 247)	I Stress	II Severity of Illness	III Health Function	IV Health Change	H^2 Communalities
1. Subjective Stress Scale Score	.71*	-.21*	-.03	.03	.55
2. Neuroticism Scale Score	.62*	-.07	-.13	-.25	.47
3. Stress Estimation Post Test	.62*	.01	-.11	-.01	.40
4. Subjective Readjustment Rating Scale Score	.59*	.19	-.13	.02	.40
5. Stress Estimation Pre Test	.57*	-.12	.12	-.20	.43
6. Hinkle Severity of Illness Mean Score	.09	.91*	-.13	-.10	.86
7. Hinkle Severity of Illness Mean Score	.07	.89*	-.15	-.26	.89
8. Bush Health Status Index Post-Test	-.11	-.17	.94*	.03	.93
9. Bush Health Status Index Low Score	-.22	-.16	.83*	.34	.88
10. Bush Health Status Index Pre-Post Residuals[1]	-.25	.03	-.04	.79*	.69
11. No. of Visits to Physician	-.02	.35	-.29	.61*	.58
12. No. of Days in Hospital	-.08	.24	-.14	.55*	.39
Eigen Values	2.09	1.96	1.78	1.60	7.47
Variance	17.4	16.3	14.8	13.3	61.8

* Factor loadings significant at .01 level.

[1] Normalized Residuals obtained from a regression of Bush Health Status Index Pre-Test Scores against Post-Test Score.

Table 4

STUDY VARIABLES

	N	MEDIAN	MEAN	S.D.	S.E.
1. Bush Pre-Test	261	0.748	0.751	0.109	0.007
2. Bush Post-Test	234	0.747	0.747	0.130	0.009
3. Bush Pre-Post Residuals	234	-0.03	0.0	0.93	0.06
4. Bush Lo Score	263	0.70	0.70	0.115	0.007
5. Hinkle Mean	261	4.1	3.9	1.84	0.11
6. Hinkle Hi Score	261	5.7	5.1	2.36	0.15
7. Visits to Physician	259	4.0	5.2	4.49	0.28
8. Days in Hospital	259	0.076	0.749	2.44	0.15
9. S.R.R.S.	262	123.5	162.2	148.31	9.16
10. Subjective Stress	263	12.3	11.8	3.24	0.20
11. Stress P1	263	1.0	1.2	0.67	0.04
12. Stress P2	230	1.0	1.2	0.61	0.04
13. Extraversion	263	14.1	13.0	3.73	0.23
14. Neuroticism	263	11.1	10.9	5.04	0.31
15. Internal-External Control	231	8.1	8.3	3.69	0.24
16. Learning	263	1620.4	1806.2	1158.31	71.42
17. Attitude to Adult Education	263	112.2	103.9	26.39	1.63
18. Blishen (Socio-Economic Status)	204	37.6	38.0	11.2	0.78
19. Personal Income	246	9500.2	10285.4	9286.0	592.1
20. Household Income	229	16988.0	18169.0	10432.7	689.4
21. Years at Job	211	5.2	8.9	9.18	0.63
22. Age	256	41.1	40.3	12.03	0.75
23. Years of Schooling	255	10.7	10.4	3.51	0.22
24. Number of Children	257	1.6	1.7	1.75	0.11
25. Number of Adults	257	2.1	2.2	0.93	0.06
26. Chapin (Social Participation)	228	5.2	7.4	7.60	0.50
27. Years in Neighbourhood	229	6.3	9.4	8.98	0.59
28. Years in Vancouver	228	18.6	20.8	13.69	0.91

(Sellin and Wolfgang, 1964), the importance of Swedish monarchs (Ekman and Kunnapas, 1963), occupational prestige (Perloe, 1963), and the magnitude of social readjustments or life changes (Holmes and Rahe, 1967).

The basis of the method rests on the human capability to match numbers of stimuli and stimuli to numbers in such a way as to estimate accurately ratios between stimuli and also to adjust stimuli to match prescribed ratios. The usual procedure in magnitude estimation involves having the subject compare two stimuli presented simultaneously. One of the stimuli serves as a standard or referent and the subject estimates the magnitude of the two, or the ratio between the two stimuli. Subjects' responses can be obtained by the assigning of numbers, drawing lines of lengths proportional to the stimuli, squeezing hand grips, drawing circles or squares, increasing the magnitude of another stimulus, or by some other similar means.

Stevens (1966) refers to these procedures as direct methods of scaling, and to the Thurstonian procedures as indirect. The distinction is that with indirect methods respondents perform a minimum of quantification. Usually they are asked which of a pair of stimuli is the greater in terms of an observable characteristic. This data provides information to rank order the stimuli, and later variablity of judgments is superimposed on the ranks in order to distribute subjects along the scale continuum. With the direct method of magnitude estimation no psychometric assumptions are superimposed on the data at a later date. The respondents perform the quantification usually by assigning their own numerical value to the response. On many attitude continua, Thurstonian scales generated by

indirect methods have been found to have an invariant relation to the scale of magnitude developed by the direct methods of magnitude estimation (Stevens, 1966).

In many experiments over the last thirty years it has been shown from the subjective estimations of observers plotted against the magnitudes of the stimuli observed, that there is a great deal of agreement between individuals' perceptions of magnitude. In fact, man may have an innate psychological capacity for making quantitative judgments about psycho-physical phenomena. It has been suggested that these responses are non-voluntary at the psychological level, and it is also possible as Shinn (1969) has speculated, the subjective responses to social stimuli may also be non-voluntary and that "the individual is in a sense a prisoner of his conditioned values". (Shinn, 1969, p. 16.) If such is the case the value placed on learning by an adult may be determined by his previous experiences as a learner. As many adults have shared similar experiences in the formal instructional setting and the natural societal setting it was thought possible that a social consensus existed regarding the magnitude of learning that occurs in various activities.

The Subjective Estimation of Adult Learning Scale (SEALS) was developed over a three year period. An item pool of 110 learning activities derived from adult education brochures, calendars and circulars was used in several trial versions of the scale which were administered to adult education graduate students and participants enrolled in a wide range of adult education activities. Item analyses were conducted and those items with large standard deviations indicating disagreement among raters were rejected. During this process items were

edited to ensure clarity, the duration of each of the activities was added to the form, directions to the respondents were modified and the value of the "standard" item was varied. The 26 items include credit, non-credit, vocational, general interest, institutional and self-directed learning activities (see Appendix 5).

Scale reliability was estimated using test-retest and a cross-modal response matching technique. Twenty-four graduate students in the Department of Adult Education at the University of British Columbia completed the SEALS twice, with a one month interval between the two administrations. Pearson product moment correlation coefficients obtained between test and retest responses for each item ranged from .51 to .68 ($p < .01$). A coefficient of .79 was obtained between the arithmetic mean scores of the twenty-six items on the group's test-retest responses.

Seventeen doctoral students and faculty members of the Adult Education Department responded to the SEALS in the form in which it was used in this study, with the standard item being participation in a non-credit, evening, school district general interest course such as wood carving, pottery or learning a new language. This standard item was presented to the respondent as having a value of 100 units of learning. One week later the respondents completed a second form which required lines to be drawn to indicate units of learning rather than the assignment of numbers. The standard item was presented with a line ten centimeters long. The order of the items remained the same, and space was left on the form for lines to be drawn beneath each item. Respondents were asked to draw the lines

freehand. If the length of their proposed lines exceeded the width of the form, provision was made for additional lines to be drawn. Measurements were recorded in millimetres to a maximum of 3.5 times the length of the standard. Test-retest correlation coefficients for each item ranged from .49 to .60 ($p < .05$) and a correlation of .66 ($p < .01$) was obtained between the test-retest arithmetic means of the items.

The SEALS was administered to a group of participants in credit courses at the Vancouver Community College, students and faculty in the Department of Adult Education at the University of British Columbia, and participants in the Vancouver School Board adult education program. Approximately 10 per cent of the school board participants gave responses which indicated that they did not understand the instructions on the form. The incomplete and invalid responses were rejected leaving 191 college respondents, 147 adult education students and faculty members, and 165 school board respondents for a total of 503 completed forms.

At each administration of the form the respondents were given an explanation of the intent of the research and several examples of the rating procedure were presented prior to the form being distributed. The instructions on the form were read aloud and individuals were encouraged to ask questions and seek guidance to the procedure. There was no discussion of the actual scale items or the value to be placed on the items, and there was no discussion once the group began to complete the forms. Approximately half of the adult education students responding had completed one or two of the developmental forms of the SEALS and were therefore familiar with the scaling

technique.

The mean item scores produced by the 503 respondents are presented in Table 5. As recommended by Stevens (1966), geometric means ($\bar{G}$) were calculated to establish the mean item values to be assigned to patients in the study sample. Arithmetic means ($\bar{A}$) were presented only for purposes of comparison. As the variability of the estimates increases in proportion to the magnitude of the scores, geometric means are the most appropriate measure for averaging over subjects.

$$\bar{G} = \frac{\text{Log } X_1 + \text{Log } X_2 \ldots \text{Log } X_n}{N}$$

There was considerable agreement among the three groups concerning the ranking of the items by their geometric means. Spearman rank order correlation coefficients were computed to test the relationship of the rank orders between the groups. The coefficients obtained, all significant beyond the .01 level, were: college vs school board r = .99; college vs adult education r = .99; and school board vs adult education r = .98. The correlation between the rank order of items as they appeared on the form and the total group item ranks was not significant (r = .047) indicating that there was no response bias due to the ordering of the items.

Kendall's Coefficient of Concordance W was used to test the extent of agreement among respondents' rankings of the scale items within each of the three respondent groups. The computer program for Kendall's W was not capable of dealing with the total number of respondents simultaneously. The value of W obtained for each group indicated that when each respondent's assigned scores were used to rank the scale items there was a

consensus in each group regarding the rank order of the item. A high degree of similarity about the ordering of the items generated W coefficients significant beyond the .001 level for each group (Community College, W = .59; Adult Education Department, W = .64; School Board, W = .66).

The distribution of the ratios of the geometric and arithmetic mean scores for each item when plotted against the arithmetic mean item scores were found to be similar in shape to the distribution reported by Masuda and Holmes (1967) in the development of a ratio scale of life change events. The distributions indicate that as judgmental variance increases with the magnitude of the estimates, it increases proportionally and linearly to the increase in estimates.

According to Masuda and Holmes (1967), such a relationship supports the general scientific law of relative variablity and contributes to the validity of subjective magnitude estimation procedures being used in psycho-social measurement. The two highest ranking items, apprenticeship and vocational training, have mean ratios which deviate from the ratios of other high ranking items. This observation suggests that the reliability of the two items in terms of their ratio scale properties may be open to doubt.

The relationship between the standard errors of the geometric means and the geometric mean item scores is a strong linear relationship ($r = .98$) indicating support for the principle of measurement that variablity in scores is a function of the magnitude of the scores, and as such is evidence of the scalable nature of the data.

To obtain estimates of the extent to which individual

Table 5

ARITHMETIC MEANS[1], GEOMETRIC MEANS[2] AND GEOMETRIC MEAN RANKS BY INSTITUTIONAL AFFILIATION OF RESPONDENTS AND SCALE ITEMS

Original Item Number	Item	Community College N = 191			Adult Education Department N = 147			School Board N = 165			Totals N = 503		
		$\bar{A}$	$\bar{G}$	Rank	$\bar{A}$	$\bar{G}$	Rank	$\bar{A}$	$\bar{G}$	Rank	$\bar{A}$	$\bar{G}$	Rank
11	Apprenticeship	1025	495	1	929	439	1	1831	1119	1	1261	625	1
20	Vocational School Course	484	263	2	371	267	2	596	390	2	488	301	2
16	University Credit Course	294	219	3	265	226	3	338	282	3	300	240	3
9	University Credit Correspondence	251	182	4	230	187	4=	261	209	4	248	192	4
22	Community College Credit	201	162	5	215	187	4=	211	181	5	208	176	5
24	High School Credit	142	125	7	164	142	7	170	144	6	158	136	6
27	Short Vocational Credit Course	143	123	8	180	152	6	151	130	8	156	133	7
3	High School Credit Correspondence	165	126	6	178	141	8	166	133	7	169	132	8
13	Non-credit College	121	100	9=	104	96	12	115	106	9	114	101	9
1	Standard Item	100	100	9=	100	100	11	100	100	10	100	100	10
5	Non-credit Correspondence	131	97	11	144	114	9	123	90	11=	132	99	11
21	Recreation Centre Lessons	116	93	12	119	102	10	110	90	11=	115	95	12
10	Programmed Text	79	62	13	111	80	13	73	58	13	87	65	13
17	One Day Workshop	63	50	14	78	61	14	52	41	16	64	50	14=
4	Individual Lessons	83	55	15	76	44	17	81	49	14	80	50	14=
15	Read Non-fiction Book	66	51	16	71	49	15	59	44	15	65	48	16
23	Labour Union Short Course	65	44	17	60	45	16	49	35	17	58	41	17
14	Attended a One Day Convention	58	42	18	55	34	19	50	31	18	54	36	18
12	Read a News Magazine	51	35	19	60	42	18	48	30	19=	53	35	19
7	Guided Tour	52	34	20	49	32	21	48	30	19=	50	32	20
18	Educational TV Program	48	35	21	46	33	20	35	23	21	43	30	21
8	Taped Lecture	50	31	22	39	25	23=	36	22	22	42	26	22
26	Attended a Public Show	38	26	23=	39	26	22	30	19	24	35	24	23=
25	Attended a Public Lecture	36	26	23=	34	25	23=	32	20	23	34	24	23=
19	Read a Daily Newspaper	39	26	23=	37	25	23=	29	16	27	35	22	25
6	Attended a Union or Professional Meeting	30	20	27	31	21	26	29	17	25=	30	19	26
2	Listened to Educational Radio	35	23	26	23	15	27	26	17	25=	28	18	27

1. $\bar{A}$ = Arithmetic Mean
2. $\bar{G}$ = Geometric Mean

patients in the study sample had engaged in learning they were asked to indicate whether or not during the previous six months they had participated in each of the SEALS activities. For those activities where multiple opportunities for participation were possible, the frequency of participation was determined and used as a weight to multiply against the item value. If a subject had participated in a learning activity he or she was assigned a score which was the geometric mean estimate of learning derived from the original SEALS study population. (See Table 6) This procedure follows exactly that of Holmes and Rahe in the development of the SRRS (Holmes, 1972).

Attitude to Adult Education Measurement

Although a scale to measure attitudes toward adult education had been developed by Adolph and Whaley (1967), the procedures followed in the development of the scale raised serious doubts about the validity of the instrument. The size of the sample on which the scale was tested was inadequate; the sample was not representative of adult education participants; the judgments which were the basis for the selection of scale items were made by non-experts, and the empirical support for the validity of the scale was weak. For the above reasons it was decided to develop an alternative measure to the Adolph-Whaley scale, using expert judges to select the scale items and Thurstone's procedure to calculate item scale values and reduce measurement error.

All 24 items from the Adolph-Whaley scale, together with 92 additional items identified from adult education literature and brainstorming sessions in an adult education doctoral

seminar, were combined to form a pool of 116 items. The items were randomly assigned to a questionnaire for presentation to the judges with a nine-point Likert scale, with accompanying directions as outlined by Edwards (1957).

Fifty-four judges were selected on the basis of their employment in adult education, or their enrollment in a full time program of graduate study in adult education at the University of British Columbia. Of the 36 employed judges, seventeen had completed masters degrees in adult education, ten others had completed doctorates in adult education and the remaining nine had been enrolled in but had not completed doctorates. Eighteen judges were full time graduate students in adult education; seven were enrolled in masters programs and eleven were enrolled in doctoral studies.

Q values were calculated from the judges' ratings as proposed by Edwards (1957). A standard deviation was also computed for each scale item. Items were rejected on the basis of the magnitude of the Q values. When highly similar items were retained following this procedure, the decision to retain only one of the items was made after comparing both the Q values and the standard deviations of the items. Those items with the lowest Q values and standard deviations indicating high agreement among the judges, were retained. Forty items met the above criteria for inclusion in the scale, and scale values were calculated for each item. Only one of the original Adolph-Whaley scale items was retained, however, several items very similar to Adolph-Whaley items were included. (See Appendix 5)

Table 6

'UNITS OF LEARNING' ASSIGNED TO LEARNING ACTIVITIES IN THE SUBJECTIVE ESTIMATION OF ADULT LEARNING SCALE

SCALE ITEM	'UNITS OF LEARNING'
Apprenticeship	625
Vocational School Course	301
University Credit Course	240
University Credit Correspondence	192
Community College Credit	176
High School Credit	136
Short Vocational Credit Course	133
High School Credit Correspondence	132
Non-Credit College	101
Standard Item	100
Non-Credit Correspondence	99
Recreation Centre Lessons	95
Programmed Text	65
One Day Workshop	50
Individual Lessons	50
Read Non-fiction Book	48
Labour Union Short Course	41
Attended a One Day Convention	36
Read a News Magazine	35
Guided Tour	32
Educational TV Program	30
Taped Lecture	26
Attended a Public Show	24
Attended a Public Lecture	24
Read a Daily Newspaper	22
Attended a Union or Professional Meeting	19
Listened to Educational Radio	18

The method of successive intervals was used to calculate the scale item values rather than the method of equal-appearing intervals used by Adolph and Whaley. The fundamental assumption underlying scaling by means of the equal-appearing intervals procedure is that the intervals into which the statements are scored are in fact equal (Edwards, 1957). Within the equal-appearing intervals procedure there is no provision to estimate the appropriateness of this assumption. Judgments made at the two extremes of the scale may become biased, and 'true' ratings skewed toward the mean. Adolph and Whaley (1957) reported three scale items with values in the range of 1.3 to 1.8 and three items in the range of 8.0 to 8.6. These six items represented 25 per cent of the total number of scale items. Should the assumption of equal intervals have been inappropriate in their study - as it may have been given the judges used (undergraduate students) - the scale values for these items may be biased. That would result in inaccurate scale ratings being assigned, thus reducing reponse variability and limiting the capability of the scale to differentiate between positive and negative attitudes, especially those at the extremes of the scale.

The method of successive intervals follows exactly the same procedure as the method of equal-appearing intervals in obtaining item judgments. In the successive intervals method, the scaling problem is to estimate the widths of the scale intervals which comprise the scale psychological continuum rather than to assume their equality. A frequency distribution of the number of items that a statement had been placed in each of the successive intervals was developed. The cumulative

frequencies were converted to cumulative proportions, which in turn were inspected for normality before being converted to Z scores. From a table of normal distributions the Z scores corresponding to the boundaries of the successive intervals for each statement were identified. Once the scale values of the psychological continuum had been identified, scale values were calculated for each of the scale items in accordance with the procedures described by Edwards (1957). The values of the scale intervals on the psychological continuum are reported at the end of Appendix 5.

The widths of the two extreme intervals are indeterminate by the successive intervals procedure. However, since the number of intervals used in obtaining the judgments was relatively large, the likelihood of scale values falling into the extreme categories of the psychological continuum was minimized in this study.

A test of the internal consistency of the scale was conducted by estimating the magnitude of the discrepancies between the observed and the theoretical proportions of judgments as recommended by Edwards (1957). The absolute value of discrepancies between the theoretical and empirical proportions over all items was 108.8 and when divided by 320, the total number of discrepancies, the mean deviation was 0.31. Although this is not as low as the typical value (.24) reported by Edwards, the results obtained indicate that the forty items do comprise an acceptable set of items consistent with the original empirical observations.

Given the need to limit the duration of patient interviews in the study, it was necessary to reduce the number of scale

items to a minimum. Such an eventuality had been recognized by Edwards (1957) who acknowledged that a Thurstone scale with a large number of items can be treated as an item pool. Consequently, twenty-eight items were randomly selected from the forty scale items to establish a short form of the attitude scale. The scale as used in this study is included in the interview schedule in Appendix 3.

Validity of the Learning Activity and Attitude to Adult Education Measures

Scores on the learning activity and attitude scale were correlated with five criterion variables: 1) years of school completed, 2) social participation, 3) socio-economic status, 4) internal-external locus of control and 5) personal income.

Many studies have revealed that previous formal educational experience, participation in community social activities and socio-economic status are all related to participation in adult education (Verner and Newberry, 1958). Since participation in adult education is normally voluntary, positive attitudes toward adult education might logically be expected to be evident among those adults who possess characteristics similar to those of adult education participants, that is among the relatively well educated, the socially active and the middle and higher socio-economic groups. It was anticipated, therefore, that scores on the learning activity and attitude to adult education scales would correlate positively and significantly with those four socio-demographic variables. It was also anticipated on the basis of logical analysis that scores on the attitude scale would correlate with learning activity scale scores.

Research on locus of control supports the hypothesis that an individual's expectancy for control over life situations influences attention to, and acquisition of information available in the environment (Rotter, 1961). If individuals consider the generalized changes occurring in their lives to be partially within their control (internally controlled), it is likely that they would look favourably upon adult education in general, and would participate in learning activities as one means of achieving personal goals. It was predicted, therefore, that scores on the locus of control scale indicating internal control would correlate positively and significantly with scores on the learning activity scale indicating involvement in adult learning activities and scores on the attitude scale indicating a positive attitude toward adult education.

The Chapin Social Participation Scale (Chapin, 1938) was used to measure social participation; the Blishen Socio-Economic Index (Blishen, 1976) was used to assign socio-economic ratings, and locus of control scores were obtained from the Rotter Locus of Control Scale (Rotter, 1961). Pearson product-moment correlation coefficients obtained between each of the five criterion variables and the learning activity and attitude toward education scale scores are shown in Table 7.

Scores on the learning activity scale correlated as predicted with two of the five criterion variables, years of school completed and socio-economic status. The correlation between learning activity and social participation ($r = .10$, $p < .06$) approached statistical significance, as did the correlation between learning activity and personal income

($r = .08$, $p < .10$). However, the expected significant relationship between locus of control and learning activity ($r = .02$) was not observed.

With one exception, the correlations between scores on the attitude toward adult education scale and the criterion variables were in the anticipated directions and were statistically significant beyond the .01 level. The exception was the correlation between attitude towards adult education and personal income ($r = .10$, $p < .06$). As anticipated, scores on the learning activity scale correlated positively and significantly with scores on the attitude scale indicating positive attitudes toward adult education ($r = .15$, $p < .01$).

Overall, the correlations between the learning activity and attitude scale scores and the five criterion variables, although small in magnitude, were in the predicted direction and the great majority were statistically significant beyond the .01 level. Collectively the observed relationships supported the concurrent validity of the two scales in this study.

Personality Measures

Two instruments were used to assess dimensions of personality, the Eysenck Personality Inventory (Eysenck and Eysenck, 1966) and the Rotter Locus of Control Scale (Rotter, 1966).

The Eysenck Personality Inventory (EPI) consists of two scales which measure Neuroticism - Stability (N) and Extraversion - Introversion (E). The Neuroticism scale was originally selected for inclusion in the study for its joint utility as a measure of response to perceived stress, and as

Table 7

PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENT MATRIX OF CRITERION VARIABLES AND LEARNING AND ATTITUDE SCALE SCORES

	1	2	3	4	5	6	7
1. SEALS (learning)	1.0						
2. Attitude to Adult Education	.15+	1.0					
3. Locus of Control	.02	-.22*	1.0				
4. Personal Income	.08	.10	-.09	1.0			
5. Years of Schooling	.30*	.25*	-.24*	.24*	1.0		
6. Blishen (Socio-Economic Status)	.25*	.27*	-.19*	.38*	-.59*	1.0	
7. Chapin (Social Participation)	.10	.13+	-.07	.14+	.30*	.42*	1.0

N = 263

* = $p < .001$

+ = $p < .01$

a broad measure of emotional response as a personality type as depicted by Eysenck. Extraversion is typified by outgoing, uninhibited, impulsive and sociable behaviours and introversion by inhibited, careful and reserved behaviours. Each scale consists of 24 statements with which respondents were asked to agree or disagree (see Appendix 5). In order to save time during the interviews the nine 'lie' scale items distributed throughout the EPI were omitted.

As reported earlier the EPI has been widely used (Buros, 1972) and test-retest reliability coefficients ranging from 0.84 to 0.94 for the complete inventory have been obtained.

The Internal-External Locus of Control Scale developed by Rotter (1966) was used in a slightly amended form to measure the patients' expectancies for control over factors influencing the changes that are occurring in their lives. Items seven and seventeen in the twenty-item scale were written to replace original scale items judged to be inappropriate for use in this study (see Appendix 4). Respondents were asked to indicate which one of two contrasting statements they believed to be true.

The Locus of Control Scale has been demonstrated to have satisfactory internal consistency, test-retest reliability and construct validity. Kuder-Richardson split half reliability estimates ranging from 0.65 to 0.75 and Spearman Brown reliability estimates of 0.79 are reported by Rotter (1966). Ample evidence of the validity of the scale has been demonstrated in a series of studies conducted by Seeman (1959, 1962, 1963, 1966, 1967a, 1967b, 1972).

Socio-Demographic Variables

A range of socio-demographic variables was included in the study in order to describe the study sample for comparative purposes, and to determine the extent to which selected socio-demographic variables might influence any relationship found to exist between stress, health and engagement in adult learning activities. Data was obtained in the following broad categories:

(i) Personal Data - Age, sex, marital status, immigrant status, number of children, years of schooling and number of adults in household.

(ii) Labour Force Activity - Labour force status, occupation, number of years at present job and socio-economic status (Blishen scale scores derived from occupation and income data).

(iii) Income - Personal income and household income.

(iv) Community Involvement - Number of years in present neighbourhood, years in Vancouver and participation in social activities (Chapin scale).

From the occupation and income data Blishen Socio-Economic Index Scores (Blishen, 1976) were derived, and the extent of participation in social organizations was quantified by use of the Chapin Social Participation Scale (Chapin, 1938). (See Appendix 3.)

Reliability of Instruments

Seven instruments which required participant responses to psychometric scale items were analyzed for reliability. The

seven instruments were: the Subjective Readjustment Rating Scale (SRRS); the Subjective Stress Scale (SSS); the Eysenck Personality Inventory (EPI) including the neuroticism-stability and intraversion-extraversion scales; the Subjective Estimation of Adult Learning Scale (SEALS); the Attitude to Adult Education Scale; and the Locus of Control Scale. Each instrument was analyzed on the basis of the zero-one responses and the results of the analysis are shown in Table 8.

The lowest reliability coefficients obtained were for the 26 item Subjective Estimation of Adult Learning Scale which had a coefficient of .69 and the 42 item Subjective Readjustment Rating Scale with a coefficient of .70. These two scales contain items which are unlikely to be selected by the great majority of respondents, consequently reducing the likelihood of high reliability coefficients being obtained. For example, the SRRS contains items such as, 'I have lost my husband or wife by death during the last six months', and 'I have retired within the last six months', while the SEALS contains items such as 'I have been registered in an apprenticeship training program', or 'I have taken a university credit course by correspondence'. The five remaining scales had reliability coefficients ranging from .73 (Neuroticism-Stability) to .87 Attitude to Adult Education Scale).

SUMMARY

The study used a sample of adults aged between eighteen and sixty-five years who were the patients of one family physician. From a total population of 506 patients who had completed a mailed copy of the Subjective Readjustment Rating

Table 8

HOYT ESTIMATE OF RELIABILITY COEFFICIENTS
FOR SEVEN PSYCHOMETRIC SCALES

Scales	No. of Items	No. of Respondents	Hoyt Estimate of Reliability
1. Subjective Readjustment Rating Scale	42	263	.70
2. Subjective Stress Scale	4	263	.80
3. Neuroticism-Stability (EPI)	24	263	.73
4. Intraversion-Extraversion (EPI)	24	263	.81
5. Subjective Estimation of Adult Learning Scale	26	263	.69
6. Attitude to Adult Education Scale	28	263	.87
7. Locus of Control	20	231	.76

Scale a random sample of 300 patients was selected. The study used a panel design with two data collection periods nine months apart. The first interview was completed with 263 patients and eight months later 226 patients completed the final study interview.

A total of eight different health variables were quantified: level of health function; pre-test and post-test (Bush Health Status Index); lowest level of health function during the study period (Bush Health Status Index Low Score); health change over the study period (Bush Health Status Index Pre-Post Test Residuals); severity of illness (Hinkle Severity of Illness Scale Mean Score); the most severe level of illness (Hinkle Severity of Illness Scale High Score); the number of days spent in hospital; and the total number of visits made to the physician's office to seek care. Five distinct measures of stress were obtained for each patient including social stress (Subjective Readjustment Rating Scale); subjective stress (Subjective Stress Scale); perceived stress (Neuroticism-Stability, E.P.I.); and two subjective estimations of stress. Factor analyses of the health and stress variables were conducted yielding the conclusion that distinct constructs of health and stress were being quantified by the study variables.

Instruments to measure participation in learning activity and attitude toward adult education were developed for use in the study. The Subjective Estimation of Adult Learning Scale (SEALS) was developed through psychometric magnitude estimation techniques to provide estimates of adult learning that occurs in a variety of adult learning activities. The Thurstone successive intervals scaling technique was used to develop a

scale to quantify attitude toward adult education. Scores on the SEALS and the attitude scale were correlated with five criterion variables: 1) years of school completed, 2) social participation, 3) socio-economic status, 4) internal-external locus of control and 5) personal income. Collectively the observed relationships between the learning activity and the attitude scale scores and each of the five criterion variables supported the validity of the two scales.

Three measures of personality were used: Neuroticism-Stability and Extraversion-Intraversion were quantified by the Eysenck Personality Inventory, and the Locus of Control Scale was used to quantify generalized feelings of control over the environment. Four broad categories of socio-demographic data were included to describe the study sample and to determine the extent to which selected socio-demographic variables influence participation in learning activities. The four categories of socio-demographic data were: 1) personal data, 2) labour force activity, 3) income and 4) community involvement.

Seven psychometric scales used in the study were analyzed for reliability. The lowest reliability coefficients obtained were from the SEALS with a coefficient of .69 and the SRRS with a coefficient of .70. The highest reliability coefficient obtained was for the attitude toward adult education scale with a coefficient of .87.

CHAPTER IV

THE STUDY SAMPLE

The purpose of this chapter is to describe the sample. Combinations of socio-demographic variables and bivariate distributions of socio-demographic variables with the health, stress, personality, learning activity, and attitude toward adult education variables are presented. The six selected socio-demographic variables are age, sex, marital status, years of schooling, country of birth and socio-economic status.

The health, stress, personality, learning activity and attitude to adult education variables were all dichotomized at the median score to enable bivariate distributions of the data to be used for descriptive purposes and to test for differences between the levels of each of the socio-demographic variables with respect to the variable in question. When statistically significant differences between bivariate distributions of the data or significant correlations between variables have approached

significance (<.10), the likelihood of these observations being attributable to chance has been stated. The tabular bivariate distributions of this data are included in Appendix 6.

Socio-Demographic Characteristics

The mean age of the sample was 40.3 years with a standard deviation of 12.03 years. Males (48.4%) and females (51.6%) were almost evenly represented in the sample. There was a larger proportion of younger females than males, and of older males than females and the difference between the age distributions of the sexes approached the .05 level of statistical significance (Table 9).

Table 9

DISTRIBUTION OF SUBJECTS BY AGE AND SEX

Age	Males		Females		Totals	
	No.	%	No.	%	No.	%
<20	1	0.8	6	4.5	7	2.7
20 - 29	20	16.1	33	24.8	53	20.6
30 - 39	27	21.8	33	24.8	60	23.3
40 - 49	38	30.6	31	23.3	69	26.8
50 - 59	30	24.2	27	20.3	57	22.2
>59	8	6.5	3	2.3	11	4.3
TOTALS	124	100.0	133	100.0	257	100.0

Age: $\overline{X}$ = 40.3 yrs., s.d. = 12.03

X^2 = 10.198, d.f. = 5, p <.07. Missing Cases = 6.

The majority of the subjects were married (70.5%) while the remainder were single (14.7%) and widowed, separated or divorced (14.8%) (Table 10). The sample contained slightly

more single males than females, and more females than males who were widowed, separated or divorced.

Table 10

DISTRIBUTION OF SUBJECTS BY MARITAL STATUS AND SEX

Marital Status	Males No.	Males %	Females No.	Females %	Totals No.	Totals %
Single	22	17.6	16	12.0	38	14.7
Married	91	72.8	91	68.4	182	70.5
Widowed	0	0.0	3	2.3	3	1.2
Separated	3	2.4	6	4.5	9	3.5
Divorced	7	5.6	13	9.8	20	7.8
Common-law	2	1.6	4	3.0	6	2.3
TOTALS	125	100.0	133	100.0	258	100.0

$X^2 = 5.86$, d.f. = 2, $p < .05$ (Single, Married and Other).

One-third of the sample (33.9%) reported having no children while 13.2 per cent reported having one child, 29.6 per cent reported two children and 14.4 per cent reported three children. The largest number of children reported was ten, and the mean number of children reported was 1.7. Two-thirds of the subjects (62.4%) reported living in a two-adult household, 13.7 per cent lived alone with the remaining 22.2 per cent living in households of between three and nine adults. The mean number of adults per household was 2.2.

In terms of occupational status 81.7 per cent of the subjects were members of the labour force with the majority (61.9%) employed full time. Fourteen per cent were employed part time and 6.2 per cent were currently unemployed. Those subjects who were not members of the labour force were

homemakers (14.8%), disabled (1.0%), or retired (1.6%). Almost twice as many males as females were employed on a full time basis (Table 11).

Table 11

DISTRIBUTION OF SUBJECTS BY OCCUPATIONAL STATUS AND SEX

Occupational Status	Males		Females		Totals	
	No.	%	No.	%	No.	%
Employed Full Time	102	81.6	56	42.4	158	61.9
Employed Part Time	8	6.4	28	21.2	36	14.0
Homemaker	0	0.0	38	28.8	38	14.8
Unemployed	8	6.4	7	5.9	15	5.8
Disabled	3	2.4	2	1.7	5	1.9
Retired	4	3.2	0	0.0	4	1.6
TOTALS	125	100.0	131	100.0	256	100.0

$X^2 = 65.24$, d.f. = 4, $p < .001$ (Disabled and retired combined)

Those subjects who were employed reported being in their present job a mean of 8.9 years; however, fifty per cent of the subjects reported less than 5.2 years work experience in their present job.

The mean personal annual income for the total sample was $10,285 with a standard deviation of $9,286 and the mean household income was $18,169 with a standard deviation of $10,433. Of those subjects employed full time, 51 per cent earned more than $13,000 per year, and 45.7 per cent of those employed part time earned more than $6,000 per year.

Subject's scores on the Blishen Socio-Economic Index (Blishen, 1976) ranged from a low of 21.72 (e.g. textile and weaving occupations) to a maximum of 75.28 (e.g. administrator,

teaching and related fields). The median for the sample was 37.62 (e.g. pipefitting, plumbing and related occupations), indicating that in terms of socio-economic status the sample represented an upper working class and lower middle class stratum. A Pearson product-moment correlation coefficient of 0.38, significant at $p < .01$, was observed between personal income and Blishen Socio-Economic Index ratings.

Almost half of the sample (45.0%) was not Canadian born. As the physician's practice was located in a low-rent, urban residential district with a clearly discernible immigrant character, a large number of foreign-born adults had been expected in the study sample. No statistically significant differences were noted between the Canadian born and non-Canadian born by sex and by age (Table 12).

Table 12

DISTRIBUTION OF SUBJECTS BY BIRTH PLACE, AGE AND SEX

Age	Canadian Born						Non-Canadian Born					
	Males		Females		Total		Males		Females		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<20	1	1.7	3	3.8	4	2.9	0	0.0	3	5.7	3	2.6
20-29	10	16.9	19	24.1	29	21.0	10	15.6	14	26.4	24	20.5
30-39	17	28.8	22	27.9	39	28.3	10	15.6	10	18.0	20	17.1
40-49	11	18.6	19	24.1	30	21.7	27	42.2	12	22.6	39	33.3
50-59	15	25.4	15	19.0	30	21.7	14	21.0	12	22.6	26	22.2
>59	5	8.5	1	1.3	6	4.3	3	4.3	2	3.8	5	4.3
TOTALS	59	100.0	79	100.0	138	100.0	64	100.0	53	100.0	117	100.0

Canadian Born, Sex v Age, $X^2 = 6.471$, d.f. = 5, N.S.
Non-Canadian Born, Sex v Age, $X^2 = 8.834$, d.f. = 5, N.S.
Birth Place v Sex, $X^2 = 2.94$, d.f. = 1, $p < .09$. Missing Cases = 7

The mean number of years of school completed by the sample was 10.41 years with a standard deviation of 3.51 years. Almost one in five of the subjects (19.4%) had completed more than twelve years of school. While a larger proportion of males than females had completed less than eight years of school, and more than twelve years of school, the difference in the distribution between the two sexes was not statistically significant (Table 13). As might be expected, older subjects tended to report fewer years of school completed than did the middle aged and younger subjects (Table 14). The difference in the bivariate distributions between age and years of school completed was statistically significant beyond the .001 level (X^2 = 29.3, d.f. = 12, $p < .001$) and a Pearson product-moment correlation coefficient of $r = -0.29$, significant beyond the .01 level, was observed indicating a linear relationship between the two variables.

Table 13

DISTRIBUTION OF SUBJECTS BY YEARS OF SCHOOL AND SEX

Age	Males		Females		Totals	
	No.	%	No.	%	No.	%
< 8	27	22.3	21	16.0	48	19.0
8 - 10	33	27.3	40	30.5	73	29.0
11 - 12	34	28.1	48	36.6	82	32.5
13 - 14	15	12.4	10	7.6	25	9.9
>14	12	9.9	12	9.2	24	9.5
TOTALS	121	100.0	131	100.0	252	100.0

Years of School: $\bar{X}$ = 10.41, SD = 3.51

X^2 = 4.422, d.f. = 4, N.S. Missing Cases = 11

Table 14

DISTRIBUTION OF SUBJECTS BY AGE AND YEARS OF SCHOOL

Age	Years of School										Totals	
	< 8		8-10		11-12		13-14		> 14			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<30	4	8.3	10	13.7	31	38.3	7	28.0	6	25.0	58	23.1
30-39	11	22.9	13	17.8	17	21.0	8	32.0	9	37.5	58	23.1
40-49	16	33.3	20	27.4	18	22.2	8	32.0	6	25.0	68	27.1
50-59	11	22.9	27	37.0	13	16.0	2	8.0	3	12.5	56	22.3
>59	6	12.5	3	4.1	2	2.5	0	0.0	0	0.0	11	4.4
TOTALS	48	100.0	73	100.0	81	100.0	25	100.0	25	100.0	251	100.0

Years of School: $\overline{X}$ = 10.41 yrs, s.d. = 3.51
Age: $\overline{X}$ = 40.3 yrs, s.d. = 12.03
X^2 = 29.3, d.f. = 12, $p < .001$. Missing Cases = 12
$r = -.029$, $p < .01$

Almost one quarter of the sample reported minimal levels of participation in formal social organizations during the six month period preceding the interview (Table 15). Overall, participation was low with a mean score of 7.4, and a median of 5.2 indicating fee-paying membership in two or three associations and active participation in at least one association. A small number of respondents reported high scores with the maximum score being 42. This particular respondent was active in six associations and was an executive member of three. As anticipated, males tended to report higher levels of participation than females. However, a significant proportion of women (21.6%) did report high levels of participation (X^2 = 14.92, d.f. = 3, $p < .002$).

As observed in previous studies, years of schooling was

strongly associated with social participation ($r = .30$, $p < .001$). Of those patients with less than eight years of schooling, 73.8 per cent had participation scores below the median of 5.2 while 68.2 per cent of those patients with greater than fourteen years of schooling had participation scores above the median (Table 16). Only one quarter of the most active social participants had completed fewer than eight years of schooling ($X^2 = 28.2$, d.f. = 12, $p < .005$).

Table 15

DISTRIBUTION OF SUBJECTS BY
SOCIAL PARTICIPATION SCORE AND SEX

Social Participation Score	Males No.	Males %	Females No.	Females %	Totals No.	Totals %
<3	16	14.8	41	35.3	57	25.4
3 - 5	36	33.3	31	26.7	67	29.9
6 - 10	33	30.6	19	16.4	52	23.2
>10	23	21.3	25	21.6	48	21.4
TOTALS	108	100.0	116	100.0	224	100.0

$X^2 = 14.92$, d.f. = 3, $p < .002$

Health and Stress Characteristics[1]

The median score for the sample on the Social Readjustment Rating Scale (SRRS) was 123.2, the mean score was 162.2 and the standard deviation was 148.3 indicating that a relatively large proportion of the sample had not experienced a great many life change events during the six months preceding the start of the study. No significant differences were observed between the distribution of SRRS scores by age categories, sex, years of

[1]See Tables 1, 2, 3 and 4 in Appendix 6.

schooling, place of birth or socio-economic status. However, the patients did differ in terms of marital status and SRRS score distribution (Table 1, Appendix 6). Married patients tended to report SRRS scores below the median while the single and the widowed, separated or divorced tended to report SRRS scores well above the median (X^2 = 13.87, d.f. = 2, $p < .001$).

Table 16

DISTRIBUTION OF SUBJECTS BY YEARS OF SCHOOLING AND SOCIAL PARTICIPATION SCORE

Years of Schooling	Social Participation Score <3		3-5		6-10		>10		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
<8 Yrs	11	20.0	20	30.8	6	11.5	5	10.4	42	19.1
8-10 Yrs	13	23.6	20	30.8	19	36.5	7	14.6	59	26.8
11-12 Yrs	21	38.2	19	29.2	13	25.0	19	39.6	72	32.7
13-14 Yrs	6	10.0	3	4.6	9	17.3	7	14.6	25	11.4
>14 Yrs	4	7.3	3	4.6	5	9.6	10	20.8	22	10.0
TOTALS	55	100.0	65	100.0	52	100.0	48	100.0	220	100.0

X^2 = 28.20, d.f. = 12, $p < .005$. $r = .30$, $p < .001$

Scores on the Subjective Stress Scale (SSS) also indicated that the majority of patients were not experiencing high levels of social stress, with half of the sample reporting scores ranging from 12 to 16 (low stress) on the 16 point scale. The mean scale score for the total sample was 11.74 with a standard deviation of 3.24. No significant differences were observed between the distribution of SSS scores by any of the six selected socio-demographic variables (Table 2, Appendix 6).

With a median score of .748 on the Bush Health Status

Index (post-test) and a standard deviation of .11 the study sample exhibited relatively high levels of health. As might be expected older patients experienced lower levels of health. An increase in the proportions of patients with health index scores below the median was observed in each of the age categories, with 50.9 per cent of 30 to 39 year olds with below median scores as compared to 66.7 per cent of those over 59 years (Table 3, Appendix 6). However, the differences observed between distributions were not statistically significant. While single patients as a group were predominantly healthy with 59 per cent above the sample median as compared to the separated, widowed and divorced who were less healthy with 69.2 per cent below the sample median, the differences in the distributions were not statistically significant. Similarly, while a majority of patients with lower levels of socio-economic status were below the median of health status index, and a majority of patients with higher socio-economic levels were above the median the difference between the distributions was not statistically significant.

A statistically significant relationship was observed between years of schooling and health status index scores ($X^2 = 16.86$, d.f. = 4, $p < .01$). Higher levels of health functioning were associated with higher levels of education; almost three quarters of patients with over 14 years of schooling had health status index scores above the sample median, as compared to only 29.5 per cent of those patients with between eight and ten years of schooling completed. No statistically significant relationships were observed between health status and either sex or place of birth.

The variable health change was obtained by saving the standardized residuals from a regression of post-test health index scores on pre-test health index scores. No significant differences were found between the distribution of health change scores by any of the six selected socio-demographic variables (Table 4, Appendix 6).

Personality Characteristics[1]

The mean extraversion scale score for the total sample was 13.87 with a standard deviation of 3.7, a range of 22, and a median score of 14.1. While the differences between the distributions by marital status and extraversion scale score approached statistical significance ($X^2 = 4.85$, d.f. = 2, $p < .09$) none of the six selected socio-demographic variables was found to be significantly related to extraversion scale scores (Table 5, Appendix 6).

Several differences were observed, however, in the distributions of neuroticism scale scores ($\overline{X} = 10.0$, s.d. = 5.0) and the selected socio-demographic variables (Table 6, Appendix 6). An inverse relationship between age and neuroticism was statistically significant beyond the .01 level ($r = -.17$, $p < .004$). The majority of adults below the age of 40 had neuroticism scores above the median (11.1) while the majority of adults over the age of 40 had scores below the median ($X^2 = 18.67$, d.f. = 4, $p < .001$). Sex was also noted to be associated with neuroticism with males tending to have low scores in comparison to females ($X^2 = 6.36$, d.f. = 1, $p < .02$). The relationship between marital status and neuroticism

[1]See Tables 5, 6 and 7 in Appendix 6.

approached statistical significance (X^2 = 3.73, d.f. = 2, $p < .10$) with singles and the widowed, separated and divorced groups recording scores above the median scale score while the majority of married patients reported scores below the median.

Although the differences in the distribution between years of schooling and neuroticism was found to be statistically significant (X^2 = 15.62, d.f. = 4, $p < .01$) the Pearson correlation coefficient obtained indicated that the relationship was not linear ($r = 0.03$, $p < .3$). Adults with less than eight years of schooling reported low neuroticism scale scores, patients with between eight and twelve years of schooling reported high levels of neuroticism and those with greater than twelve years of schooling reported relatively lower levels of neuroticism. It is possible that an inverse relationship exists between years of schooling and neuroticism, and that this relationship is confounded by the effects of age with older adults with few years of schooling completed reporting lower neuroticism scores than younger adults with less than high school completion. No differences were observed between the neuroticism scores of patients by country of birth or by socio-economic status.

The mean locus of control scale score for the total sample was 8.3 with a standard deviation of 3.7 and a range of 17. Although there were no statistically significant differences between the distributions of locus of control scores and age, sex and marital status, differences in distributions were noted in terms of years of schooling, country of birth and socio-economic status (Table 7, Appendix 6).

External locus of control scores were associated with low levels of schooling and internal locus of control scores as predicted were observed to be associated with high levels of schooling ($r = -.24$, $p < .001$). Similarly, low socio-economic status was associated with external locus of control scores and higher levels of socio-economic status were associated with internal locus of control scores ($r = -.19$, $p < .005$). Those patients born in Canada tended to be internally controlled while the non-Canadian born tended to be externally controlled ($X^2 = 4.65$, d.f. = 1, $p < .05$).

Learning Activity and Attitude Toward Adult Education Characteristics[1]

The mean learning activity scale scores (SEALS) was 1806.2, with a standard deviation of 1158.3. Fifty per cent of the sample had scores below 1620.4 and while males tended to report higher scores than females, and singles reported lower scores than the widowed, separated and divorced, these differences were not statistically significant (Table 8, Appendix 6). As was expected from findings of previous research, the learning activity scores for patients between 30 and 49 years of age tended to be greater than those of adults below the age of 30 and above the age of 50. The differences in the distribution of learning activity scores by age group were statistically significant at the .1 level ($X^2 = 7.42$, d.f. = 4, $p < .1$).

As was anticipated, years of schooling was found to be strongly correlated with learning activity ($r = 0.30$, $p < .001$). While three-quarters of those patients with more than 14 years of schooling had scores above the median, almost three-quarters

[1]See Tables 8 and 9 in Appendix 6.

of those with less than eight years of schooling had scores below the median for the total sample (X^2 = 17.36, d.f. = 4, $p < .01$). Similarly, a statistically significant linear relationship between socio-economic status and learning activity was observed ($r = 0.25$, $p < .001$). While only 31.6 per cent of those with Blishen Index scores below 30.1 had SEALS scores above the median, 53.1 per cent of those with Blishen scores of 30.1 to 40.0 had scores above the median, 63.6 per cent with Blishen scores of 40.1 to 50.0 had scores above the median SEALS score and 65.7 per cent of those with more than 50.0 at the Blishen scale had scores above the SEALS median score (X^2 = 17.21, d.f. = 3, $p < .001$).

No significant differences were observed between the learning activity scores of the Canadian born and the non-Canadian born in the study sample.

A mean score of 103.9 with a standard deviation of 26.4 was obtained on the attitude toward adult education scale. Although the differences were slight there was a tendency for the 30 to 59 year old respondents to report more positive attitudes towards adult education than the 20 to 29, and over 59 year old age groups. Neither sex nor marital status was found to be related to attitudes toward adult education (Table 9, Appendix 6).

Predictably, years of schooling was found to be positively and significantly related to attitude towards adult education ($r = 0.25$, $p < .001$). The distribution of attitude scores by years of school reveals a strong linear relationship with one-third of those respondents with less than eight years of schooling recording scores below the median attitude scale

score while over three-quarters of those with more than 14 years of schooling recorded higher than median attitude scale scores ($X^2 = 14.58$, d.f. = 4, $p < .01$). Similarly, with socio-economic status and attitude toward adult education ($r = 0.27$, $p < .001$), the lowest socio-economic grouping of respondents recorded 65.8 per cent of its members with below median scores while 65.7 per cent of the highest socio-economic status group recorded attitude scores above the median.

A significant difference was also observed between the recorded attitudes of the Canadian and non-Canadian born with the Canadian born expressing more positive attitudes towards adult education ($X^2 = 6.14$, d.f. = 1, $p < .02$).

SUMMARY

This chapter has described the study sample in terms of socio-demographic variables and in terms of bivariate distributions relating socio-demographic variables to measures of health, stress, personality, learning activity and attitude toward adult education.

The mean age of the sample was 40.3 years, and there was no significant age difference between the sexes, which were almost equally represented in the sample. The majority of the sample were married (70.5%) while the remainder were single (14.7%) and widowed), separated or divorced (14.8%). The mean number of children reported was 1.7, and one-third of the sample reported having no children.

Four of every five subjects in the sample were in the labour force, with 61.9 per cent of the sample employed full time; half of the subjects had been employed in their present

job for longer than 5.2 years. The mean personal annual income reported was $10,285 and the mean household income was $18,169. In terms of socio-economic status the sample represented upper working class and lower middle class strata with occupations ranging from textile and weaving occupations to administrators in public education and related occupations.

Almost half (45.9%) of the sample was foreign born. However, no statistically significant differences were noted between the Canadian and non-Canadian born by sex and by age.

The mean number of years of school completed by the sample was 10.41 years with nearly one in five of the subjects reporting more than twelve years of school. Older subjects had completed fewer years of schooling than the younger subjects in the sample. The reported levels of participation in formal social organizations was generally low, with only a small minority of subjects reporting high participation.

No significant relationships were observed between the extraversion scale and six selected socio-demographic variables. However, socio-demographic differences were observed in the case of the neuroticism scale and six selected socio-demographic variables. However, socio-demographic differences were observed in the case of the neuroticism scale. Younger adults tended to have higher neuroticism scale scores than older adults. Females tended to have higher neuroticism scores than males. A non-linear relationship was observed between years of schooling and neuroticism. Those subjects with eight to twelve years of schooling reported higher levels of neuroticism than both subjects with fewer than eight years and those with greater than twelve years of schooling.

Although no significant differences between the distributions of locus of control scores and age, sex, and marital status were observed, differences were noted in terms of years of schooling, country of birth and socio-economic status. Subjects classified as internals had completed more years of schooling than subjects classified as externals. Low socio-economic status scores were associated with external subjects while high socio-economic status subjects tended to have high internal locus of control scores. Additionally, the foreign born tended to be classified as externals while the Canadian born tended to be classified as internally controlled.

The number of years of school completed and socio-economic status were observed to be related with learning activity scores with high learning activity scores being associated with high levels of education and high socio-economic status. Similarly positive attitudes to adult education were associated with high levels of education and high socio-economic status. Although country of birth was not related to learning activity scores, Canadian born subjects were observed to express more positive attitudes toward adult education than did non-Canadian born subjects.

The sample had experienced generally low levels of social stress, and they reported low levels of subjective stress. Only the relationship between SRRS scores and marital status proved to be statistically significant with the widowed, separated and divorced reporting scores above the median. Similarly, the sample reported relatively high levels of health functioning. On only one of the six selected socio-demographic

variables, years of schooling, was there a statistically significant difference in the distribution of patients health status scores. Higher levels of education were associated with high levels of health functioning. No statistically significant differences were observed between the distribution of health change scores and the six selected socio-demographic variables.

CHAPTER V

DATA ANALYSIS

This chapter describes the origins and purposes of path analysis; the procedures followed to prepare the data; the equations for the path and effect coefficients; and the results of the path analysis for each of five sub-sets of paths within the theoretical model. A description of the total system with all of the exogenous variables simultaneously affecting the endogenous variables of health and health change is also reported. The chapter concludes with a synopsis of all of the major procedures and the outcomes of the analysis for each of the ten propositions derived from the theoretical framework described in Chapter II.

Path Analysis

Geneticist Sewell Wright (1921, 1934) developed path analysis not to discover causal relationships among a set of variables but to confirm or disconfirm a posited causal model

which had been established on the basis of prior empirical research and a priori assumptions based upon prior research. Path analysis itself does not establish causality; rather it enables the researcher to interpret from correlation and regression coefficients whether a theoretical framework bears any relationship to empirical reality. Path analysis indicates whether or not relations among a data set are consistent with the predicted theoretical relationships (Kerlinger and Pedhazur, 1973).

Four assumptions underlying the application of path analysis have been described by Kerlinger and Pedhazur (1973). Firstly, relations among the variables included in a model subjected to path analysis must be linear, additive and causal. Secondly, it is assumed that the residuals are not correlated among themselves, nor are they correlated with other variables within the model. In order for this assumption to be met, steps must be taken to ensure that all of the variables thought to be relevant are included in the model. While the exogenous variable inter-relationships are not analysed, all endogenous variables are treated as linear combinations of the exogenous and other endogenous variables together with the associated residual term.

A third assumption for the application of path analysis is that there is a strict one way causal flow in the model and that no reciprocal causal relations exist. The final assumption is that the levels of measurement of the variable be appropriate for parametric procedures and that each variable be measured on an interval or ratio scale. No basis appears to exist for the rejection of any part of either the model or the study data

on the basis of gross violations of one or more of the four assumptions identified.

Data Preparation

The data were initially screened for extreme outlier values and non-linearity by means of visual inspection of scattergram plots. Extreme values which could not be justified as valid cases were observed on several variables and the decision was made to exclude values which fell outside the range of plus or minus two standard deviations from the mean.

While it was clear from the scattergram plots that strong linear relationships among the study variables did not exist, no higher order deviations from simple linearity were observable, and no attempt was made to "improve" the linearity of the data through log or polynomial transformations.

Path Coefficient Analysis

A path coefficient is a standardized partial regression coefficient and indicates the direct influence or effect that one variable has upon another. The analysis of path coefficients enables the researcher to partition correlations into direct and indirect effects.

The structure of the causal network is represented diagrammatically in Figure 10, where single-arrowed lines represent the direct influence of one variable or more upon another. Path Coefficients are noted symbolically as Pij with the subscript i indicating the dependent variable and subscript j the independent variable whose influence is under study.

The following thirteen variables were included in each

path coefficient analysis:

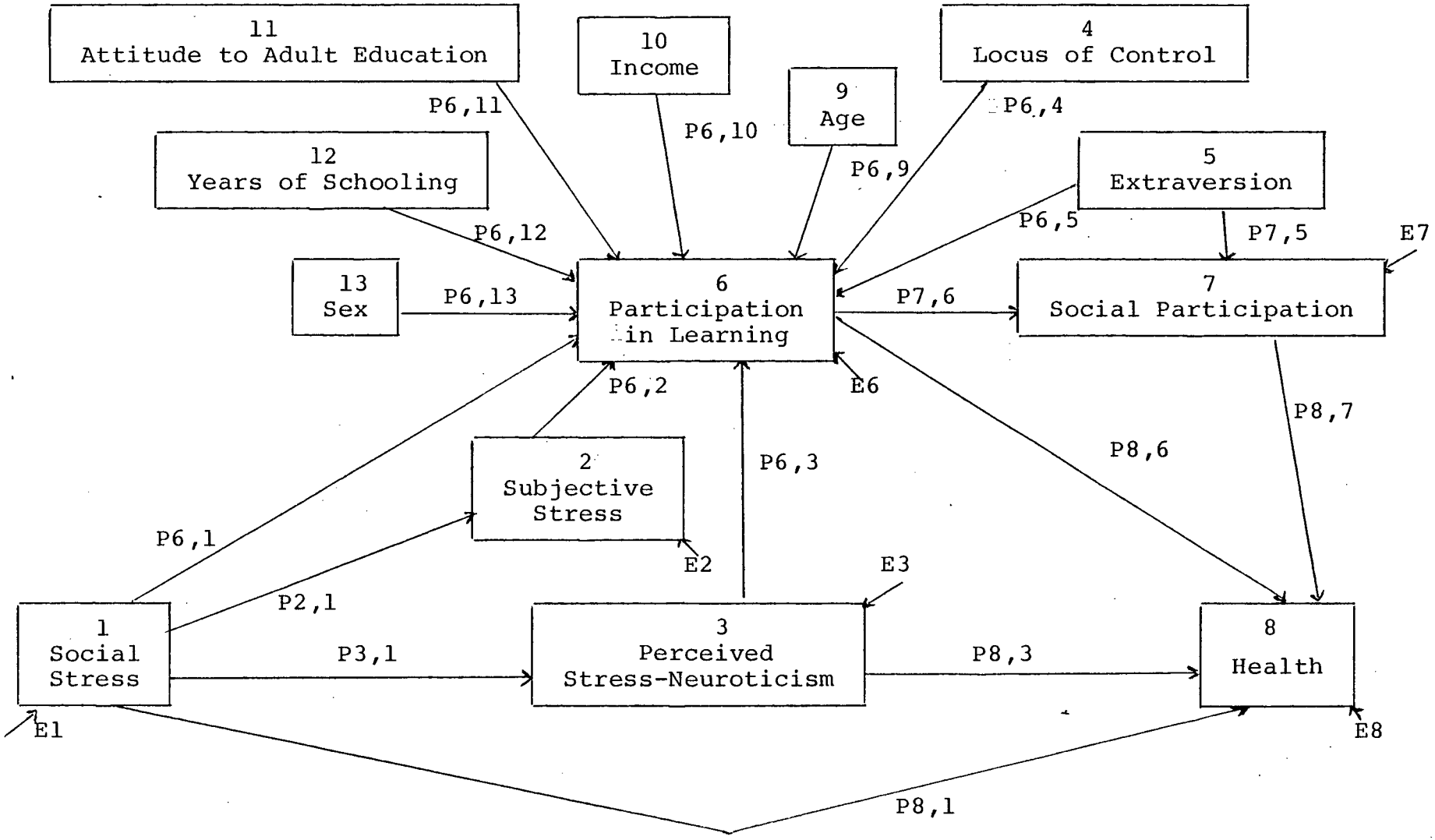
1) Social Stress (SRRS)
2) Subjective Stress (SSS)
3) Neuroticism (EPI)
4) Locus of Control (Rotter)
5) Extraversion (EPI)
6) Learning (SEALS)
7) Social Participation (Chapin)
8) Health (Bush post-test or pre-post residuals)
9) Age
10) Personal Income
11) Attitude to Adult Education
12) Years of School Completed
13) Sex

Using the Statistical Package for the Social Sciences (SPSS), (Nie et al, 1975), path coefficients for each analysis were obtained by estimating the following system of linear equations through a series of regression analyses:

$$X1 = E1$$
$$X2 = E2 + P_{2,1} X_1$$
$$X3 = E3 + P_{3,1} X_7$$
$$X4 = E4$$
$$X5 = E5$$
$$X6 = E6 + P_{6,1} X_1 + P_{6,2} X_2 + P_{6,3} X_3 + P_{6,4} X_4 + P_{6,5} X_5 + P_{6,9} X_9 + P_{6,10} X_{10} + P_{6,11} X_{11} + P_{6,12} X_{12} + P_{6,13} X_{13}$$
$$X7 = E7 + P_{7,5} X_5 + P_{7,6} X_6$$
$$X8 = E8 + P_{8,1} X_1 + P_{8,3} X_3 + P_{8,6} X_6 + P_{8,7} X_7$$
$$X9 = E9$$
$$X10 = E10$$
$$X11 = E11$$
$$X12 = E12$$
$$X13 = E13$$

Figure 10

THE PATH MODEL



Leaves 111-13 are missing from this thesis. The same leaves are missing from the Library's 2d copy and also from the copy in the Adult Education Division, Faculty of Education.

The author, Dr. Adrian Blunt, has been approached but is unable to supply the missing leaves.

The path model as tested (Figure 10) is depicted with the proposed causal paths reflecting exactly the theoretical framework described in Chapter II. Table 19 and Figure 11 present the relevant path coefficients (P_{ij}), effect coefficients (C_{ij}) and residual path coefficients (E_i) for two analyses with level of health at the end of the study period (Bush Health Index Post Test) and health change (the Bush Health Index Pre-post test residuals) as the dependent variables.

1) Health and Stress Variable Paths

When the Bush post-test measure of health was taken as the dependent variable, it was observed that the effects of social stress (SRRS) on health were in the direction predicted ($P_{8,1}$=-.22). That is an increase of one standard deviation in social stress was found to be associated with a decrement in health of .22 standard deviation when all other variables were held constant. The paths between subjective stress scores ($P_{2,1}$=.-28) and perceived stress as measured by the EPI neuroticism scale ($P_{3,1}$=.29) were, as anticipated, strongly related to social stress. Also as predicted, neuroticism was observed to be inversely associated with health ($P_{8,3}$=-.16). When the analysis was repeated with health change (as measured by the Bush pre-port residuals) included as the dependent variable, the relationships between neuroticism and health ($P_{8,3}$=-.07) and between social stress (SRRS) and health ($P_{8,1}$=-.15) were again observed, though they were smaller.

The data supported the theoretical propositions that: 1) high levels of social stress (SRRS) are associated with low levels of health functioning and decrements in health over time.

Table 19

PATH COEFFICIENTS (P_{ij}), EFFECT COEFFICIENTS (C_{ij}) AND RESIDUAL PATH COEFFICIENTS (E_{ij}) FOR PATH ANALYSES

$P_{2,1}$	-.28	$=C_{2,1}$
E_2	.9590	
$P_{3,1}$	.29	$=C_{3,1}$
E_3	.9573	
$P_{6,1}$	.06	$=C_{6,1}$
$P_{6,2}$	.03	$=C_{6,2}$
$P_{6,3}$	.01	$=C_{6,3}$
$P_{6,4}$	-.01	$=C_{6,4}$
$P_{6,5}$	.05	$=C_{6,5}$
$P_{6,9}$	.09	$=C_{6,9}$
$P_{6,10}$	.10	$=C_{6,10}$
$P_{6,11}$	.06	$=C_{6,11}$
$P_{6,12}$	.28	$=C_{6,12}$
$P_{6,13}$	-.06	$=C_{6,13}$
E_6	.9330	
$P_{7,5}$	.03	$=C_{6,7,5}$
$P_{7,6}$	.10	$=C_{7,6}$
E_7	.9945	

a) Health (Bush Post-test)

$P_{8,1}$	-.22	$C_{8,1}$	-.18
$P_{8,3}$	-.16	$C_{8,3}$	-.16
$P_{8,6}$	.08	$C_{8,6}$	.07
$P_{8,7}$	-.10	$C_{8,7}$	
E_8	.9561		

b) Health Change (Bush Pre-Post Residual)

$P_{8,1}$	-.15	$C_{8,1}$	-.17
$P_{8,3}$	-.07	$C_{8,3}$	-.07
$P_{8,6}$	.02	$C_{8,6}$	.01
$P_{8,7}$	-.13	$C_{8,7}$	
E_8	.9708		

2) Levels of subjective stress are directly related to social stress (SRRS) experienced and 3) perceived stress, as measured by the personality dimension of neuroticism-stability, is related to social stress (SRRS) experienced and detrimentally influences levels of health function.

2) Social Learning and Personality Variable Paths

All three of the variables measuring psychological factors thought to influence participation in learning activities (SEALS), failed to become established as predictors of participation in learning. While locus of control scale scores correlated significantly with participation in learning (SEALS) ($r=-.11$, $p < .05$) the path coefficient obtained ($P_{6,4}=-.01$) indicated little or no unique component of learning was associated with locus of control in the regression equation. Similarly, the extent of participation in learning did not appear to be dependent upon neuroticism ($P_{6,5}=.05$). All three theoretical propositions concerning the purported effects of the generalized expectancy for control over the social environment and the personality dimensions of extraversion-intraversion and neuroticism-stability influencing participation in learning activities were rejected on the basis of the path coefficients obtained.

3) Socio-Demographic and Learning Variable Paths

Four socio-demographic variables, sex, years of schooling, income and age were included in the model as variables exogenous to participation in learning. The single most powerful predictor of participation in learning score (SEALS) was the number of years of schooling completed ($P_{6,12}=.28$) with income ($P_{6,10}=.10$),

age ($P_{6,9}$=.09) and sex ($P_{6,13}$=-.06) demonstrating weaker effects upon learning activity. As was predicted, high numbers of years of schooling completed, higher incomes, being older and being male were associated with participation in learning activities and the propositional statement that these variables influence participation in learning was accepted.

Although attitude towards adult education was significantly correlated with participation in learning ($r = .15$, $p < .01$) the magnitude of the path coefficient obtained ($P_{6,11}$=.06) was much lower than had been anticipated. Although the effects of attitude toward adult education were overshadowed by the single dominant predictor of participation in learning, number of years of previous schooling, the proposition was accepted that attitude toward adult education does influence participation in learning activities.

With the Bush post-test measure of health as the dependent variable, learning was found to exert a positive, though small, effect upon health ($P_{8,6}$=.08). An increase of one standard deviation in the variable participation in learning, with all other variables held constant, produced a corresponding increase of .08 in health level. With health change as the dependent variable (measured by the Bush pre-post residuals), the path coefficient between learning and health ($P_{8,6}$=.02) was found to be so low it is considered to be insignificant. However, the proposition was accepted that engaging in learning activities is associated with higher levels of health functioning, on the basis of the path coefficient obtained ($P_{8,7}$=-.10).

4) Social Participation, Learning and Health Paths

One unexpected finding among the path coefficients was that of an inverse relationship between formal social participation and health, with high social participation scores being associated with lower levels of health and decrements in health. Learning and social participation ($P_{7,6}$=.10) as anticipated were found to be positively related. However, the assumptions that social participation was positively associated with good health and with improvements in health were shown to be inappropriate by the obtained path coefficients ($P_{8,7}$) of -.10 and -.13 between social participation and health and health change respectively. The proposition that participation in formal social organizations is associated with high levels of health functioning and improvements in health over time was rejected.

5) Stress and the Participation in Learning

From the theoretical framework of the study it had been proposed that as levels of social change (SRRS), anxiety and over-responsiveness to life crises (neuroticism), and feelings of subjective stress (SSS) increased, they would influence participation in learning activities as a means of coping with perceived social stressors. The path coefficients obtained failed to support this proposition, and only minimal effects of neuroticism ($P_{6,3}$=.01) and subjective stress ($P_{6,2}$=.03) were observed. Social change was significantly correlated with participation in learning ($r = .10$, $p < .05$) indicating that those individuals experiencing the most social change were the most active learners. However, the path coefficient

obtained between the two variables was more modest ($P_{6,1}$=.06), indicating that exposure to social change was not a major factor initiating the decision to engage in learning for the majority of adults.

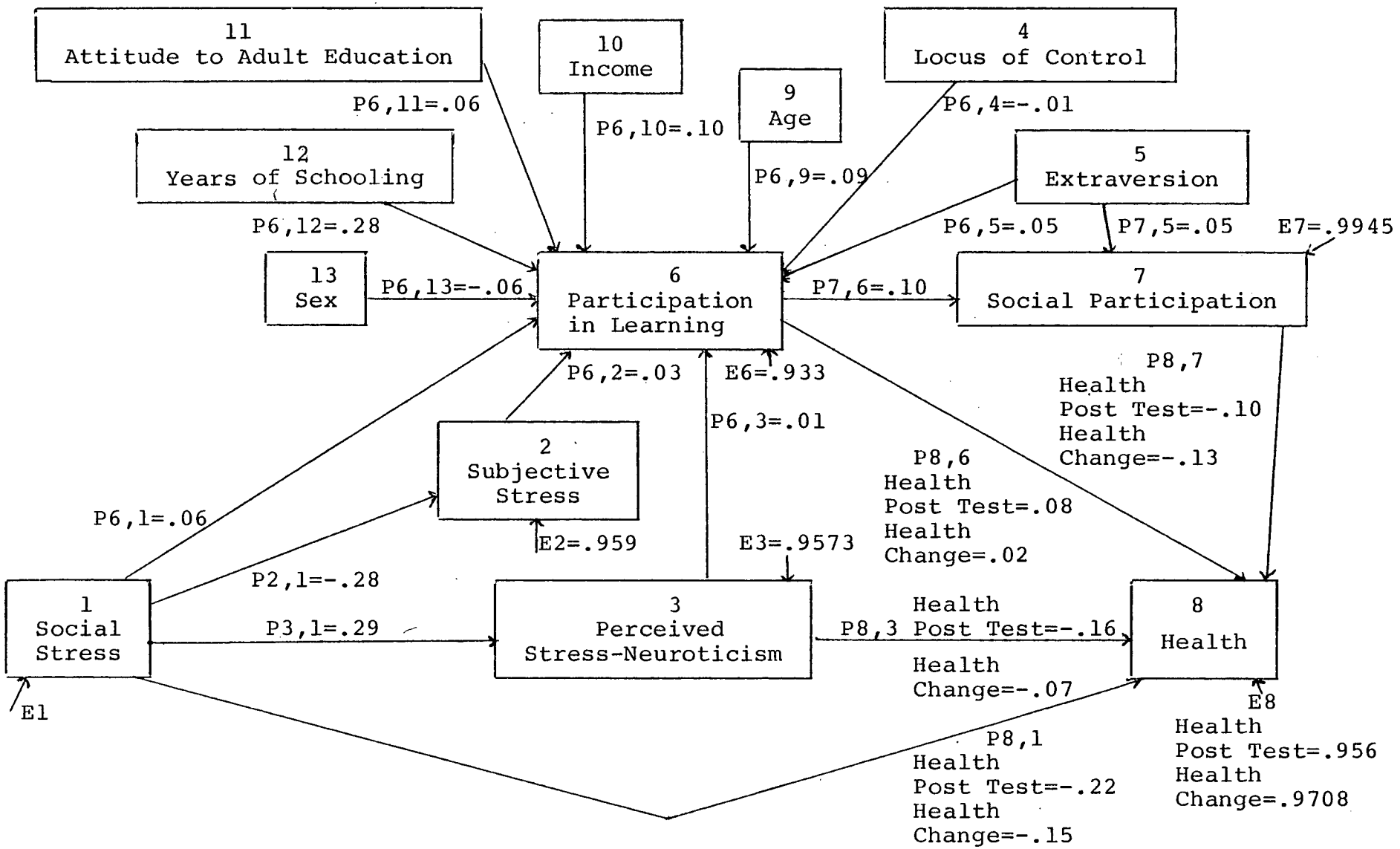
6) The Model

The model is comprised of two sets of variables; stock or fixed variables and flow or manipulated variables. Among the stock variables are age, sex, number of years of school completed and other socio-demographic variables which have been fixed by a single observation at one point in time and which theoretically cannot be influenced by change in other system variables. Examples of the flow variables include participation in learning activity, social stress and social participation which are conceptualized as influencing other flow variables within the variable system or model.

Social stress is depicted as 'driving' the system, determining the range of variation of the other flow variables within the model some of which are being controlled or limited by stock variables (see Figure 11). A view of the model at work begins with social stress strongly influencing levels of future health (Bush post-test $P_{8,1}$=-.22), subjective stress ($P_{2,1}$=-.28) and perceived stress ($P_{3,1}$=.29) with a small but discernible effect flow influencing participation in learning. As the incremental effects of social stress raise the perceived and subjective stress levels, variables not identified in the model, but whose presence is known to be influencing the system also work to divert the effects of variables within the system, confounding the magnitude of forces within the system and

Figure 11

THE PATH MODEL AND PATH COEFFICIENTS



competing for control over system variables. Each of the system variable effects appears weak as a result of measurement error, imperfections in the quality of instruments monitoring the system and poor explanatory support circuitry in the system due to the original design having been conceived in isolation from a prior understanding of the system parts. In spite of the inadequacies of the system, the effects of social stress upon health are directly observable ($P_{8,1}$=-.22). When the full system effects are allowed to influence the dependent variable the decremental effects of social stress are reduced ($C_{8,1}$=-.18).

While the increase in participation in learning attributable to social stress ($P_{6,1}$=.06) is minimal, other pre-disposing characteristics of the system are raising the levels of this mediating variable. The strongest effect on participation in learning originates with the number of years of previous schooling ($P_{6,12}$=.28). Other effects raising the levels of participation in learning are personal income ($P_{6,10}$=.10), age ($P_{6,9}$=.09), attitude to adult education ($P_{6,11}$=.06) and sex ($P_{6,13}$=-.06).

While extraversion ($P_{6,5}$=.05) effects contribute to the magnitude of participation in learning, another contributing flow variable, locus of control, ($P_{6,4}$=-.01) is seemingly weakened or drained of effect by the stock variables of years of schooling completed and attitude to adult education wherein locus of control may in part have its origins.

Effects from participation in learning activities flow directly to social participation ($P_{7,6}$=.10) and to health status ($P_{8,6}$=.08) slightly raising the observed levels of each. While extraversion ($P_{7,5}$=.03) effects are observable upon social

participation ($P_{7,5}$=.03) they are so small as to be not meaningful. However, the effects of social participation upon future health status are observable and undesirable ($P_{8,7}$=-.10). Social participation, previously thought to be capable of providing incremental effects upon future health in a similar way to participation in learning activities, actually forces future health levels lower, and the power of this direct negative effect ($P_{8,7}$=-.10) appears to be greater than the positive effect of participation in learning ($P_{8,6}$=.08).

With all of the system variables in effect simultaneously, the detrimental effects of social stress are observed to be reduced ($P_{8,1}$=-.22; $C_{8,1}$=-.18), as the incremental effects of participation in learning are slightly reduced ($P_{8,6}$=.08; $C_{8,6}$=.07). Using the model to predict changes in health status that are unrelated to previous levels of health shows that the direct effects of social stress continue to affect health adversely, making improvement in health difficult ($P_{8,1}$=-.15). Similar effects upon health originate from increased levels of perceived stress ($P'_{8,3}$=-.07) and social participation ($P'_{8,7}$=-.13). The positive incremental effects of participation in learning thought to be capable of promoting improvements in prior levels of health were insubstantial ($P_{8,6}$=.02). With all of the system variables in effect simultaneously the negative effects observable upon future health changes by levels of social stress increased slightly ($C_{8,1}$=-.17).

SUMMARY

Path analysis was selected as the most appropriate procedure for assessing whether or not the proposed theoretical

model could be supported by the relationships found to exist among the empirical observations gathered in the study. After screening out extreme data values, the decision was made to exclude all observations which fell outside the range of plus or minus two standard deviations from the mean.

The path model as represented diagramatically in Figure 11 shows the hypothesized causal relations among the thirteen variables within the model. Path coefficients or standardized partial regression coefficients for each path shown in the model as P_{ij} (i indicating the dependent and j indicating the independent variable) were obtained from a series of regression analyses. Effect coefficients (C_{ij}) which represent the direct and indirect covariation between all of the unconstrained system variables were also calculated for selected paths. Rather than using statistical significance as the criterion for evaluating the importance of path coefficients, the simple criterion of .05 as the minimal size for a meaningful path or effect coefficient was adopted.

The effects of social stress on Bush Health Index post-test scores ($P_{8,1}$=-.22) and health change scores ($P_{8,1}$=-.15) was observed as predicted with low levels of health functioning at the end of the study period, and decrements in health over the study period was adopted (Proposition 1). There was evidence of support for the proposition that social stress influenced participation in learning activities ($P_{6,1}$=.06), however the effects observed were quite modest (Proposition 2).

While levels of subjective stress were observed to be related to levels of social stress ($P_{2,1}$=-.28) as predicted, subjective stress effects upon participation in learning

activities were below the standard of effect meaningfulness ($P_{6,2}$=.03), and the proposition was not accepted (Proposition 4). Similarly, perceived stress as measured by the personality dimension of neuroticism-stability was observed to influence levels of health function as predicted ($P_{8,3}$=-.16) (Proposition 5). However, the effects of perceived stress upon participation in learning were miniscule ($P_{6,3}$=.01), and this proposition was therefore rejected.

Generalized expectancy for control over the social environment was found not to influence the decision to engage in learning activities ($P_{6,4}$=-.01) (Proposition 6). The effects of the personality dimension of extraversion-introversion upon participation in learning were at the minimal level of acceptability for meaningfulness ($P_{6,5}$=.05) enabling proposition seven to be accepted (Proposition 7). Although attitude toward adult education was found to influence participation in learning activity scores (Proposition 8) the magnitude of the relationship was not as great as anticipated ($P_{6,11}$=.06).

All four of the socio-demographic variables predicted to influence the decision to engage in learning activities (Proposition 9) were observed to have meaningful effects. Number of years of schooling ($P_{6,12}$=.28) was the most powerful effect upon learning participation while the other three socio-demographic variables income ($P_{6,10}$=.10), age ($P_{6,9}$=.09) and sex ($P_{6,13}$=-.06) had more modest effects.

The theoretical proposition (10) that participation in formal social organizations would be associated with high levels of health functioning and with improvements in health was rejected on the basis of decremental effects on health status

($P_{8,7}$=-.10) and health change ($P_{8,7}$=-.13) being observed.

Finally, on the basis of an observed effect of .08 ($P_{8,6}$) of participation in learning on levels of health function at the end of the study period it was concluded that learning activities do promote higher levels of health functioning. However, no basis for part of the proposition that participation in learning activities would be associated with improvements in levels of health over the study period was obtained ($P_{8,6}$=.02).

With all of the model's variables free to vary in relation with each other it was observed that an increase of one standard deviation in social stress scores was capable of lowering post-test levels of health by .18 standard deviation units ($C_{8,1}$=0.18) and detrimentally effecting health change by .17 standard deviation units ($C_{8,1}$=-.17). Simultaneously the incremental effects of an increase of one standard deviation in participation in learning activities on post-study levels of health was .07 standard deviation units of health, while the effects on health change were barely observable and judged to be not meaningful ($C_{8,6}$=.01).

CHAPTER VI

CONCLUSIONS

Social, economic and technological change is occurring at an unprecedented rate so that people experience seemingly uncontrollable changes in their daily lives. The effects of these changes have been referred to in popular literature as future shock and in the health care and epidemiology research literature as social stress. Many studies have identified a link between the experiencing of social stress and subsequent decrements in levels of health. However, it has been recognized that not all who experience social stress become ill. Some individuals appear to have immunity to stress-induced illness or use coping strategies to resist the harmful effects of stressful experiences. The purpose of this study was to determine whether or not participation in learning activities is effective as a coping strategy. Do those adults who are active learners maintain their health after experiencing stress;

and do adults who are not active learners experience decrements in their levels of health when exposed to stress?

Design of the Study

Three major problems influenced decisions made in the development of the model for this study. There was little research to guide the selection of variables for inclusion in the model. The number of variables with potential explanatory powers was large and therefore many variables had to be omitted for the model to be operationalized. Additionally, there were relatively few data collection instruments with acceptable levels of reliability and validity available to quantify the variables selected.

No consensus was found to exist in the literature on a universally acceptable definition of stress, and many theoretical models were identified (Selye, 1956, Levine and Scotch, 1970, Dohrenwend and Dohrenwend, 1974). While no single definition of stress is accepted, one broad category of stress models - that of stress as a behavioural response to social-psychological stimuli - has emerged during the last fifteen years to become dominant in social stress research. The single most widely used instrument in this area is the Social Readjustment Rating Scale (SRRS), developed by Holmes and Rahe (1967). For purposes of this study social stress was operationally defined in terms of scores on the SRRS.

The study used a randomly selected sample in a panel design, with two data collection periods approximately nine months apart. The population consisted of all the patients over eighteen and under sixty-five years of age who had sought

health care from a family physician in East Vancouver during the year preceding the study.

Each of the 867 patients was mailed a copy of the Social Readjustment Rating Scale (SRRS). A total of 506 (58.4%) forms were returned fully completed, 109 (12.6%) were returned to the physician's office as undeliverable and 224 (25.8%) were not returned. Of the 758 forms received by patients the rate of response was 72 per cent with 66.8 per cent fully completed. A random sample of 300 patients was selected from the 506 fully completed SRRS returns. A total of 263 patients completed the first interview and 226 completed the final interview.

During the first interview data were collected on health status, perceived stress, participation in learning activities, attitude towards adult education, personality and basic socio-demographic data. The second set of interviews was conducted nine months later to gather the following data: health status, subjective estimates of stress and locus of control scores. Severity of illness scale scores were assigned by the physician for each occasion the patient sought health care, and the number of visits to the physician's office together with the number of days spent in hospital were also recorded.

Health status was quantified using a scale developed by Bush and associates (Bush and Fanshel, 1970; Bush and Chen, 1973) which assesses health from the perspective of a person's ability to function socially and in his or her regular employment. Severity of illness was assessed using a slightly modified scale developed by Hinkle (1960) to record physician's assessments of the severity of illness in terms of the disability that an episode of illness generates. The variable health

change was generated by using the residuals of a regression of Bush health status post-test scores on Bush health status present scores.

Five measures of stress were used in the study. Social stress was quantified by the Social Readjustment Rating Scale (Holmes and Rahe, 1967), a scale consisting of 43 items or life events which demand social readjustments on the part of an individual when experienced. Subjective stress was measured by the Subjective Stress Scale (SSS; Chapman, 1966). The neuroticism-stability scale from the Eysenck Personality Inventory (EPI) was used as a measure of perceived stress (Eysenck and Eysenck, 1966).

Participation in learning activities was quantified by a scale developed for use in the study called the Subjective Estimation of Adult Learning Scale (SEALS; Blunt, 1977). This magnitude estimation scale consists of 26 items including credit, non-credit, vocational, general interest, institutional and self directed learning activities. Attitude towards adult education was measured by a Thurstone successive intervals scale also developed specifically for use in the study.

Rotter's Internal-External Locus of Control Scale (1966) was used to assess the extent to which patients' expectancies for control over their environment influenced the decision to participate in adult learning activities. The personality dimension of extraversion-introversion was measured by the Eysenck Personality Inventory (1966) which describes extraversion as outgoing, uninhibited, impulsive and highly sociable behaviours as compared to the inhibited, careful and reserved behaviours which typify introversion.

Several socio-demographic variables were included in the study in order to describe the study sample and to assess the extent to which selected variables influenced the relationship between stress and health through their association with participation in learning activities. Among the variables selected were the personal characteristics of age, sex, marital status, immigrant status, number of children, years of schooling and the number of adults in the household. Under the category of labour force activity, information was collected on labour force status, occupation, number of years at present job and Blishen socio-economic status indices (Blishen, 1976). Finally, the patients' levels of income and participation in formal social organizations as measured by the Chapin Social Participation Scale (Chapin, 1938) were also included.

Reliability and Validity

All of the health and stress measures were found to be correlated at statistically significant levels. To test the construct validity of the two sets of variables, factor analyses were conducted to determine the extent to which the variables would cluster together into discrete groups of health and stress variables. One analysis employing orthogonal rotation and imposing no factor constraints on the number of factors to be extracted yielded four factors accounting for 61.8 per cent of the total variance. The four factors were labelled Stress, Severity of Illness, Health Function and Health Change. Each of the four factors extracted presented a clear, unambiguous grouping of the variables providing strong support for their validity as individual measures of the constructs of health and

stress.

Scores on the learning activity and attitude scales were correlated with five criterion variables 1) years of school completed, 2) social participation, 3) socio-economic status, 4) internal-external locus of control, and 5) personal income. Previous research had suggested that each of the five criterion variables would be correlated with both adult learning activity and attitude toward adult education.

Although their magnitude was smaller than had been anticipated in most cases, the correlations between the five predictor variables and learning activity as well as attitude towards adult education were statistically significant at the .05 level with only one exception. Collectively, the observed inter-correlations supported the validity of the learning activity and attitude toward adult education scales.

Seven psycho-metric scales used in the study (Subjective Readjustment Rating Scale, Subjective Stress Scale, Neuroticism-Stability, Introversion-Extraversion, Subjective Estimation of Adult Learning Scale, Attitude to Adult Education Scale and the Rotter Locus of Control Scale) were analysed on the basis of the zero-one item responses and Hoyt reliability coefficients for the variables were calculated. The lowest reliability coefficient obtained was for the SEALS with a coefficient of .69 followed by the SRRS with .70. The remaining five scales had reliability coefficients ranging from .73 for neuroticism-stability (EPI) to .87 for the Attitude to Adult Education Scale.

Data Analysis

The results of a series of path analyses were examined

to determine whether or not each of ten theoretical propositions could be supported on the basis of the path coefficients obtained.

> Proposition 1: High social stress will be associated with low levels of health functioning and with decrements in health over time.

With all other variables within the model held constant, an increase of one standard deviation in the magnitude of social stress scores was observed to be associated with lower levels of health at the end of the study period by .22 standard deviation units ($P_{8,1}$=-.22) and to lower health change scores by .15 standard deviation units ($P_{8,1}$=-.15). On the basis of these observations and the magnitude of the effect coefficients -.18 and -.17 on health status and health change respectively, demonstrating the effects of social stress with all other system variables unconstrained, the proposition was accepted.

> Proposition 2: Participation in learning will be influenced by social stress, with highly stressed individuals participating in learning activities to a greater extent than individuals experiencing little social stress.

The observed effect of social stress upon participation in learning scores was at the lowest acceptable level of effect meaningfulness .06 ($P_{6,1}$) enabling the proposition to be tentatively accepted.

> Proposition 3: Participation in learning activities will be associated with high levels of health functioning, and improvements in levels of health over time.

Although the effect is not powerful the influence of participation in learning activities upon post-study level of health scores was considered to be meaningful ($P_{8,6}$=.08; $C_{8,6}$=.07). However, the effect upon health change was at the

minimal observable level and below that of acceptable effect meaningfulness ($P_{8,6}$=.02; $C_{8,6}$=.01). Therefore, only the first part of the proposition that participation in learning is associated with incremental effects upon health was accepted.

> Proposition 4: Levels of subjective stress will be directly related to levels of social stress and will influence the decision to engage in learning activities.

While the effect of social stress upon levels of subjective stress was one of the most powerful relationships observed in the study ($P_{2,1}$=-.28) there was no meaningful effect observed of subjective stress upon participation in learning ($P_{6,2}$=.03). That part of the theoretical proposition stating that the decision to engage in learning activities was influenced by levels of subjective stress was rejected.

> Proposition 5: Perceived stress as measured by the personality dimension of neuroticism-stability will directly influence levels of health functioning and the decision to engage in learning activities.

As anticipated, neuroticism scores were associated with decremental effects upon levels of health functioning ($P_{8,3}$=-.16) and health change ($P_{8,3}$=-.07). However, the predicted effect of neuroticism upon participation in learning scores was below that of effect meaningfulness ($P_{6,3}$=.01). Therefore, that section of the propositional statement predicting that perceived stress as measured by the personality dimension of neuroticism-stability would influence the decision to engage in learning activities was not accepted.

> Proposition 6: Generalized expectancy of control over the social environment

is a factor influencing the decision to engage in learning activities.

No support for the acceptance of this proposition was observable from the path coefficient obtained ($P_{6,4}$=.01).

Proposition 7: The personality dimension of extraversion-introversion will directly influence participation in learning activities with introverts participating to a greater degree than extraverts.

Although there was an observed effect of extraversion upon participation in learning scores, the path coefficient obtained was at the lowest level of effect meaningfulness acceptable ($P_{6,5}$=.05). The proposition was tentatively accepted.

Proposition 8: Attitudes toward adult education will be a factor positively influencing participation in adult learning activities.

Although attitude toward adult education scores correlated significantly with participation in learning scores ($r = .15$, $p < .01$), the path coefficient obtained ($P_{6,11}$=.06) was lower than anticipated, possibly due to the strong predictor effects of the variable number of years of school completed. However, the observed relationship was considered to be meaningful and the proposition was accepted.

Proposition 9: The socio-demographic factors of age, sex, income and years of schooling completed will directly effect participation in learning activities.

All four of the socio-demographic factors influenced the participation in learning scores as predicted with number of years of schooling ($P_{6,12}$=.28) being the single most powerful influence followed by income ($P_{6,10}$=.10), age ($P_{6,9}$=.09) and sex ($P_{6,13}$=-.06). The proposition was therefore accepted.

> Proposition 10: Participation in formal social organizations will be associated with high levels of health functioning at the end of the study period, and improvements in levels of health over the study period.

Although the effect relationship between participation in learning activities and participation in formal social organizations was observed as anticipated ($P_{7,6}$=.10), the observed relationship between formal social participation and health status proved to be the inverse of the anticipated relationship. High participation in formal social organizations appears to be detrimental to health ($P_{8,7}$=-.10) and to promote undesireable changes in levels of health ($P_{8,7}$=-.13). The data provided strong support for the rejection of the proposition.

Overall the hypothesized relationships between the stress variables and participation in learning were all disconfirmed. No evidence was obtained to indicate that the decision to engage in learning activities is influenced by levels of subjective or perceived stress, or locus of control. Participation in formal social organizations was found to have decremental effects upon health although positively associated with participation in learning. Finally, modest support was obtained for the proposition that participation in learning activities promotes future levels of health although no effect upon health change itself was observable.

Discussion

The single most difficult problem in discussing the results of this study centre around the operationalisation of the major constructs in the theoretical model, none of which have universally acceptable definitions or instruments to

quantify them. Clearly the results obtained must be interpreted in terms of the exact phenomena that were quantified. While evidence of instrument validity for the major variables has been presented, the limitations of the instruments to measure their respective constructs ought not to pass unquestioned. For example, social stress is quantified solely in terms of the 42 life events on the Social Readjustment Rating Scale (Holmes and Rahe, 1967), not all of which are equally likely to be experienced by each respondent such as divorce, death of spouse or pregnancy. The scale items limit the range of responses possible for each subject and therefore may not be an appropriate sample of stressors from the universe of stressors likely to be experienced by each subject in the study.

The Bush Health Status Index (Bush and Fanshel, 1970) measures the ability of the individual patient to function in his normal occupational and social settings. Relative differences between patients' abilities to function are ignored. Individual differences in motivation, personal need, family influence, pain or discomfort thresholds and satisfaction with the social and natural environment are among factors which influence the patients decision to discontinue normal activities when experiencing a health problem. The decision to claim illness as the cause of health dysfunction in some cases may not be appropriate, and the difference between true and observed levels of health function is therefore magnified. Participation in learning activities as measured by the Subjective Estimation of Adult Learning Scale is restricted to participation in twenty-seven learning activities. While the scale has been demonstrated to have validity in terms of its ability to generate

scores which correlate signficantly and in predicted directions with other variables, it is not known whether the sample of items which comprise the scale adequately reflect the universe of participation activities for the population of interest. It is possible therefore that alternate items might have yielded higher participation in learning scores for some subjects.

These problems of quantification are not unique to this study. However, recognition of the limitations of the observations must be made when the magnitude of relationships among this study's variables are generally lower than desirable for the confirmation of the theoretical propositions. Further, it is appropriate to remember that there are limitations on the study's constructs that require terms such as health, learning and stress to be interpreted solely within specified intent of the respective instruments to quantify those constructs.

All of the previous research on social stress reviewed for this study was based on special populations such as college students, naval personnel, hospital patients and specific patient groups such as coronary or tuberculosis patients. This study is different in that it uses a random sample of adults within the practice of a family physician. Further, while the great majority of previous research was conducted with retrospective designs, this study used a prospective panel design to control for the effects of measurement contamination.

The study finding that the relationship between social stress and health is observable among a random sample of adults

registered as patients of a family physician and not just special patient groups has implications for the family physician interested in the research and practice of preventive medicine in the family practice setting. Given the great number of factors known to influence health, the fact that participation in learning activities as an additional, though modest influence can be observed among a random sample of family practice patients is a promising observation for researchers attempting to identify strategies for coping with the effects of social stress. It is recognized that in this initial explanatory investigation alternative explanators of health were not included in the model; therefore the posited causative effects of learning appear to go unchallenged. It is also recognized that the effects observed were relatively small in absolute terms.

Two unanticipated conclusions appear warranted by the study findings. Firstly, personality as measured by the Eysenck Personality Inventory (Eysenck and Eysenck, 1968) and the Locus of Control Scale (Rotter, 1966) did not influence participation in learning activities. Secondly, participation in formal social organizations appeared to have deleterious effects upon health. Nothing new has been added by this study to knowledge about factors influencing participation in adult learning activities. Those socio-demographic variables previously identified as being most closely associated with participation in adult education were also confirmed as being associated with participation in adult learning activities in this study. However, the hypothesized effects upon participation in learning activities of personality, social stress and attitude

toward adult education were shown to be non-existent or weak.

Without the benefit of any direct previous research to provide guidance, it was assumed that participation in formal social organizations would be positively associated with levels of health function. Given that social participation has frequently been cited as a motive for participation in adult education (Boshier, 1971) it was reasonable to hypothesize that participation in formal social organizations would be similarly related to health as the hypothesized learning activity - health relationship. That this appears not to be the case raises the question of what differences might exist between social interaction within a formal social organization and social interaction within a learning environment that might result in different effects being observed by these two variables upon health status. Whether or not there are other variables influencing the nature of the effects of learning activity and participation in formal social organizations is unknown.

With the possible detrimental effects of measurement error, the limitations of the instruments used to quantify the constructs themselves, and the nature of the study sample (relatively healthy as opposed to ill) it is possible that the results obtained are as likely to under-estimate as to over-estimate the magnitude of the 'real' effects of learning upon health status. It is not possible to claim that the observed relationship between learning activity and health is so negligible as to be unworthy of further investigation. Nor is it possible to claim that the results demonstrate evidence that a substantive effect of learning upon health might exist

which would raise the importance of further investigations in this area above the importance of the effects of other social or environmental factors which might mediate the relationship between social stress and health. The results stand presently as an isolated observation supporting the thesis advanced by Moss (1973) that participation in information networks enables one to acquire immunity from illness. As such, the study advances the challenge to researchers in adult education to further confirm or disconfirm the hypothesis that participation in learning activities promotes good health.

In retrospect this study may have been conducted too early and the methodology may have been too ambitious an attempt to investigate the relationship between stress, health and learning. The study may have been conducted too early because the instruments needed to quantify the major study variables had not been previously developed, or were not universally recognized and validated, and because no prior studies of special populations or groups had been conducted to guide the design of the study. The study may also have been too ambitious because it used a community-care sample as compared to a sample from a high social stress or high illness group, and the study design was developed to assess changes in health status over time as compared to levels of health status at only one point in time.

Limitations of the Study

The study sample contained a large proportion of non-Canadian born (45%) and represented a predominantly upper working class social stratum. Further, each of the

respondents represent only users of the services of a family physician. Generalizations of the study findings ought therefore to be limited to groups with similar socio-demographic and health care utilization characteristics.

Data for each of the variables in the study has validity solely in terms of the extent to which each scale, index or other data collection instrument accurately measures the construct in question. Each of the study variables is operationally defined solely in terms of the instrument used to gather the data. Social stress in this study therefore is not all social stress but solely the occurrence of each of the 42 life-change events identified on the Social Readjustment Rating Scale (Holmes and Rahe, 1967). Similarly, health status and participation in learning activities are variables which have parameters placed upon their literal interpretation by the study instruments.

All of the variables in this study can be operationalized in a variety of ways. Alternate forms of quantifying the variables might generate slightly different results. It is important therefore to recognize that the relationships between the constructs within the study's theoretical model ought not to be interpreted beyond the limitations of the respective scales, indexes and other instruments to quantify them.

Implications for Further Research

This study provides modest support for the proposition that participation in learning activities is a strategy for coping with social stress by mediating the detrimental effects of social stress upon health. If within a random sample of the patients

of a family physician's practice it can be demonstrated that active learners do not experience decrements in health subsequent to participation in learning activities, it ought to be possible to demonstrate that a similar relationship holds true among high social stress samples, extremes of active and non-active learners, and both good and poor health groups.

Prospective studies are required to identify whether the learning process, the socialization process during formal learning experiences or the content of the material to be learned affects the relationship between social stress and health. Until the nature of the hypothesized linkages in the model have been explored more specifically and through different research techniques and methodologies, there can be no clear directions for adult educators to take regarding the utilization of knowledge about the effects of learning upon the outcomes of social stress. The results of this study are clearly non-specific in terms of the development of adult education strategies to combat the effects of social stress.

Given such broad possibilities for the conduct of research it is likely that a series of smaller studies of specific groups such as single parents, immigrants, offenders, graduate students, firemen, physicians, dentists and other such high stress occupations or social groups may be required rather than broadly based heterogeneous community samples such as was used in this study.

One conclusion to be drawn from this study is that the personality dimensions of extraversion-introversion and neuroticism-stability do not appear to effect decisions to participate in learning activities. Although personality may

affect actual learning performance and ultimately affect health through that means there is little evidence from this study to support the inclusion of Eysenck's personality constructs in similar future studies. The same conclusion can be drawn from the effects of Rotter's Locus of Control Scale Scores which did not appear to influence engagement in learning activities as was predicted. If personality and locus of control affect participation in some learning activities and not others it is possible that the effects are confounded. To determine whether this was the case analysis of the Subjective Estimation of Adult Learning Scale individual item responses through point-biserial correlational analysis or some similar procedure would be required.

The question of why participation in formal social organizations would be inversely correlated with health status, while participation in learning activities is positively correlated, is a question of importance to be answered by future studies. Given the frequently cited reason of 'opportunities for social participation' stated by participants in formal adult education programs it is unexpected that the outcomes of participation in these two activities should be dis-similarly related to health status. It is possible that there are certain categories of adult learning activities which have differing levels of social appeal and effects upon health status. Similarly certain forms of participation in formal social organizations may be associated with effects upon health which are positive and these effects are confounded by others which are detrimental to health maintenance.

Since this study was begun one investigation of the

relationship between life transitions and participation in adult learning activities has been reported. Aslanian and Brickell (1980) have reported that 49 percent of a United States national sample participated in learning activities and that 83 percent of the learners cited life transitions as their reasons for learning. The study was designed to test the hypothesis that life transitions are reasons for learning and as Cross (1981) has pointed out the investigators may have influenced their respondents through the interview process and obtained data to support their hypothesis. Further studies are needed to confirm or refute the importance of life changes as factors influencing the decision to engage in learning activities.

The purpose of this study has been to explore the relationships between stress, participation in learning activities and health and to determine whether a new function for adult education might be identified - the function of promoting homeostasis of physiological and psychological health. In conclusion it appears that the relationships between the three major constructs remain in need of clarification and the question of whether or not learning is a strategy for coping with change remains largely unanswered. While this study has produced modest evidence to show that participation in learning activities may help to maintain health, whether it is the beneficial effects of learning that promote health, the content of the learning activity or even other social processes which may be present during learning activities is not known. Whether or not adult education has the potential to serve a new function, the promotion of homeostasis of phsyciological and psychological health must remain a question for future studies.

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APPENDICES

A P P E N D I X 2

PATIENT NO.: _____

INTERVIEWER'S NAME: _____

DATE: _____

FAMILY PRACTICE PATIENT CARE

RESEARCH STUDY

HEALTH INDEX

UNIVERSITY OF BRITISH COLUMBIA

DEPARTMENT OF ADULT EDUCATION

INTERVIEWER'S

COMMENTS

PAGE 1

(MARK AND SHOW CALENDAR; RECORD DATES ON TOP OF PAGE 1A: CROSS OUT REMAINING COLUMNS)→

For most of the questions I'll be asking about the past 8 days, that is, from a week ago yesterday, or last (day/date) through yesterday (day/date).

SPC1. (CARD 1) First I would like to ask about any symptoms or problems you might have had. Please look at this list one at a time and tell me the number of all of the items that you had at any time during the past 8 days. Don't worry about how important or serious the problem was; if it was present at all last week, please give me the number. (PUT NUMBERS IN LEFT HAND COLUMN)

SPC2. Were there any other symptoms or problems not on the list that you had at any time during the past 8 days? What were they? (PROBE TO CHECK IF COVERED ON SPC LIST: IF NOT, FILL OUT X, Y, OR Z.) (IF NO SPC's AT ALL, RECORD AND TURN TO MOB1 p. 2. IF ANY SPC's ASK)

SPC3. On which days, from a week ago yesterday (day/date) through yesterday (day/date), did you have (first number given)? (CIRCLE ALL DAYS; REPEAT QUESTION FOR ALL SPC's, INCLUDING X, Y, AND Z.)

SPC4. (FOR ALL DAYS WITH MORE THAN ONE NUMBER RECORDED, ASK) You've told me that on (day/date) you had numbers (repeat all numbers given for that day). Which did you consider the most undesirable on that day? (PUT AN "X" THROUGH THE APPROPRIATE CIRCLE; REPEAT UNTIL ALL DAYS ARE RATED.)

CARD 1

1. Trouble seeing (includes wearing glasses or contacts).
2. Pain or discomfort in one or both eyes, such as burning or itching.
3. Trouble hearing (includes wearing hearing aid).
4. Earache, toothache, or pain in jaw.
5. Sore throat, lips, tongue, gums or stuffy, runny nose.
6. Several or all permanent teeth missing or crooked.
7. Pain, bleeding, itching, or discharge (drainage) from sexual organs, (excludes normal menstruation).
8. Itching, bleeding, or pain in rectum.
9. Pain in chest, stomach, side, back or hips.
10. Cough and fever or chills.
11. Cough, wheezing, or shortness of breath.
12. Sick or upset stomach, vomiting, or diarrhea (watery bowel movements).
13. Fever or chills with aching all over and vomiting or diarrhea (watery bowel movements).
14. Hernia or rupture of abdomen (stomach).
15. Painful, burning, or frequent urination (passing water).
16. Headache, dizziness or ringing in ears.
17. Spells of feeling hot, nervous or shaky.
18. Weak or deformed (crooked) back.
19. Pain, stiffness, numbness, or discomfort of neck, hands, feet, arms, legs, or several joints.
20. One arm and one leg deformed (crooked), paralyzed (unable to move), or broken (includes wearing artificial limbs or braces).
21. One hand or arm missing, deformed (crooked), paralyzed (unable to move), or broken (includes wearing artificial limbs or braces).
22. One foot or leg missing, deformed (crooked), paralyzed (unable to move), or broken (includes wearing artificial limbs or braces).
23. Two legs deformed (crooked), paralyzed (unable to move), or broken (includes wearing artificial limbs or braces).
24. Two legs missing (includes wearing artificial limbs or braces).
25. Skin defect of face, body, arms or legs, such as scars, pimples, warts, bruises or changes in color.
26. Burning or itching rash on large areas of face, body, arms, or legs.
27. Burn over large areas of face, body, arms or legs.
28. Overweight for age and height.
29. General tiredness, weakness, or weight loss.
30. Trouble talking, such as lisp, stuttering, hoarseness, or being unable to speak.
31. Trouble learning, remembering, or thinking clearly.
32. Loss of consciousness such as seizures (fits), fainting, or coma (out cold or knocked out).
33. Taking medication or staying on prescribed diet for health reasons.
34. Breathing smog or unpleasant air.
36. Spells of feeling upset, depressed, or crying.

PAGE 1A

SYMPTON/PROBLEM COMPLEX ANSWER SHEET

	Month(s)														
	Date														
	SPC No	NONE													
A.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
B.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
C.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
D.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
E.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
F.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
G.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
H.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
I.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
J.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
K.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
L.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
M.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
N.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
O.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
P.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Q.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
R.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
S.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
T.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
X.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Y.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Z.		Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat

X Y Z NONE

PAGE 2

(MARK DATES AT TOP OF PAGE 2A) →

During the next few questions I will be asking you about all of the past 8 days, that is, from (day/date) through (day/date), including weekends, holidays, days off, and so on. Although this may involve some repetition, once you hear the pattern of each question for one day, you will see that we can run through additional days very quickly.

MOB1. On which of the past 8 days, if any, did you spend any part of a day or night as a bed patient in a hospital, nursing home, mental institution, home for the retarded, or similar place?

NONE → DR.SCR.

(CIRCLE DAYS SPENT IN HOSPITAL AND, FOR ALL DAYS TOGETHER, ASK)

1A. What was the reason that you were in the (hospital, etc.)? (RECORD RESPONSE) → DR.SCR.

DR.SCR. (Driving Screener) Do you have a valid driver's license?

YES → MOB 2

NO → A. Is the reason you do not have a license in any way related to your health?

YES → CODE H FOR ALL DAYS ON MOB 2 ANSWER SHEET AND SKIP TO P.T.SCR. PAGE 3

NO → SKIP TO P.T. SCR. PAGE 3.

MOB 2 On which of the past 8 days, if any, did you drive a car?

drove ALL days → (TURN TO PAGE 3 P.T. SCR.)

(IF NOT ALL, CIRCLE DAYS WHEN DROVE, X REMAINING DAYS: FOR FIRST X DAY ASK)

2A. And what was the reason that you did not drive on (day/date)? (RECORD REASON)

(IF H CODE) → (REPEAT 2A UNTIL ALL X DAYS CODED H/O) → (TURN TO PAGE 3 P.T. SCR.)

(IF NOT H ASK) → 2B. In addition to that (reason) were there any reasons related to your health that you did not drive on (day/date)? (RECORD REASON AND CODE H/O) → (REPEAT 2A UNTIL ALL X DAYS CODED H/O) → (TURN TO PAGE 3 P.T. SCR.)

PAGE 2A

(ENTER DATES)

Month(s)														
Date														
MOB1.	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
1A.														

MOB2.	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
H. RELATED	H	H	H	H	H	H	H	H	H	H	H	H	H	H
NOT H. REL.	O	O	O	O	O	O	O	O	O	O	O	O	O	O
(day/date)														
y/date)														
(day/date)														

PAGE 3

(MARK DATES AT TOP OF PAGE 3A) →

P.T.SCR. (Public Transportation Screener) Do you ever use public transportation, such as a bus, train, plane, or subway?

1. YES

2. NO

A. Is the reason you do not use public transportation in <u>any</u> way related to your health?

YES	NO
CODE H FOR ALL DAYS ON MOB3 ANS. SHT. AND SKIP TO PAC1 PAGE 4	SKIP TO PAC1 PAGE 4

MOB3. On which of the past 8 days, if any, did you use public transportation?

Used ALL days

CIRCLE ALL DAYS FOR FIRST CIRCLED DAY ASK

(IF NOT ALL, CIRCLE DAYS USED; X REMAINING DAYS, FOR FIRST X DAY ASK)

3A. And what was the reason that you did not use public transportation on (day/date)? (IF H CODE AND RECORD RESPONSE)

(IF NOT H ASK)

MOB 3B. In addition to that (reason), were there any reasons related to your health that you did not use public transportation on (day/date)? (IF H CODE AND RECORD)

(IF NOT H CODE O AND ASK)

[REPEAT 3A UNTIL ALL X DAYS CODED H/O. IF NO CIRCLED DAYS SKIP TO PAC 1 p. 4. FOR FIRST CIRCLED DAY ASK]

3C. On (day/date) did you use help from someone else in order to take public transportation?

3C. If you had taken public transportation on (day/date) would you have used help to do so?

[PROBE, RECORD RESPONSE, CODE U/NU;
IF X DAYS REMAIN REPEAT 3A;
IF CIRCLED DAYS REMAIN, REPEAT 3C;
IF ALL DAYS ACCOUNTED FOR SKIP TO PAC 1 PAGE 4]

PAGE 3A

(ENTER DATES)

Month(s) _____

.ate

MOB3.	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
H. RELATED	H	H	H	H	H	H	H	H	H	H	H	H	H	H
NOT H. REL.	O	O	O	O	O	O	O	O	O	O	O	O	O	O
USED	U	U	U	U	U	U	U	U	U	U	U	U	U	U
NOT USED	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU	NU

_____ (day/date)

_____ (day/date)

_____ (day/date)

PAGE 4

(MARK DATES AT TOP OF PAGE 4A) →

PAC1. On which of the past 8 days, if any, did you spend most or all of the day in bed?

NONE (CIRCLE DAYS IN BED, AND FOR FIRST CIRCLED DAY ASK)

No days in bed → (PAC2, p. 5)

1A. And what was the reason that you stayed in bed on (day/date)?(RECORD)
(IF H, CODE) → (PAC2, p. 5)
(IF NOT H, ASK) →
In addition to that (reason), were there any other reasons that (day)? (RECORD)
(IF H, CODE) →
(IF NOT H, ASK) →
Anything else? (RECORD)
(IF H, CODE; IF NOT H, REPEAT PROBE UNTIL H OR NO OTHER REASONS) →

(REPEAT 1A UNTIL ALL CIRCLED DAYS CODED H/O)

PAGE 4A

(ENTER DATES)

PAC1.	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
H. RELATED	H	H	H	H	H	H	H	H	H	H	H	H	H	H
NOT H. REL.	0	0	0	0	0	0	0	0	0	0	0	0	0	0

_____ (day/date)

_____ (day/date)

PAGE 5

(MARK DATES AT TOP OF PAGE 5A) →

PAC2. On which of the past 8 days, if any, did you sit for most or all of the day in any type of chair, couch, or wheelchair?

NONE (CIRCLE DAYS SPENT IN CHAIR, ETC.; FOR FIRST CIRCLED DAY ASK)

No days spent in chair, etc.

2A. And what was the reason that you spent most or all of the day (day/date) in a (chair/wheelchair/etc.)? (RECORD)
(IF H, CODE) (IF NOT H, ASK)

In addition to that (reason), were there any other reasons that (day)? (RECORD)
(IF H, CODE) (IF NOT H, ASK)

Anything else? (RECORD)
(IF H, CODE; IF NOT H, REPEAT UNTIL H OR NO OTHER REASONS)

(REPEAT 2A UNTIL ALL CIRCLED DAYS CODED H/O)

PAC3.

3A. On which of the past 8 days, if any, did you have trouble - or not try to - lift, stoop, bend over, or use stairs or inclines?

NONE (CIRCLE DAYS AND FOR EACH CIRCLED DAY ASK)

A1. What was the reason (that you...) on (day/date)?
(RECORD REASON AND CODE H/O FOR EACH CIRCLED DAY)

3B. On which of the past 8 days, if any, did you limp, or use a cane, crutches, or walker?

NONE (CIRCLE DAYS AND FOR EACH CIRCLED DAY ASK)

B1. What was the reason (that you...) on (day/date)?
(RECORD REASON AND CODE H/O FOR EACH CIRCLED DAY)

3C. On which of the past 8 days, if any, did you have any (other) physical limitations or not try to walk as far or as fast as most persons your age are able?

NONE (CIRCLE DAYS AND FOR EACH CIRCLED DAY ASK)

C1. What was the trouble or limitation on (day/date)?
(RECORD REASON AND CODE H/O FOR EACH CIRCLED DAY)

(TURN TO ROL1 p. 6) (TURN TO ROL1 p. 6)

PAGE 5A

(ENTER DATES)

Month(s) _____

Date _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

PAC2.	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
H. RELATED	H	H	H	H	H	H	H	H	H	H	H	H	H	H
NOT H. REL.	O	O	O	O	O	O	O	O	O	O	O	O	O	O

_____ (day/date) _____

_____ (day/date) _____

PAC3A.	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
H. RELATED	H	H	H	H	H	H	H	H	H	H	H	H	H	H
NOT H. REL	O	O	O	O	O	O	O	O	O	O	O	O	O	O

PAC3B.	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
RELATED	H	H	H	H	H	H	H	H	H	H	H	H	H	H
NOT H. REL.	O	O	O	O	O	O	O	O	O	O	O	O	O	O

PAC3C.	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
H. RELATED	H	H	H	H	H	H	H	H	H	H	H	H	H	H
NOT H. REL.	O	O	O	O	O	O	O	O	O	O	O	O	O	O

_____ (day/date) _____

_____ (day/date) _____

_____ (day/date) _____

PAGE 6

ROL1. Are you primarily working, retired, disabled, unemployed, a student, (housewife), or what? (CHECK ALL THAT APPLY)

WRKG	DSBL	UNEM	STUDENT	RTRD	HSWF
SKIP TO SAC1. BELOW	SKIP TO SAC1. BELOW	SKIP TO SAC1. BELOW	SKIP TO SAC1 PAGE 7	SKIP TO SAC1 PAGE 8	SKIP TO SAC1 PAGE 9

(MARK DATES AT TOP OF PAGE 6A)

WORKING, DISABLED, UNEMPLOYED, ON STRIKE, SICK LEAVE

SAC1. During the past 8 days, including weekends, holidays and so on, on which days, if any, did you work on a job at all?

Worked ALL days (CIRCLE ALL DAYS) (FOR 1ST CIRCLED DAY ASK)

(IF NOT ALL, CIRCLE YES DAYS; X REMAINING DAYS, FOR FIRST X DAY ASK)

SAC 1A And what was the reason that you did not work on a job on (day/date)?
(IF H, CODE AND RECORD RESPONSE) (IF NOT H, ASK)

SAC 1B In addition to that (reason), were there any reasons related to (your?) health that you did not work on (day/date)?

(IF H CODE AND RECORD) (IF NOT H, CODE O AND ASK)

[REPEAT SAC 1A UNTIL ALL X DAYS CODED H/O. IF NO CIRCLED DAYS SKIP TO SAC2, P.10, FOR FIRST CIRCLED DAY ASK]

1C On (day/date), were you limited in any way in the amount or kind of work in job, such as,

1C If you had worked on a job on (day/date), would you have been limited in any way, such as,

[WORKING DISABLED UNEMPLOYED] using special working aids, not doing certain tasks or strenuous work, taking special rest periods, or working only part of the day?

[PROBE, RECORD RESPONSE, CODE L/NL;
IF X DAYS REMAIN, REPEAT 1A;
IF CIRCLED DAYS REMAIN, REPEAT 1C;
IF ALL DAYS ACCOUNTED FOR, TURN TO SAC2. PAGE 10]

PAGE 6A

(ENTER DATES)

Month(s)														
Date														
SAC1.	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
H. RELATED	H	H	H	H	H	H	H	H	H	H	H	H	H	H
NOT H. REL.	O	O	O	O	O	O	O	O	O	O	O	O	O	O
LIMITED	L	L	L	L	L	L	L	L	L	L	L	L	L	L
NOT LIMITED	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL

(day/date)

(day/date)

(day/date)

(day/date)

(day/date)

(day/date)

PAGE 7

STUDENT

MARK DATES AT TOP OF PAGE 7A →

SAC1. During the past 8 days, including weekends, holidays, and so on, on which days, if any, did you attend classes or school activities at all?

ALL school activities all days

CIRCLE ALL DAYS; FOR FIRST CIRCLED DAY ASK

(IF NOT ALL, CIRCLE YES DAYS; X REMAINING DAYS, FOR FIRST X DAY ASK)

1A. And what was the reason that you did not (attend classes/ do school activities) on (day/date)?
(IF H CODE) (IF NOT H ASK)

1B. In addition to that (reason) were there any reasons related to your health that you did not (attend classes/do school activities) on (day/date)?
(IF H CODE) (IF NOT H CODE O AND ASK)

REPEAT 1A UNTIL ALL X DAYS CODED H/O.
IF NO CIRCLED DAYS, SKIP TO SAC2, P.10.
FOR FIRST CIRCLED DAY ASK

1C. On (day/date), were you limited in any way in the amount or kind of school activities such as

1C. If you had (attended class done school activities) on (day/date) would you have been limited in any way such as

being excused from certain courses, including gym or recess activities, attending a special school or classes, having special teaching or courses at home, or not carrying a full schedule?

[PROBE, RECORD RESPONSE, CODE L/NL;
IF X DAYS REMAIN REPEAT 1A;
IF CIRCLED DAYS REMAIN REPEAT 1C;
IF ALL DAYS ACCOUNTED FOR TURN TO SAC2. PAGE 10]

PAGE 7A

(ENTER DATES)

Month(s)	_____								_____					
Date	___	___	___	___	___	___	___	___	___	___	___	___	___	___
SACl.	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
H. RELATED	H	H	H	H	H	H	H	H	H	H	H	H	H	H
NOT H. REL.	O	O	O	O	O	O	O	O	O	O	O	O	O	O
LIMITED	L	L	L	L	L	L	L	L	L	L	L	L	L	L
NOT LIMITED	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL

_____ (day/date) _____

_____

_____

_____ (day/date) _____

_____

_____

_____ (day/date) _____

_____

_____

_____ (day/date) _____

_____

_____

_____ (day/date) _____

_____

_____

_____ (day/date) _____

_____

_____

PAGE 8

RETIRED

MARK DATES AT TOP OF PAGE 8A →

SAC1. During the past 8 days including weekends, holidays, and so on, on which days, if any, did you do any work activities at all such as shopping, cooking, or working in or around the house, yard, or garden?

ALL did work activities all days

(IF NOT ALL, CIRCLE YES DAYS, X REMAINING DAYS, FOR FIRST X DAY ASK)

CIRCLE ALL DAYS; FOR FIRST CIRCLED DAY ASK

1A. And what was the reason that you did not do work activities on (day/date)?
(IF H, CODE AND RECORD)

(IF NOT H ASK)

1B. In addition to that (reason) were there any reasons related to your health that you did not do work activities on (day/date)?
(IF H CODE AND RECORD)

(IF NOT H CODE O AND ASK)

[REPEAT SAC 1A UNTIL ALL X DAYS CODED H/O. IF NO CIRCLED DAYS SKIP TO SAC2 P.10. FOR FIRST CIRCLED DAY ASK]

1C. On (day/date) were you limited in any way in the amount or kind of work activities such as

1C. If you had done work activities on (day/date) would you have been limited in any way such as

using special working aids, not doing certain tasks or strenuous work, taking special rest periods, or working only part of the day?

[PROBE, RECORD RESPONSE, CODE L/NL;
IF X DAYS REMAIN, REPEAT 1A;
IF CIRCLED DAYS REMAIN, REPEAT 1C;
IF ALL DAYS ACCOUNTED FOR TURN TO SAC2, PAGE 10]

PAGE 8A

(ENTER DATES)

Month(s)	_____								_____					
Date	__	__	__	__	__	__	__	__	__	__	__	__	__	__
SAC1.	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
H. RELATED	H	H	H	H	H	H	H	H	H	H	H	H	H	H
NOT H. REL.	O	O	O	O	O	O	O	O	O	O	O	O	O	O
LIMITED	L	L	L	L	L	L	L	L	L	L	L	L	L	L
NOT LIMITED	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL

_____ (day/date) _____

_____ (day/date) _____

_____ (day/date) _____

_____ (day/date) _____

_____ (day/date) _____

_____ (day/date) _____

PAGE 9

MARK DATES AT TOP OF PAGE 9A →

HOUSEWIFE

SAC1. During the past 8 days, including weekends, holidays, and so on, on which days, if any, did you do any housework at all?

housework ALL days

(IF NOT ALL, CIRCLE YES DAYS; X REMAINING DAYS, FOR FIRST DAY ASK)

CIRCLE ALL DAYS; FOR FIRST CIRCLED DAY ASK

1A. And what was the reason that you did no housework on (day/date)?
(IF H CODE AND RECORD RESPONSE) (IF NOT H ASK)

1B. In addition to that (reason) were there any reasons related to your health that you did no housework on (day/date)?
(IF H CODE AND RECORD) (IF NOT H, CODE O AND ASK)

REPEAT 1A UNTIL ALL X DAYS CODED H/O;
IF NO CIRCLED DAYS SKIP TO SAC2. PAGE 10
FOR FIRST CIRCLED DAY ASK

1C. On (day/date) were you limited in any way in the amount or kind of housework such as

1C. If you had done housework on (day/date), would you have been limited in any way, such as

not lifting small children, not cooking, washing, or ironing, or not doing heavy cleaning, or taking special rest periods.

PROBE, RECORD RESPONSE, CODE L/NL;
IF X DAYS REMAIN, REPEAT 1A;
IF CIRCLED DAYS REMAIN REPEAT 1C;
IF ALL DAYS ACCOUNTED FOR TURN TO SAC2, PAGE 10

PAGE 9A

(ENTER DATES)

onth(s)	_____								_____					
Date	__	__	__	__	__	__	__	__	__	__	__	__	__	__
SACl.	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
H. RELATED	H	H	H	H	H	H	H	H	H	H	H	H	H	H
NOT H. REL.	O	O	O	O	O	O	O	O	O	O	O	O	O	O
LIMITED	L	L	L	L	L	L	L	L	L	L	L	L	L	L
NOT LIMITED	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL	NL

(day/date) _____

(day/date) _____

(day/date) _____

(day/date) _____

(day/date) _____

(day/date) _____

PAGE 10

(MARK DATES AT TOP OF PAGE 10 ⟶

SAC2. (CARD X (OTHER ACTIVITIES) On which of the past 8 days, if any, were you limited in any way in the amount or kind of any activities other than (work/housework/work activities/school), such as the examples shown on this card, as usual for your age?

NONE (CIRCLE DAYS; FOR FIRST CIRCLED DAY, ASK)

not limited on any days

2A. In what way were you limited on (day/date)? (RECORD RESPONSE AND CODE H/O; REPEAT 2A FOR NEXT CIRCLED DAY UNTIL ALL ACCOUNTED FOR)

SFCR (CARD XI (SELF-CARE) On which days, if any, from a week ago yesterday through yesterday, did you have more than the usual help for most persons your age with any items on this card?

NONE (CIRCLE ALL DAYS WHEN ANY ONE APPLIED: FOR FIRST CIRCLED DAY ASK)

1A. Please give me the numbers that applied on (day/date)? (RECORD RESPONSES AND CIRCLE NUMBERS FOR EACH DAY; REPEAT 1A FOR NEXT CIRCLED DAY UNTIL ALL ACCOUNTED FOR)

END END

EXAMPLES ONLY (as usual for age) — CARD X OACT

Going shopping, handling personal business, and so on.

Taking part in hobbies, games, play, recreational activities and so on.

Taking part in individual or group sports, athletic activities, etc.

Visiting or meeting with friends, relatives, and so on.

Taking part in church, Sunday School, synagogue, or other religious activities.

Taking part in community work, civic projects, etc.

Going to club, lodge, other meetings, and so on.

Attending movies, ballgames, plays, concerts, other entertainment, and so on.

Taking part in extracurricular activities such as chorus, drama, sports, etc.

PAGE 10A

(ENTER DATES)

Month(s)														
Date	___	___	___	___	___	___	___	___	___	___	___	___	___	___
SAC2.	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
H. RELATED	H	H	H	H	H	H	H	H	H	H	H	H	H	H
NOT H. REL.	O	O	O	O	O	O	O	O	O	O	O	O	O	O

(day/date) _____

(day/date) _____

SFCR1.	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat
DRESS	1	1	1	1	1	1	1	1	1	1	1	1	1	1
FEED SELF	2	2	2	2	2	2	2	2	2	2	2	2	2	2
TAKE BATH	3	3	3	3	3	3	3	3	3	3	3	3	3	3
USE TOILET	4	4	4	4	4	4	4	4	4	4	4	4	4	4

(day/date) _____

(day/date) _____

HAD MORE HELP THAN OTHERS THE SAME AGE — CARD XI SFCR

1. Had help to DRESS (tying shoes, buttoning shirt, blouse, coat, etc.), or did not DRESS for health reasons.

2. Had help to FEED SELF (being fed, having meat cut, bread buttered, etc.), or did not FEED SELF (e.g., received fluids by vein).

3. Had help to use TOILET (getting on or off the seat, cleaning with tissues, etc.), or did not use TOILET for health reasons (e.g., bedpan).

4. Had help to TAKE BATH (getting in or out of tub or shower, washing all parts of the body, etc.) or did not TAKE BATH for health reasons.

A P P E N D I X 3

PATIENT NO.: _____

INTERVIEWER'S NAME: _____

DATE: _____

FAMILY PRACTICE PATIENT CARE

RESEARCH STUDY

FIRST INTERVIEW SCHEDULE

UNIVERSITY OF BRITISH COLUMBIA

DEPARTMENT OF ADULT EDUCATION

INTERVIEWER'S

COMMENTS

PERSONAL HEALTH REPORT

We are now going to ask you to make a comparison between your past average health and your health as you see it today. We will ask you to make this comparison by drawing a line. We will say that your average health for the past five years is represented by a line this long:

past health

Now, in the space above, we would like you to draw a line indicating how your present health compares to your average health over the last five years. For example, if your present health is about half as good as your average health in the past, then draw a line about half as long as the line above. If you view your present health as -- say 2½ times better than your average health for the last five years, then draw a line 2½ times longer than the line above.

PERSONAL STRESS REPORT

We are now going to compare how stressed you feel you are at this time with your average level of stress for the past five years. Again we will ask you to make this comparison by drawing a line. We will say that your average stress level for the past five years is represented by a line this long:

past stress

Now, in the space above, draw a line indicating how your present stress level compares to your average stress over the last five years.

Page

Directions: 1. If you can answer YES to the question asked, put a circle around the YES.

2. If you have to answer NO to the question asked, put a circle around the NO.

3. Please answer all the questions. If you are not sure, guess the answer.

			For Office Use Only Dup 1-4
During the last six months have you:			5 3
1. - Taken a high school credit course by correspondence?	YES	NO	6 ____
2. - Taken a non-credit course of study by correspondence?	YES	NO	7 ____
3. - Taken a university credit course by correspondence?	YES	NO	8 ____
4. - Been registered in an apprenticeship training program?	YES	NO	9 ____
5. - Attended a community college non-credit course to learn a new language, to improve your English or to learn a hobby or handicraft, etc.?	YES	NO	10 ____
6. - Attended a School district adult education non-credit course to learn a new language, to improve your English or to learn a skill such as wood carving or pottery, etc.?	YES	NO	11. ____
7. - Taken a university credit course? (other than by correspondence.)	YES	NO	12. ____
8. - Attended a full-time vocational course at a provincial vocational school?	YES	NO	13. ____
9. - Attended a part-time vocational course for credit towards a trade certificate such as Typing, Welding, or Electrical Code Courses?	YES	NO	14. ____
10. - Attended a one day convention or professional association meeting?	YES	NO	15. ____
11. - Attended a one day workshop or educational course on any topic?	YES	NO	16. ____
12. - Taken a course at a recreation centre to learn a recreational or hobby skill such as tennis, skating, golf, bridge, pottery, or painting, etc.?	YES	NO	17. ____

13. - Taken a college-level credit course at a community college? (other than by correspondence). YES NO 18. _____

14. - Taken a high school level credit course given by a school district adult education department? (other than by correspondence). YES NO 19. _____

15. - Spent a day at a boat, house, car or agricultural show? YES NO 20. _____

16. - Have you worked through a programmed text book such as a "how to do it" or "teach yourself" book on car mechanics, book-keeping, or macrame, etc.? YES NO 21. _____

17. - Attended a short training or educational course given by a labour union or a professional association? YES NO 22. _____

Please note: In the following questions if the answer is YES indicate the number of times that you have engaged in each activity.
Example: 1. 1 (2) 3 4 5 more than 5 Never
2. 1 2 3 4 5 (more than 5) Never

How often during the last six months have you:

18. - Listened to a teaching tape or record on subjects such as learning a foreign language or improving one's job performance, etc.?
1 2 3 4 5 more than 5 Never 23. _____

19. - Taken tours or educational visits to art galleries, museums, historic buildings, industrial sites or armed forces bases, etc?
1 2 3 4 5 more than 5 Never 24. _____

20. - Attended a public lecture? (Not an election meeting).
1 2 3 4 5 more than 5 Never 25. _____

21. - Attended a labour union, professional association or community group meetings?
1 2 3 4 5 more than 5 Never 26. _____

22. - Taken individual lessons or tutoring to develop a recreational or hobby skill such as piano, guitar, tennis or swimming, etc. ?
1 2 3 4 5 more than 5 Never 27. _____

Page

For Office Use Only

23. - Read a serious non-fiction book of your own, borrowed from a library, a friend or from any other source?

1 2 3 4 5 more than 5 Never 28. _____

24. - Thoroughly read a news, or cultural magazine such as Time, Newsweek, Reader's Digest or Macleans, etc.?

1 2 3 4 5 more than 5 Never 29. _____

25. - Do you usually read a news or cultural magazine as often as you did last month? (CHECK ONE ITEM, X)

Yes, I always read as much as I did last month _____
I usually read a little less _____
I usually read only half as much _____
I usually read less than half as much _____ 30. _____
I usually read less than a quarter as much _____
No, I rarely read as much as I did last month _____

26. - Watched a serious or educationally valuable feature television program such as the National Geographic Series, World at War, W5, Ombudsman, Maclean or Newsweek for between half an hour and an hour?

1 2 3 4 5 6 7 8 9 more than 9 Never 31. _____

27. - Do you usually watch educationally valuable television programs as often as you did last month? (CHECK ONE ITEM, X)

Yes, I always watch as much educational television as I did last month _____
I usually watch a little less _____
I usually watch only half as much _____ 32. _____
I usually watch less than half as much _____
I usually watch less than a quarter as much _____
No, I rarely watch as much as I did last month _____

28. - Listened to a serious or educationally valuable radio program such as "Cross-Country Check Up" or "As It Happens", etc. for between half an hour and an hour?

1 2 3 4 5 6 7 8 9 more than 9 Never 33. _____

29. - Do you usually listen to as much educationally valuable radio as you did last month? (CHECK ONE ITEM, X)

Yes, I always listen to as much educational radio as I did last month _____
I usually listen to a little less _____
I usually listen only half as much _____ 34. _____
I usually listen less than half as much _____
I usually listen less than a quarter as much _____
No, I rarely listen as much as I did last month _____

Page

Directions: 1. If you can answer YES to the question asked, put a circle around the YES.

2. If you have to answer NO to the question asked, put a circle around the NO.

3. Please answer all the questions. If you are not sure, guess the answer

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Dup 1-4

5 4

1.	Do you like plenty of excitement and bustle around you?	Yes	No	6 _____
2.	Have you often got a restless feeling that you want something but do not know what?	Yes	No	7 _____
3.	Do you nearly always have a "ready answer" when people talk to you?	Yes	No	8 _____
4.	Do you sometimes feel happy, sometimes sad without any real reason?	Yes	No	9 _____
5.	Do you usually stay in the background at parties or "get-togethers"?	Yes	No	10 _____
6.	Do you sometimes sulk?	Yes	No	11 _____
7.	When you are drawn into a quarrel, do you prefer to "have it out" to being silent hoping things will get better?	Yes	No	12 _____
8.	Are you moody?	Yes	No	13 _____
9.	Do you like mixing with people?	Yes	No	14 _____
10.	Have you often lost sleep over your worries?	Yes	No	15 _____
11.	Would you call yourself happy-go-lucky?	Yes	No	16 _____
12.	Do you often make your mind up too late?	Yes	No	17 _____
13.	Do you like working alone?	Yes	No	18 _____
14.	Have you often felt listless and tired for no good reason?	Yes	No	19 _____
15.	Are you rather lively?	Yes	No	20 _____
16.	Do you often feel "fed-up".	Yes	No	21 _____
17.	Do you feel uncomfortable in anything but everyday clothes?	Yes	No	22 _____
18.	Does your mind often wander when you are trying to attend closely to something?	Yes	No	23 _____
19.	Can you put your thoughts into words quickly?	Yes	No	24 _____
20.	Are you often "lost in thought"?	Yes	No	25 _____
21.	Do you like practical jokes?	Yes	No	26 _____
22.	Do you often think of your past?	Yes	No	27 _____
23.	Do you very much like good food?	Yes	No	28 _____

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24.	When you get annoyed do you need someone friendly to talk to about it?	Yes	No	29 _____
25.	Do you mind selling things or asking people for money for some good cause?	Yes	No	30 _____
26.	Are you touchy or sensitive about some things?	Yes	No	31 _____
27.	Would you rather be at home on your own than go to a boring party?	Yes	No	32 _____
28.	Do you sometimes get so restless that you cannot sit long in a chair?	Yes	No	33 _____
29.	Do you like planning things carefully, well ahead of time?	Yes	No	34 _____
30.	Do you have dizzy spells?	Yes	No	35 _____
31.	Do you usually do things better by figuring them out alone than by talking to others about it?	Yes	No	36 _____
32.	Do you ever get short of breath without having done heavy work?	Yes	No	37 _____
33.	Are you an easy-going person, not generally bothered about having everything "just-so"?	Yes	No	38 _____
34.	Do you suffer from "nerves"?	Yes	No	39 _____
35.	Would you rather plan things than do things?	Yes	No	40 _____
36.	Do you get nervous in places like elevators, trains or tunnels?	Yes	No	41 _____
37.	When you make new friends, is it usually you who makes the first move, or does the inviting?	Yes	No	42 _____
38.	Do you get very bad headaches?	Yes	No	43 _____
39.	Do you generally feel that things will turn out right in the end somehow?	Yes	No	44 _____
40.	Do you find it hard to fall asleep at bedtime?	Yes	No	45 _____
41.	Do you sometimes say the first thing that comes into your head?	Yes	No	46 _____
42.	Do you worry too long after an embarrassing experience?	Yes	No	47 _____
43.	Are you a private person?	Yes	No	48 _____
44.	Do you often get into trouble because you do things without thinking?	Yes	No	49 _____
45.	Do you like telling jokes and funny stories to your friends?	Yes	No	50 _____
46.	Do you often feel self-conscious when you are with superiors?	Yes	No	51 _____

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47. In a risky situation, do you still usually think it worth taking a chance? Yes No 52 _____

48. Do you often feel nervous in your stomach before an important occasion? Yes No 53 _____

Below are 4 statements relating to everyday stress and strains which may describe how you feel at this time.

Please check the extent to which each statement describes you.

For example, if statement number one describes you "fairly well" then you should circle the number '2' opposite that statement. Continue until you have responded to all 4 statements.

This describes me:

1	2	3	4
very well	fairly well	not very well	not at all

1. In general, I am unusually tense or nervous. 1 2 3 4 54. _____

2. I experience a great amount of nervous strain connected with my daily activities. 1 2 3 4 55. _____

3. At the end of the day I am completely exhausted, mentally and physically. 1 2 3 4 56. _____

4. My daily activities are extremely trying and stressful. 1 2 3 4 57. _____

Page

Directions: 1. If you agree with each of the items listed below put a circle around the AGREE.

2. If you disagree with each of the items listed below put a circle around the DISAGREE.

3. Please answer all of the items.

				For Office Use Only Dup 1-4
1.	Adult education helps you to recognize opportunities in life.	Agree	Disagree	5 ____
2.	Adult education helps a person to adjust to change.	Agree	Disagree	6 ____
3.	Adult education can help me to attain my goals in life.	Agree	Disagree	7 ____
4.	Adult education will not help a person to become a better worker.	Agree	Disagree	8 ____
5.	Most people involved in adult education have nothing better to do.	Agree	Disagree	9 ____
6.	Adult education is not important in the fight against poverty.	Agree	Disagree	10 ____
7.	I really cannot see any benefits in adult education.	Agree	Disagree	11 ____
8.	The more an adult learns the better equipped he is to deal with the important problems in life.	Agree	Disagree	12 ____
9.	People are exaggerating the need for adult education.	Agree	Disagree	13 ____
10.	I do not have the time to take an interest in adult education.	Agree	Disagree	14 ____
11.	Adult education helps a person to reach their full potential.	Agree	Disagree	15 ____
12.	Adult education is a good way of learning more about cultural activities.	Agree	Disagree	16 ____
13.	Government agencies should promote adult education.	Agree	Disagree	17 ____
14.	Adult education has value to the community.	Agree	Disagree	18 ____
15.	Adult education does not develop a person's self confidence.	Agree	Disagree	19 ____
16.	Adult education will not help a person become a better citizen.	Agree	Disagree	20 ____
17.	Adult education is a poor way to use one's leisure time.	Agree	Disagree	21 ____
18.	Most of the people attending adult education classes are not the type of person I would choose to be friends with.	Agree	Disagree	22 ____
19.	Adult education is like investing in one's self.	Agree	Disagree	23 ____
20.	Adult education is just as important as the education of children.	Agree	Disagree	24 ____
				25 ____

Page

				For Office Use Only
21.	Adult education is a waste of time.	Agree	Disagree	26 _____
22.	Adult education can help a person become self reliant and independent.	Agree	Disagree	27 _____
23.	Business and industry should do more to encourage people to take part in adult education activities.	Agree	Disagree	28 _____
24.	As people get more time for leisure activities adult education will be in greater demand.	Agree	Disagree	29 _____
25.	I resent spending money on adult education.	Agree	Disagree	30 _____
26.	The way society is changing adults in the future will have to keep on learning all through their lives.	Agree	Disagree	31 _____
27.	Adult education does <u>not</u> help you to get ahead.	Agree	Disagree	32 _____
28.	An adult who is an active learner is respected by others.	Agree	Disagree	33 _____

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PATIENT CODE NO. _____ DATE _____ TIME _____

1-4 _____

5 _____

1. Age on last birthday _____ years. 6-7 _____ _____

15 - 19 years	1 _____	
20 - 29 years	2 _____	
30 - 39 years	3 _____	
40 - 49 years	4 _____	
50 - 59 years	5 _____	
60 + years	6 _____	8 _____

2. Sex.

Male	1	
Female	2	9 _____

3. Marital Status.

Single	1 _____	
Married	2 _____	
Widowed	3 _____	
Separated	4 _____	
Divorced	5 _____	
Common-law marriage or cohabiting	6 _____	10 _____

4. Occupational Status.

Employed Full Time	1 _____	
Employed Par Time	2 _____	
Homemaker	3 _____	
Unemployed	4 _____	
Retired	5 _____	
Disabled - not in labour force	6 _____	11 _____

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5. Personal income before taxes from employment and/or private income sources, to nearest $500.00 during 1975 $_____ 12-16 _ _ _ _ _

less than $5,000	1 _____	
$5,000 - $5,999	2 _____	
$6,000 - $6,999	3 _____	
$7,000 - $7,999	4 _____	
$8,000 - $8,999	5 _____	
$9,000 - $9,999	6 _____	
$10,000 - $10,999	7 _____	
$11,000 - $11,999	8 _____	
$12,000 - $12,999	9 _____	
$13,000 +	A _____	17 _____

6. Total househod income before taxes, including spouse, sons, daughters and relatives to nearest $5000.00 during 1975 $_____ 18-22 _ _ _ _ _

less than $7,000	1 _____	
$7,000 - $7,999	2 _____	
$8,000 - $8,999	3 _____	
$9,000 - $9,999	4 _____	
$10,000 - $10,999	5 _____	
$11,000 - $11,999	6 _____	
$12,000 - $12,999	7 _____	
$13,000 - $13,999	8 _____	
$14,000 - $14,999	9 _____	
$15,000 +	A _____	23 _____

7. Occupation - Full title of job and brief description of responsibilities.

_____ 24-25 _____ _____

_____ 26-27 _____ _____

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8. Number of years at present job _____ years. 28-29 _____ _____
30 _____

9. Born in Canada. Yes 1
No 2 31 _____

10. If "No", how many years residency in Canada? _____ years. 32-33 _____ _____

11. Ethnic origin. _____ 34-35 _____ _____

12. Number of years of schooling completed. Grade 1 to University _____ years. 36-37 _____ _____

less than 8 years 1 _____
8 - 10 years 2 _____
11 - 12 years 3 _____
13 - 14 years 4 _____
15 years + 5 _____ 38 _____

13. Number of children. _____ 39-40 _____ _____

14. Number of adults presently living in your household _____ 41-42 _____ _____

A P P E N D I X 4

PATIENT NO: _____

INTERVIEWER'S NAME: _____

DATE: _____

FAMILY PRACTICE PATIENT CARE

RESEARCH STUDY

SECOND INTERVIEW SCHEDULE

UNIVERSITY OF BRITISH COLUMBIA
DEPARTMENT OF ADULT EDUCATION

PERSONAL HEALTH REPORT

As with the first interview you participated in last Spring, we would like you to make some comparisons using the length of a line as a reference. Please think of the health of the people you are in contact with in your daily activities. We will say that the average health of these people is a line this long:

Now in the space above draw a line indicating how your average health over the past year compares to the health of others around you. For example, if you view your health over the past year as about twice as good as people around you then you would draw a line which is two times as long as the line above. If, on the other hand, your health is about 1/3 as good as others, you would correctly respond by drawing a line 1/3 as long as the reference line.

PERSONAL STRESS REPORT

Now think of the people with whom you are in daily contact and visualize the amount of stress which you see they experience. We will say that this average stress is represented by a line this long:

In the space above, draw a line indicating how your own personal stress over the past year compares to the stress of others around you.

The following questions are designed to find out the way in which certain important events in our society affect different people. Each item consists of a pair of alternatives marked a. or b. Please select the one statement of each pair - and only one - which you more strongly believe to be true as far as you are concerned. This is a measure of your personal belief. There are no right or wrong answers.

WHICH DO YOU BELIEVE TO BE TRUE?

CIRCLE THE NUMBER YOU SELECT.

1.a. Many of the unhappy things in peoples lives are partly due to bad luck.	or	1.b. People's misfortunes result from the mistakes they make.
2.a. One of the major reasons why we have wars is because people don't take enough interest in politics	or	2.b. There will always be wars, no matter how hard people try to prevent them.
3.a. In the long run people get the respect they deserve in this world.	or	3.b. Unfortunately an individual's worth often passes unrecognised no matter how hard he tries.
4.a. Without the right breaks one cannot be an effective leader.	or	4.b. Capable people who fail to become leaders have not taken advantage of their opportunities
5.a. No matter how hard you try some people just don't like you.	or	5.b. People who can't get others to like them don't understand how to get along with others.
6.a. I have often found that what is going to happen will happen.	or	6.b. Trusting to fate has never turned out as well for me as making a decision to take a definite course of action.

7.a.	If people exercised and had a good diet they wouldn't become ill.	or 7.b.	Health is a matter of luck no matter what you do, if you are unlucky you become ill.
8.a.	Becoming a success is a matter of hard work, luck has little or nothing to do with it.	or 8.b.	Getting a good job depends mainly on being in the right place at the right time.
9.a.	The average citizen can have an influence in government decisions.	or 9.b.	This world is run by the few people in power, and there is not much the little guy can do about it.
10.a.	When I make plans, I am almost certain that I can make them work.	or 10.b.	It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.
11.a.	In my case getting what I want has little or nothing to do with luck.	or 11.b.	Many times we might just as well decide what to do by flipping a coin.
12.a.	Who gets to be the boss often depends on who was lucky enough to be in the right place first.	or 12.b.	Getting people to do the right things depends upon ability, luck has little or nothing to do with it.
13.a.	As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control	or 13.b.	By taking an active part in political and social affairs the people can control world events.

14.a. Most people don't realize the extent to which their lives are controlled by accidental happenings.	or 14.b.	There really is no such thing as "luck".
15.a. It is hard to know whether or not a person really likes you.	or 15.b.	How many friends you have depends upon how nice a person you are.
16.a. In the long run the bad things that happen to us are balanced by the good ones.	or 16.b.	Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.
17.a. With enough effort we can put a stop to environmental pollution.	or 17.b	It is difficult for people to have much control over things such as the pollution of our environment.
18.a. Many times I feel that I have little influence over the things that happen to me.	or 18.b.	It is impossible for me to believe that chance or luck plays an important role in my life.
19.a. People are lonely because they don't try to be friendly.	or 19.b.	There's not much use in trying too hard to please people, if they like you they like you.
20.a. What happens to me is my own doing.	or 20.b.	Sometimes I feel that I don't have enough control over the direction my life is taking.

THE HINKLE ET AL (1960) SEVERITY OF ILLNESS RATING SCALE

Original Ratings	Amended Ratings	Characteristics
1	1. Low	Illnesses associated with a definite abnormality of cells or metabolic systems but not seriously impairing the function of any organ system.
	2. High	Examples: Orthostatic albuminuria; late latent lues, manifested only by seropostivity; small benign naevus.
2	3. Low	Illnesses associated with a definite impairment of one or more organ systems, but having little or no effect upon the capacity of the individual to carry out his usual activities.
	4. High	Examples: Functional constipation; moderate grades of obesity; early stages of hypertensive vascular disease.
3	5. Low	Illnesses which seriously impair the function of one or more organ systems, but which have little effect on the highest integrative functions, so that the individual may carry out his usual activities, but in a somewhat restricted manner.
	6. High	Examples: Many episodes of active peptic ulcer, diabetes mellitus; hypertensive cardiovascular discease; the common cold; vascular headache.
4	7. Low	Illnesses which prevent an individual from carrying out his usual activities, but do not prevent all other activities.
	8. High	Examples: Measles; fracture of ankle; moderately severe anxiety state; many episodes of the common cold or dysmenorrhea; any disease which causes absence from work or "bed disability".
5	9. Low	Illnesses which severely impair the highest integrative functions, and make it impossible for the individual to carry out any activities other than those directly associated with survival.
	10. High	Examples: Menigococcus meningitis; hepatic coma; typhoid; catatonic schizophrenia.

APPENDIX 5

TABLE 1

ATTITUDE SCALE ITEMS AND VALUES

Item		Scale Value
1	Adult education is mainly for those who did not complete high school	7.7
2	Adult education is a waste of time	7.0
3	Adult education is a good way of learning more about cultural activites	6.8
4	Adult education is not important in the fight against poverty	6.7
5	Adult education helps you to recognise opportunities in life	6.6
6	Government agencies should promote adult education	6.4
7	Adult education helps a person reach their potential	6.3
8	Most people have jobs that require them to learn how to keep abreast of change	6.1
9	Adult education has value to the community	6.1
10	Adult education helps to overcome the frustrations of every day life	6.0
11	I resent spending money on adult education	5.9
12	Adult education is just as important as the education of children	5.7
13	The more an adult learns the better equipped he is to deal with the important problems in life	5.4
14	Business and industry should do more to encourage people to take part in adult education activities	5.2

Item		Scale Value
15	I really cannot see any benefits in adult education	4.9
16	People are exaggerating the need for adult education	4.7
17	Adult education can help a person become self-reliant and independant	4.3
18	As people get more time for leisure activities adult education will be in greater demand	4.3
19	Most of the people attending adult education classes are not the type of person I would choose to be friendly with	4.2
20	Adult education is a poor way to use one's leisure time	4.0
21	Adult education does not help you to get ahead	3.9
22	Adult education is like investing in one's self	3.7
23	Money should be spent on improving facilities for adult education	3.5
24	Adult education will not help a person become a better citizen	3.4
25	I do not have the time to take an interest in adult education	3.2
26	Adult education does not develop a person's self-confidence	3.1
27	I would be willing to pay more for adult education	3.0
28	Adult education can help me attain my goals in life	3.0
29	Adult education helps you in dealing with other people	2.7

Item		Scale Value
30	The way society is changing, adults in the future will have to keep on learning all through their lives	2.5
31	Adult education helps you to escape the drudgery of daily life	2.3
32	Adult education helps a person to adjust to change	2.1
33	Most people involved in adult education have nothing better to do	1.8
34	Most night school courses are too expensive	1.7
35	An adult who is an active learner is respected by others	1.5
36	Adult education will not help a person become a better worker	1.4
37	Adult education offers a break in the routine of home or work	1.2
38	Participating in adult education is a good way of improving one's social life	1.0
39	Adult education is a good way of meeting people	0.9
40	I enjoy learning just for the sake of learning	0.7

Psychological Continuum

0.65 1.91 2.87 3.78 4.69 6.03 7.52

A P P E N D I X 6

Table 1

DISTRIBUTION OF SOCIAL CHANGE SCORES AND SELECTED SOCIO-DEMOGRAPHIC CHARACTERISTICS

Variable	Social Readjustment Rating Scale Score					
	Less than 125		125 and greater		Totals	
	#	%	#	%	#	%
Age						
<20 Yrs	3	42.9	4	57.1	7	100.0
20 - 29 Yrs	22	41.5	31	58.5	53	100.0
30 - 39 Yrs	26	43.3	34	56.7	60	100.0
40 - 49 Yrs	42	60.9	27	39.1	60	100.0
50 - 59 Yrs	29	51.8	27	48.2	56	100.0
>59 Yrs	7	63.6	4	36.4	11	100.0
Totals	129	50.4	127	49.6	256	100.0
	X^2 = 6.87, d.f. = 4, N.S.					
Sex						
Male	63	50.8	61	49.2	124	100.0
Female	66	49.6	67	50.4	133	100.0
Totals	129	50.2	128	49.8	257	100.0
	X^2 = .04, d.f. = 1, N.S.					
Marital Status						
Single	19	44.2	24	55.8	43	100.0
Married	103	56.6	79	43.4	182	100.0
Other	7	21.9	25	78.1	32	100.0
Totals	129	50.2	128	49.8	257	100.0
	X^2 = 13.87, d.f. = 2, $p < .001$					
Yrs School						
< 8 Yrs	28	58.3	20	41.7	48	100.0
8 - 10 Yrs	36	50.0	36	50.0	72	100.0
11 - 12 Yrs	36	43.9	46	56.1	82	100.0
13 - 14 Yrs	12	48.0	13	52.0	25	100.0
>14 Yrs	13	54.2	11	45.8	24	100.0
Totals	125	49.8	126	50.2	251	100.0
	X^2 = 2.76, d.f. = 4, N.S.					
Canadian Born						
Born in Canada	62	44.9	76	55.1	138	100.0
Not Born in Canada	66	56.4	51	43.6	117	100.0
Totals	128	50.2	127	49.8	255	100.0
	X^2 = 3.34, d.f., = 1, N.S.					
Socio-Economic Status						
Less than 30.1	40	52.6	36	47.4	76	100.0
30.1 - 40.0	27	55.1	22	44.9	49	100.0
40.1 - 50.0	22	50.0	22	50.0	44	100.0
More than 50.0	16	45.7	19	54.3	35	100.0
Totals	105	51.5	99	48.5	204	100.0
	X^2 = 0.80, d.f. = 3, N.S.					

Table 2

DISTRIBUTION OF SUBJECTIVE STRESS SCORES AND SELECTED SOCIO-DEMOGRAPHIC CHARACTERISTICS

Variable	Subjective Stress Scale Scores					
	Less than 13		13 and Greater		Totals	
	#	%	#	%	#	%
Age						
<20 Yrs	3	42.9	4	57.1	7	100.0
20 - 29 Yrs	34	64.2	19	35.8	53	100.0
30 - 39 Yrs	32	53.3	28	46.7	60	100.0
40 - 49 Yrs	30	43.5	39	56.5	69	100.0
50 - 59 Yrs	34	59.6	23	40.4	57	100.0
>59 Yrs	3	27.3	8	72.7	11	100.0
Totals	136	52.9	121	47.1	257	100.0
	X^2 = 9.38, d.f. = 5, N.S.					
Sex						
Male	66	52.8	59	47.2	125	100.0
Female	71	53.4	62	46.6	133	100.0
Totals	137	53.1	121	46.9	258	100.0
	X^2 = 0.01, d.f. = 1, N.S.					
Marital Status						
Single	28	63.6	16	36.4	44	100.0
Married	91	50.0	91	50.0	182	100.0
Other	18	56.3	14	43.8	32	100.0
Totals	137	53.1	121	46.9	258	100.0
	X^2 = 2.79, d.f. = 2, N.S.					
Yrs School						
< 8 Yrs	20	41.7	28	58.3	48	100.0
8 - 10 Yrs	34	46.6	39	53.4	73	100.0
11 - 12 Yrs	54	65.9	28	34.1	82	100.0
13 - 14 Yrs	12	48.0	13	52.0	25	100.0
>14 Yrs	12	50.0	12	50.0	24	100.0
Totals	132	52.4	120	47.6	252	100.0
	X^2 = 9.41, d.f. = 4, N.S.					
Canadian Born						
Born in Canada	77	55.4	62	44.6	139	100.0
Not Born in Canada	58	49.6	59	50.4	117	100.0
Totals	135	52.7	121	47.3	256	100.0
	X^2 = 0.86, d.f. = 1, N.S.					
Socio-Economic Status						
Less than 30.1	43	56.6	33	43.4	76	100.0
30.1 - 40.0	26	53.1	23	46.9	49	100.0
40.1 - 50.0	24	54.5	20	45.5	44	100.0
More than 50.0	21	60.0	14	40.0	35	100.0
Totals	114	55.9	90	44.1	204	100.0
	X^2 = 0.45, d.f. = 3, N.S.					

Table 3

DISTRIBUTION OF HEALTH INDEX SCORES (POST-TEST)
AND SELECTED SOCIO-DEMOGRAPHIC CHARACTERISTICS

Variable	Bush Health Status Index (Post-Test)					
	Less than 0.747		Greater than 0.747		Totals	
	#	%	#	%	#	%
Age						
<20 Yrs	3	50.0	3	50.0	6	100.0
20 - 29 Yrs	15	31.3	33	68.7	48	100.0
30 - 39 Yrs	27	50.9	26	49.1	53	100.0
40 - 49 Yrs	34	54.0	29	46.0	63	100.0
50 - 59 Yrs	30	60.0	20	40.0	50	100.0
>59 Yrs	6	66.7	3	33.3	9	100.0
Totals	114	50.2	114	49.8	229	100.0
	X^2 = 10.16, d.f. = 5, N.S.					
Sex						
Male	54	49.1	56	50.0	110	100.0
Female	62	51.7	58	48.3	120	100.0
Totals	116	50.4	114	49.6	230	100.0
	X^2 = 0.15, d.f. = 1, N.S.					
Marital Status						
Single	16	41.0	23	59.0	39	100.0
Married	82	49.7	83	50.3	165	100.0
Other	18	69.2	8	30.8	26	100.0
Totals	116	50.4	114	49.6	230	100.0
	X^2 = 5.09, d.f. = 2, N.S.					
Yrs School						
< 8 Yrs	22	51.2	21	48.8	43	100.0
8 - 10 Yrs	43	70.5	18	29.5	61	100.0
11 - 12 Yrs	32	43.2	42	56.8	74	100.0
13 - 14 Yrs	12	48.0	13	52.0	25	100.0
>14 Yrs	6	26.1	17	73.9	23	100.0
Totals	115	50.9	111	49.1	226	100.0
	X^2 = 16.86, d.f. = 4, $p < .01$					
Canadian Born						
Born in Canada	61	50.4	60	49.6	121	100.0
Not Born in Canada	54	50.5	53	49.5	107	100.0
Totals	115	50.4	113	49.6	228	100.0
	X^2 = .0066, d.f. = 1, N.S.					
Socio-Economic Status						
Less than 30.1	34	52.3	31	47.7	65	100.0
30.1 - 49.0	22	51.2	21	48.8	43	100.0
50.1 - 50.0	19	48.7	20	51.3	39	100.0
More than 50.0	15	44.1	19	55.9	34	100.0
Totals	90	49.7	91	50.3	181	100.0
	X^2 = 0.65, d.f. = 3, N.S.					

Table 4

DISTRIBUTION OF HEALTH CHANGE SCORES AND SELECTED SOCIO-DEMOGRAPHIC CHARACTERISTICS

Variable	Health Change Scores (Bush Pre-Test, Post-Test Residuals)					
	-.007 and less		-.0071 and greater		Totals	
	No.	%	No.	%	No.	%
Age						
<20 Yrs	3	50.0	3	50.0	6	100.0
20 - 29 Yrs	20	42.6	27	57.4	47	100.0
30 - 39 Yrs	25	48.1	27	51.9	52	100.0
40 - 49 Yrs	34	54.0	29	46.0	63	100.0
50 - 59 Yrs	27	54.0	23	46.0	50	100.0
>59 Yrs	5	55.6	4	44.4	9	100.0
Totals	114	50.2	113	49.8	227	100.0
	X^2 = 1.94, d.f. = 5, N.S.					
Sex						
Male	55	50.0	55	50.0	110	100.0
Female	60	50.8	58	49.2	118	100.0
Totals	115	50.4	113	49.6	228	100.0
	X^2 = 0.02, d.f. = 1, N.S.					
Marital Status						
Single	19	58.7	20	51.3	39	100.0
Married	80	49.1	83	50.9	163	100.0
Other	16	61.5	10	38.5	26	100.0
Totals	115	50.4	113	49.6	228	100.0
	X^2 = 1.45, d.f. = 2, N.S.					
Yrs School						
< 8 Yrs	18	41.9	25	58.1	43	100.0
8 - 10 Yrs	37	60.7	24	39.3	61	100.0
11 - 12 Yrs	35	48.6	37	51.4	72	100.0
13 - 14 Yrs	12	48.0	13	52.0	25	100.0
>14 Yrs	12	52.2	11	47.8	23	100.0
Totals	114	50.9	110	49.1	224	100.0
	X^2 = 3.98, d.f. = 4, N.S.					
Canadian Born						
Born in Canada	65	54.6	54	45.4	119	100.0
Not Born in Canada	49	45.8	58	54.2	107	100.0
Totals	114	50.4	112	49.6	226	100.0
	X^2 = 1.76, d.f. = 1, N.S.					
Socio-Economic Status						
Less than 30.1	33	50.8	32	49.2	65	100.0
30.1 - 40.0	22	51.2	21	48.8	43	100.0
40.1 - 50.0	14	35.9	25	64.1	39	100.0
More than 50.0	21	61.8	13	38.2	34	100.0
Totals	90	49.7	91	50.3	181	100.0
	X^2 = 5.02, d.f. = 3, N.S.					

Table 5

DISTRIBUTION OF EXTRAVERSION-INTROVERSION SCORES
AND SELECTED SOCIO-DEMOGRAPHIC CHARACTERISTICS

Variable	EPI Extraversion Scale Score					
	Less than 15		15 and Greater		Totals	
	#	%	#	%	#	%
Age						
<20 Yrs	4	57.1	3	42.9	7	100.0
20 - 29 Yrs	27	50.9	26	49.1	53	100.0
30 - 39 Yrs	35	58.3	25	41.7	60	100.0
40 - 49 Yrs	39	56.5	30	43.5	69	100.0
50 - 59 Yrs	28	49.1	29	50.9	57	100.0
>59 Yrs	8	72.7	3	27.3	11	100.0
Totals	141	54.9	116	45.1	257	100.0
	X^2 = 2.79, d.f. = 4, N.S.					
Sex						
Male	68	54.4	57	45.6	125	100.0
Female	73	54.9	60	45.1	133	100.0
Totals	141	54.7	117	45.3	258	100.0
	X^2 = 0.01, d.f. = 1, N.S.					
Marital Status						
Single	23	52.3	21	47.7	44	100.0
Married	106	58.2	76	41.8	182	100.0
Other	12	37.5	20	62.5	32	100.0
Totals	141	54.7	117	45.3	258	100.0
	X^2 = 4.85, d.f. = 2, $p < .09$					
Yrs School						
< 8 Yrs	28	58.3	20	41.7	48	100.0
8 - 10 Yrs	33	45.2	40	54.8	73	100.0
11 - 12 Yrs	45	54.9	37	45.1	82	100.0
13 - 14 Yrs	18	72.0	7	28.0	25	100.0
>14 Yrs	12	50.0	12	50.0	24	100.0
Totals	136	54.0	116	46.0	252	100.0
	X^2 = 6.08, d.f. = 4, N.S.					
Canadian Born						
Born in Canada	71	51.1	68	48.9	139	100.0
Not Born in Canada	68	58.1	49	41.9	117	100.0
Totals	139	54.3	117	45.7	256	100.0
	X^2 = 1.27, d.f. = 1, N.S.					
Socio-Economic Status						
Less than 30.1	37	48.7	39	51.3	76	100.0
30.1 - 40.0	28	57.1	21	42.9	49	100.0
40.1 - 50.0	28	63.6	16	36.4	44	100.0
More than 50.0	15	42.9	20	57.1	35	100.0
Totals	108	52.9	96	47.1	204	100.0
	X^2 = 4.35, d.f. = 3, N.S.					

Table 6

DISTRIBUTION OF NEUROTICISM-STABILITY SCORES
AND SELECTED SOCIO-DEMOGRAPHIC CHARACTERISTICS

Variable	EPI Neuroticism Scale Score					
	Less than 12		12 and Greater		Totals	
	#	%	#	%	#	%
Age						
<20 Yrs	1	14.3	6	85.7	7	100.0
20 - 29 Yrs	20	37.7	33	62.3	53	100.0
30 - 30 Yrs	27	45.0	33	55.0	60	100.0
40 - 49 Yrs	48	69.6	21	30.4	69	100.0
50 - 59 Yrs	31	54.4	26	45.6	57	100.0
>59 Yrs	8	72.7	3	27.3	11	100.0
Totals	135	52.5	122	47.5	257	100.0
	X^2 = 18.67, d.f. = 4, p < .001					
Sex						
Male	76	60.8	49	39.2	125	100.0
Female	60	45.1	73	54.9	133	100.0
Totals	136	52.7	122	47.3	258	100.0
	X^2 = 6.36, d.f. = 1, p < .02					
Marital Status						
Single	19	43.2	25	56.8	44	100.0
Married	103	56.6	79	43.4	182	100.0
Other	14	43.8	18	56.3	32	100.0
Totals	136	52.7	122	47.3	258	100.0
	X^2 = 3.73, d.f. = 2, p < .1					
Yrs School						
< 8 Yrs	34	70.8	14	29.2	48	100.0
8 - 10 Yrs	34	46.6	39	53.4	73	100.0
11 - 12 Yrs	34	41.5	48	58.5	82	100.0
13 - 14 Yrs	18	72.0	7	28.0	25	100.0
>14 Yrs	14	58.3	10	41.7	24	100.0
Totals	134	53.2	118	46.8	252	100.0
	X^2 = 15.62, d.f. = 4, p < .01					
Canadian Born						
Born in Canada	76	54.7	63	45.3	139	100.0
Not Born in Canada	60	51.3	57	48.7	117	100.0
Totals	136	53.1	120	46.9	256	100.0
	X^2 = 0.29, d.f. = 1, N.S.					
Socio-Economic Status						
Less than 30.1	42	55.3	34	44.7	76	100.0
30.1 - 40.0	28	57.1	21	42.9	49	100.0
40.1 - 50.0	24	54.5	20	45.5	44	100.0
More than 50.0	19	54.3	16	45.7	35	100.0
Totals	113	55.4	91	44.6	204	100.0
	X^2 = 0.09, d.f. = 3, N.S.					

Table 7

DISTRIBUTION OF LOCUS OF CONTROL SCORES AND SELECTED SOCIO-DEMOGRAPHIC CHARACTERISTICS

Variable	Locus of Control Scale Score					
	Less than 9		9 and greater		Totals	
	#	%	#	%	#	%
Age						
<20 Yrs	4	66.7	2	33.3	6	100.0
20 - 29 Yrs	27	57.4	20	42.6	47	100.0
30 - 39 Yrs	29	55.8	23	44.2	52	100.0
40 - 49 Yrs	31	50.0	31	50.0	62	100.0
50 - 59 Yrs	25	50.0	25	50.0	50	100.0
>59 Yrs	3	33.3	6	66.7	9	100.0
Totals	119	52.7	107	47.3	226	100.0
	X^2 = 2.59, d.f. = 4, N.S.					
Sex						
Male	61	56.0	48	44.0	109	100.0
Female	59	50.0	59	50.0	118	100.0
Totals	120	52.9	107	47.1	227	100.0
	X^2 = 0.81, d.f. = 1, N.S.					
Marital Status						
Single	25	64.1	14	35.9	39	100.0
Married	84	51.9	78	48.1	162	100.0
Other	11	42.3	15	57.7	26	100.0
Totals	120	52.9	107	47.1	227	100.0
	X^2 = 3.21, d.f. = 2, N.S.					
Yrs School						
< 8 Yrs	16	38.1	26	61.9	42	100.0
8 - 10 Yrs	31	50.8	30	49.2	61	100.0
11 - 12 Yrs	38	52.8	34	47.2	72	100.0
13 - 14 Yrs	19	76.0	6	24.0	25	100.0
>14 Yrs	15	65.2	8	34.8	23	100.0
Totals	119	53.4	104	46.6	223	100.0
	X^2 = 10.55, d.f. = 4, $p < .05$					
Canadian Born						
Born in Canada	71	59.7	48	40.3	119	100.0
Not Born in Canada	48	45.3	58	54.7	106	100.0
Totals	119	52.9	106	47.1	225	100.0
	X^2 = 4.65, d.f. = 1, $p < .05$					
Socio-Economic Status						
Less than 30.1	24	37.5	40	62.5	64	100.0
30.1 - 40.1	30	69.8	13	30.2	43	100.0
40.1 - 50.0	23	57.5	17	42.5	40	100.0
More than 50.0	22	64.7	12	35.3	34	100.0
Totals	99	54.7	82	45.3	181	100.0
	X^2 = 13.08, d.f. = 3, $p < .01$					

Table 8

DISTRIBUTION OF LEARNING ACTIVITY SCORES AND SELECTED SOCIO-DEMOGRAPHIC CHARACTERISTICS

Variable	Subjective Estimation of Adult Learning Scale Scores					
	Less than 1621		1621 and Greater		Totals	
	#	%	#	%	#	%
Age						
<20 Yrs	7	100.0	0	0.0	7	100.0
20 - 29 Yrs	29	54.7	24	45.3	53	100.0
30 - 39 Yrs	26	43.3	34	56.7	60	100.0
40 - 49 Yrs	28	40.6	41	59.4	69	100.0
50 - 59 Yrs	33	57.9	24	42.1	57	100.0
>59 Yrs	6	54.5	5	45.5	11	100.0
Totals	129	50.2	128	49.8	258	100.0
	X^2 = 7.42, d.f. = 4, p < .1					
Sex						
Male	57	45.6	68	54.4	125	100.0
Female	72	54.1	61	45.9	133	100.0
Totals	129	50.0	129	50.0	258	100.0
	X^2 = 1.88, d.f. = 1, N.S.					
Marital Status						
Single	25	56.8	19	43.2	44	100.0
Married	91	50.0	91	50.0	182	100.0
Other	13	40.6	19	59.4	32	100.0
Totals	129	50.0	129	50.0	258	100.0
	X^2 = 1.94, d.f. = 2, N.S.					
Yrs School						
< 8 Yrs	35	72.9	13	27.1	48	100.0
8 - 10 Yrs	37	50.7	36	49.3	73	100.0
11 - 12 Yrs	36	43.9	46	56.1	82	100.0
13 - 14 Yrs	12	48.0	13	52.0	25	100.0
>14 Yrs	6	25.0	18	75.0	24	100.0
Totals	126	50.0	126	50.0	252	100.0
	X^2 = 17.36, d.f. = 4, p < .01					
Canadian Born						
Born in Canada	68	48.9	71	51.1	139	100.0
Not Born in Canada	61	52.1	56	47.9	117	100.0
Totals	129	50.4	127	49.6	256	100.0
	X^2= 0.26, d.f. = 1, N.S.					
Socio-Economic Status						
Less than 30.1	52	68.4	24	31.6	76	100.0
30.1 - 40.0	23	46.9	26	53.1	49	100.0
40.1 - 50.0	16	36.4	28	63.6	44	100.0
More than 50.0	12	34.3	23	65.7	35	100.0
Totals	103	50.5	101	49.5	204	100.0
	X^2= 17.21, d.f. = 3, p < .001					

Table 9

DISTRIBUTION OF ATTITUDE TO ADULT EDUCATION SCORES
AND SELECTED SOCIO-DEMOGRAPHIC CHARACTERISTICS

Variable	Attitude to Adult Education Scale Scores					
	Less than 112.1		112.1 and Greater		Totals	
	#	%	#	%	#	%
Age						
<20 Yrs	3	42.9	4	57.1	7	100.0
20 - 29 Yrs	29	54.7	24	45.3	53	100.0
30 - 39 Yrs	29	48.3	31	51.7	60	100.0
40 - 49 Yrs	32	46.4	37	53.6	69	100.0
50 - 59 Yrs	25	43.9	32	56.1	57	100.0
>59 Yrs	8	72.7	3	27.3	11	100.0
Totals	126	49.0	131	51.0	257	100.0
	X^2 = 3.73, d.f. = 4, N.S.					
Sex						
Male	64	51.2	61	48.8	125	100.0
Female	62	46.6	71	53.4	133	100.0
Totals	126	48.4	132	51.6	258	100.0
	X^2 = 0.54, d.f. = 1, N.S.					
Marital Status						
Single	22	50.0	22	50.0	44	100.0
Married	89	48.9	93	51.1	182	100.0
Other	15	46.9	17	53.1	32	100.0
Totals	126	48.8	132	51.2	258	100.0
	X^2 = 0.07, d.f. = 2, N.S.					
Yrs School						
< 8 Yrs	32	66.7	16	33.3	48	100.0
8 - 10 Yrs	36	49.3	37	50.7	73	100.0
11 - 12 Yrs	38	46.3	44	53.7	82	100.0
13 - 14 Yrs	10	40.0	15	60.0	25	100.0
>14 Yrs	5	20.8	19	79.2	24	100.0
Totals	121	48.0	131	52.0	252	100.0
	X^2 = 14.58, d.f. = 4, $p < .01$					
Canadian Born						
Born in Canada	58	41.7	81	58.3	139	100.0
Not Born in Canada	67	57.3	50	42.7	117	100.0
Totals	125	48.8	131	51.2	256	100.0
	X^2 = 6.14, d.f. = 1, $p < .02$					
Socio-Economic Status						
Less than 30.1	50	65.8	26	34.2	76	100.0
30.1 - 40.0	23	46.9	26	53.1	49	100.0
40.1 - 50.0	14	31.8	30	68.2	44	100.0
More than 50.0	12	34.3	23	65.7	35	100.0
Totals	99	48.5	105	51.5	204	100.0
	X^2 = 16.88, d.f. = 3, $p < .001$					