A STUDY OF INDIVIDUAL HEALTH PRACTICES IN RELATION TO HEALTH LOCUS OF CONTROL BELIEFS AND HEALTH VALUE

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ABSTRACT

Health-related behaviour has become a major focus of public concern because of the realisation that lifestyle factors are important in the etiology of many of today's illnesses. The present study was designed to increase the understanding and prediction of preventive health behaviour by investigating individual health beliefs. As a result of major theoretical and methodological shortcomings, previous research has not been entirely consistent in this area. However, overall trends suggest that the locus of control beliefs construct, which deals with individual perceptions of the causality of outcomes, is an important variable in the prediction of preventive health behaviour although the amount of variance explained by these factors in past studies has not been very large.

The aim of the present study is to investigate whether the locus of control construct, in conjunction with the value an individual places on his/her health, have a significant effect on preventive health behaviour.

A questionaire which included the Multi-dimensional Health Locus of Control Scale (Wallston, Wallston and DeVellis 1978), was administered to a sample of first year university students. A comprehensive range of preventive health behaviours was measured in order to obtain an accurate index of preventive health behaviour participation. The perceived efficacy of the preventive health behaviours was also measured as research into the Health Belief Model (Rosenstock 1966) suggests that it is an important factor in the prediction of health-related behaviours. Comparisons were made between those subjects who valued their health highly and those for whom health had a lower priority.

Results confirm the hypothesis that health locus of control beliefs, in conjunction with health value, account for a significant proportion of the variance in preventive health behaviour. Furthermore, when only those preventive health actions which were perceived by subjects as being very

healthy were considered, the ability of health locus of control beliefs and health value to predict preventive health behaviour increased.

The results of this study indicate the importance of measuring locus of control beliefs in conjunction with the value placed upon health, when assessing their ability to predict preventive health behaviour. The study also highlights the importance of measuring a comprehensive range of preventive health behaviours which subjects perceive as being effective in health promotion, rather than a small number of preventive health beliefs with no measure of their perceived efficacy. Practical implications of this research and future research directions are suggested.

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CHAPTER ONE

PREVENTIVE HEALTH BEHAVIOUR: INTRODUCTION

Historical Overview of Changing Disease Patterns

Preventive health care has become an important focus of the health system in the past few decades due to the fact that disease patterns have altered since the early 1900's, changing from primarily acute, infectious diseases to those that are chronic and degenerative. The rate of death from infectious diseases has decreased from about 36 per 100 deaths in the year 1900 to the 1980 level of approximately 6 per 100 while the death rate from chronic diseases has increased during this time from about 20 per 100 to nearly 70 per 100 (Matarazzo 1982). In 1976 an estimated 50% of the population suffered from chronic illness and this type of illness accounted for 70% of consultations with doctors (Gartner & Reisman 1976).

The reduction in the incidence of most major infectious diseases such as scarlet fever, influenza, pneumonia, diphtheria, whooping cough, smallpox and typhoid fever has often been incorrectly attributed to innoculations, screenings for early detection and chemical therapies, although the rates of every one of these diseases was reduced to very low levels through improvements in hygiene and nutrition prior to the introduction of the biomedical technology (Bolden 1980; Dingle1973; Illich 1976; McKeown 1976 cited in Leventhal et al 1984; McKinlay & McKinlay 1981). This erroneous belief has lead to the unrealistic expectation that medical science can provide chemical cures and preventives for all illnesses including chronic diseases (Becker and Rosenstock 1984; Leventhal, Safer and Penagis 1983). Unfortunately these cures have not been forthcoming so the prevention and alleviation of modern illnesses must rely to a great extent on general behavioural control (Bolden 1980).

This belief has also tended to foster a disease-specific or "medical model" orientation in much of modern medicine which is largely geared towards treating acute illnesses and injuries[1]. According to Glazier (1973) the medical care system's orientation has proved to be largely inadequate to cope with chronic disease for three reasons. Firstly, infectious diseases are acute and usually have a limited time-span whereas chronic diseases, (such as lung cancer, cardiovascular diseases, rheumatoid arthritis, drug and alcohol abuse) typically have gradual onsets and are initially symptomless. Often by the time a person consults a doctor, the disease has developed into a serious condition. Secondly, practitioners expect to get fairly rapid results after administering treatments. People suffering from infectious disease can now reasonably expect to recover in a limited period of time. However, chronic conditions do not usually improve immediately and are likely to need treatment for prolonged periods of time, often for a person's lifetime. Even initially compliant people frequently fail to follow medical recommendations when required to do so for extended periods of time. The focus on specific interventions and outcomes ignores the importance of complex intermediary steps and the need for positive motivation in initiating and maintaining long-term changes in behaviour. Thirdly, the need to cope psychologically with long term illness, which involves patient behaviours and attitudes, social support and family involvement in treatment, is not addressed.

Health and Lifestyle

The traditional medical model begins with the premise that every disease has a single causal agent which disrupts a specific physiological process underlying normal structure and function. The traditional medical model approach attempts to identify the specific disease agent and advocates specialised technical procedures to block or defeat the agent. This approach tends to ignore more complex, multivariate aspects of disease causation and prevention, particularly the contribution of behavioural factors (Breslow 1977; Leventhal, Zimmerman and Gutmann 1984). Although genetic and

[1]The medical model approach discussed here is largely the traditional model. Examples of more comprehensive and systems approaches can now be found which take into account all levels of mental and physical functioning, have a process orientation and consider health in a broader significantly, social and cultural context.

psychosocial factors play an important etiological role in both infectious and chronic diseases, infectious diseases require exposure to agents such as viruses whereas chronic diseases are caused by a complex combination of physical, psychological, social and environmental factors (Leventhal 1973, Twaddle and Hessler 1977). These include arbitrary causes of ill health over which the individual may have little personal control such as: age, sex, inherited conditions, failure in growth and development, some aspects of the environment (such as pollution, crowding and the weather) and faults or deficiencies in the health services themselves as well as doctor-inflicted injury. Other contributors to ill health over which people generally have more control, include lifestyle factors such as: life changes, lack of exercise, lack of rest, poor hygiene, smoking, lack or misuse of recreation, driving behaviour, poor nutrition, drug abuse (from caffeine and alcohol to stimulants and depressants), and the physical aspects of one's environment (including aesthetic, design and spatial aspects of one's environment, city living, hygiene, housing, noise, and the workplace).

The major causes of death today are those diseases in which the personal habits and lifestyle behaviours of the individual (i.e. those factors within the realm of personal control) are the most important etiological factor (Burish and Bradley 1983: Haggerty 1979; King and Remenyi 1986; Matarazzo 1982; Williams and Danaher 1978). For example, in 1979, the Surgeon General of The United States of America reported that for the ten leading causes of death, 59% of the mortality could be traced to such behavioural factors as inadequate exercise, excessive eating and drinking, and smoking (Ockene, Sorensen, Kabat-Zinn, Ockene and Donnelly 1988).

Comparisons between different states within America with similar standards of living and different lifestyles, illustrate the dramatic effects of lifestyle on people's health. There are marked differences in death rates in each age range between residents of Utah and Nevada. The death rate in Nevada, for those aged 40-49 years, is over 50% higher than in Utah. These states are similar in terms of climate, income, schooling and urbanisation but differ in terms of lifestyle as Utah, unlike Nevada, is predominantly an abstemious, Mormon society.

The predominance of unhealthy lifestyles has important consequences in terms of the increased incidence of chronic illness requiring lengthy medical treatment. This is reflected in the costs of health services which have been escalating dramatically since the early 1900's. The yearly expenditure for health care in the United States of America now exceeds $200 billion (more than 10% of that country's GNP (Matarazzo 1982). In NZ 15% of total Government expenditure was devoted to hospital costs in 1976. In the financial year ending March 1981 pharmaceutical benefit expenditure was $147 million whereas in the 1986/87 financial year, the figures had risen to $439 million. With severe limits on government expenditure, this growth could threaten other areas of health expenditure (Malcolm 1987).

Because lifestyle plays such an important role in the etiology of today's major diseases, an understanding of the reasons why people choose to engage, or not engage in various behaviours which promote or maintain their health, is necessary in order to develop strategies to foster healthier lifestyles.

Health professionals are beginning to realise the importance of the social sciences in the understanding of lifestyles necessary to protect people from chronic illness (DeLeon and Pallak 1982; Feuerstein, Labbe and Kuczmierczyk 1986). Health psychology, behavioural medicine and behavioural health are rapidly growing speciality areas for many behavioural scientists (Matarazzo 1980, 1982). The aim of a social science approach to understanding participation in health-protective behaviour needs to focus not on providing solutions to single problems (such as poor levels of participation in immunisation programs), but to gaining a greater understanding of the phenomenon of preventive health behaviour (PH behaviour) as a whole in order to devise the most effective strategies to modify lifestyles which will delay the onset of degenerative processes (Clark 1979).

CHAPTER TWO

PREVENTIVE HEALTH BEHAVIOUR

What do people do to protect their health? Despite considerable research into health behaviour (reviewed by Becker 1974a; Becker, Drachman and Kirscht 1977; Kasl and Cobb 1966; Rosenstock 1966), very little is known about the actions people take to prevent illness and the predictors of these actions. In order to understand the phenomenon of PH behaviour and the particular behaviours it incorporates, a number of underlying issues need to be addressed.

Definitions of Health and Health Behaviour

Little research has been done to investigate whether or not people are guided by a general concept of health (Becker and Rosenstock 1984), but in order to develop an effective approach to understanding PH behaviour, it is necessary to arrive at an adequate conceptualisation of the aim of this behaviour (good health). A fully adequate definition of health is difficult to establish as there are many ways in which it can be conceptualised (Hulka and Cassel 1973). A value judgement is implicit in any definition and health is a very subjective state affected by one's physical and social environment and it is culturally determined to some extent (Siegel 1973). The main dimensions in which health has been conceptualised are: the absence of disease; statistical normality; the presence of positive signs or achievements; functional ability; and wellness behaviour. All of these definitions are problematic in some way (Nevatt 1981). What is considered to be an acceptable level of health also varies greatly among individuals, which consequently affects the measures they take to protect their health.

Because of the difficulty in defining health, no consensus exists as to what actually constitutes PH behaviour. In order to attempt to explain the phenomenon of PH behaviour, it is necessary to have an adequate

conceptualisation of it. Many inconsistencies have arisen in the research as a result of poor conceptualisations of PH behaviour (Langlie 1979) which can be considered according to a number of dimensions.

1) Preventive Health Actions and Health Status

The health behaviours which a person carries out can be differentiated in terms of health status. Some health behaviours are concerned with avoiding potential risk factors, others are aimed at reducing risk factors which are already present, while others involve avoiding or detecting disease at the asymptomatic stage, actions initiated by people with symptoms to determine what illness they may have, and actions to alleviate symptoms. Initially Kasl and Cobb (1966) differentiated preventive health behaviour from health-maintenance, and risk-reduction behaviour according to health status. They defined health behaviour as:

> "any activity undertaken by a person believing himself to be healthy for the purpose of preventing disease or detecting it at an asymptomatic stage" (Kasl and Cobb 1966 p 246)

Illness behaviour, on the other hand is defined as:

> "any activity undertaken by a person who feels ill, to define the state of his health and to discover a suitable remedy" (Kasl and Cobb 1966 p 246).

This is also distinct from sick-role behaviour which is seen as:

> "any activity undertaken by those who consider themselves ill, for the purpose of getting well" (Kasl and Cobb 1966 p 246).

In 1975, Kasl broadened his definition by defining personal health behaviour as:

"all those activities which relate to health maintenance, disease risk-reduction and treatment regimen" (Kasl 1975 p 5).

However, health can also be viewed as a positive goal and a growth process and PH behaviours also include activities which are directed toward the attainment of self-actualisation and peak "wellness" (Ardell 1979). Stewart (1975) distinguishes between health-directed goals, which operate when symptoms are present, and health-related goals where individuals strive to maintain or improve their health as part of their everyday activities. The negative orientation of the medical model which views health as being the absence of disease is most likely to be operating when people have definite symptomatology (Mechanic and Volkart 1961). A person with symptoms sees him or herself as ill and is likely to seek expert advice to alleviate those symptoms. However, someone with a chronic condition such as rheumatoid arthiritis may have goals such as the relief of as much pain as possible while a healthy person may be striving for "high level wellness" (Ardell 1979). Thus the present state of an individual's health may have a marked effect on the health goals which that individual seeks to achieve.

2) The Construct of Preventive Health Behaviour

It is unclear whether PH behaviour is a uni-dimensional or multi-dimensional construct, or simply a collection of unrelated behaviours (Hayes and Ross 1987; Langlie 1977). Many studies do not report correlations among PH behaviour measures (eg.Suchman 1964; Pratt 1971) but evidence would suggest that PH behaviours are largely a collection of independent behaviours since intercorrelations among them tend to be positive but weak (Langlie 1977; Steele and McBroom 1972; Turk, Rudy and Salovey 1984; Williams and Wechsler 1972). For example, visits to doctors are not correlated with other PH behaviours (Williams and Wechsler 1972). Correlations between health maintenance actions and disease avoidance actions are also weak (Blackwell 1976).

Most research in this area has selected only one or a small number of actions to represent the construct of PH behaviour as a whole. An example which illustrates this approach is a study by Kasl and Cobb (1966) which defined PH behaviour broadly, but then go on to deal with only two types of preventive health actions - those that reduce the probability of future illness (immunisation, prenatal care etc), and those that serve to detect disease (health screenings). Health maintenance behaviours and those health behaviours not endorsed by the medical profession, were not considered in this study. Many other studies have measured specific PH behaviours such as seat belt use and smoking behaviour and have then discussed their results in terms of a general construct of PH behaviour, implicitly viewing it as a unidimensional phenomenon (eg. Haefner and Kirscht 1970; Suchman 1964; Tash, O'Shea and Cohen 1969). The fact that intercorrelations among various health-related actions tend to be low, has made interpretations of results of these studies difficult and misleading.

Ajzen and Fishbein (1977) stated that there must be an equivalent level of specificity between measures of attitudes or beliefs and behavioural constructs in order to predict one from measurement of the other. Measures of health value and locus of control beliefs are general and not descriptive of any particular behaviour, whereas the measures of PH behaviour used in much of the research have involved a small number of specific actions. Ajzen and Fishbein argued that broadening the scope of behavioural measures and using a general index of PH behaviours composed of multiple observations can improve attitude-behaviour prediction. Kristiansen (1985) has commented on the need to assess a wider range of health behaviours in relation to other variables.

Only a few studies (Harris and Guten 1979; Langlie 1977; Pratt 1971; Williams and Wechsler 1972) have used a comprehensive range of personal health maintenance and safety practices in conjunction with medically recommended preventive health actions to measure PH behaviour. As a result of this approach, Langlie (1977) found that 63% of the intercorrelations among these health behaviours were both positive and significant. Langlie also classified PH behaviours into direct and indirect risk behaviours which improved the

magnitude of correlations. Pratt (1971) used an index composed of responses to 76 questions relating to health maintenance which included sleep, exercise, body elimination, dental hygiene, smoking, alcohol consumption and nutrition practices. Harris and Guten (1979) developed an index of PH behaviour by asking subjects the three most important things they did to protect their health. Responses to this open-ended question were coded into a number of activity categories and the frequencies of responses in these categories were analysed. PH behaviour was found to be positively associated with the variables contatained in the Health Belief Model in the studies by Langlie (1977) and Harris and Guten (1979). None of these studies investigated locus of control beliefs.

There are also problems with the way individual PH behaviours have been defined and operationalised. Researchers have tended to use a number of different definitions and some of those have been rather limited. For example, Langlie (1977) operationalised exercise as the "number of blocks walked yesterday" and "choose to walk to third floor rather than use the elevator". This definition of exercise is very limited in that it excludes many other forms of exercise a person may engage in.

3) Motivations for Preventive Health Behaviours

Health behaviours are immensely complex as they are the outcome of past and present influences from many diverse sources. Intercorrelations among PH behaviours may be low because they are carried out for a combination of habitual, social, personal and environmental reasons. For example, health behaviours such as teeth brushing and other personal hygiene practices are habits established in childhood and are often motivated by factors such as preventing bad breath or concern about physical appearance. Being overweight may be seen as a risk-factor for illness but the primary reasons a person may be motivated to lose weight is likely to be concern about physical appearance and social acceptance (Balch and Ross 1975). (This issue will be discussed in more detail in the chapter on Value of Health)

4) Medical Endorsement of Preventive Health Behaviours

Another dimension along which PH behaviours need to be considered is in terms of whether the health behaviour has been endorsed by the medical profession or not. Most studies in this area have used only medically recommended PH behaviours oriented around the need to accept professional advice regarding health promotion and disease prevention and/or entering the medical system for prophylaxis, diagnosis or treatment. Professional control in health is seen as authoritative, definitive and exclusive (Levin et al 1977). Alternative interventions are often ignored by medical authorities or viewed as scientifically questionable, based on superstitions and are seen as a source of delay in obtaining professional medical care. However, medical definitions of PH behaviour exclude a great number of health-promoting activities people engage in (irrespective of their actual effectiveness). As new information has come to light regarding disease-prevention and health enhancement, lifestyles have changed. For example, jogging, aerobics and other forms of exercise have increased tremendously in popularity in recent years and many people are eating less salt, sugar, red meat, and fats in their diet. Fewer people are now smoking. Popular classes are held for meditation, self-control, stress-management and assertiveness training. The level of interest in health is illustrated by the number of books, television programs and magazine articles which are available on health related topics.

Pratt (1971) maintains that the doctor is only one source of expertise within the consumer's network of consultants. She believes that although the doctor is a source of specialised medical knowledge, the consumer should be selective about following his or her advice, as the medical professional has only limited knowledge of and limited interest in, the patient's health requirements. Lay health knowledge, beliefs and practices often originate from a scientific medical base but are integrated into an individual's belief system and interpreted in relation to social group factors, group and family organisation, values and parenting practices (Chrisman 1977). According to Suchman (1966), different social and ethnic groups vary greatly in terms of their behavioural norms determining health behaviour. Leventhal et al (1983) and medical anthropologists have found that a wide range of models of health and

illness exist which influence health practices such as exercise and dietary practices. Some of these models suggest scientifically verified health actions while others suggest alternative practices. Both Hayes-Bautista (1976) and Harris and Guten (1979) found that most people carry out a variety of activities additional to doctors' recommendations such as exercise, dietary change and relaxation. The increasing popularity in the 1970's of the concept of "self care" whereby individuals engage in self-initiated health promotion and prevention activities as well as disease detection and treatment (Levin 1977), is evidence of this. The self care approach assumes that people are informed through a variety of formal and informal educational channels and are active on their own behalf in matters of health and applying effective health care practices. It has become part of the everyday behaviour of healthy people (Quah 1977). Increased emphasis on self care, especially for minor health problems, would relieve strains on the health care system (Becker and Rosenstock 1984). However, an implicit assumption that underlies encouragement of self care is that it will involve medically approved actions. In fact, many effective self care actions are not medically endorsed although Danaher (1979) found that 80% of self treatment was completely or partially adequate and only 5% was harmful.

If one is attempting to determine why individuals carry out PH behaviours, a broad range including those not currently medically endorsed, need to be investigated. The definition of health behaviour proposed by Harris and Guten (1979) does not differentiate PH behaviour on the basis of health status and explicitly includes both health behaviours which have been medically endorsed and those which have not. They defined health-protective behaviour as "any behaviour performed by a person, regardless of his or her perceived or actual health status, in order to protect, promote, or maintain his or her health, whether or not such behaviour is objectively effective toward that end" (p 18).

5) Efficacy of Preventive Health Behaviours

A further dimension along which PH behaviours can be differentiated is their efficacy in improving or maintaining health status. As already discussed, lifestyle factors constitute the major known causes of avoidable illness in

Western societies (Haggerty 1977), but research in this area has largely been correlational (Kosa, Antonovsky and Zola 1969) and has, as yet, been unable to conclusively determine the specific pathways by which some behaviours are conducive to health, and the physiological mechanisms by which other behaviours increase the risk of contracting certain diseases. This is partly because of the complex interaction of many factors involved in the etiology of chronic disease. Although well-researched risk factors have been definitively linked to specific diseases (for example, smoking with lung cancer and emphysema, excessive alcohol consumption with cirrhosis of the liver and kidney diseases, and dietary and weight factors with diabetes mellitius), other risk factors have received less empirical support and have only a probabilistic relationship to health status. For example, the link between dietary cholesterol intake and serum cholesterol levels which are a risk factor for heart disease, has not been unequivocally established. Although a low-fat diet appears to be a remedy for hyperlipidemia (Kohn et al 1978), some studies have found that serum cholesterol levels are unrelated to dietary practices (Kaplan 1984). Genetic factors probably play a much more important role.

The epidemiological approach to health risk evaluation used by most medical research, quantifies the probability of future illness for individuals in terms of population risk statistics (Hulley, Rosenman, Bawol, and Brand 1980). These statistics are gleaned from research such as the Framington study (Dawber, Meadors and Moore 1951), and the Pooling Project (cited by Kaplan 1984) which identified risk factors for arteriosclerotic and hypertensive disease and attempted to estimate the risk to individuals through population risk statistics. According to Leventhal, Nerenz and Strauss (1980), the feasibility of using population risk statistics to estimate individual risk, is questionable. For example, the risk factors for heart disease only predict a small proportion of those who contract this condition. The Pooling Project, which combined results from six high-quality prospective studies on heart disease prediction, found that 90% of men with two or more risk factors did not develop heart problems while 58% of those who developed heart disease had one or no risk factors. Furthermore, the correlational links between a given risk factor and a disease are not indicative of causality (Kaplan 1984). The epidemiological approach identifies factors associated with disease but does not define how these factors

are related to the disease, whether change in these factors can alter morbidity and mortality, or how individuals perceive the links between risk factors and these diseases. Although the pathways linking health habits to physiological changes have not been established in most instances (Haggerty 1977), the assumption is often made by medical researchers that once high-risk individuals are identified and their risk factors reduced, this will inevitably reduce levels of morbidity and mortality. However, a significant change in a targeted behaviour may produce only insignificant changes in clinical measures of the disease state. Furthermore these changes may be caused by factors other than alterations in the target behaviour (Kleinman, Felman and Monk 1979). These problems are exacerbated by the time lag which often exists between behaviour change and the outcome, which in the area of PH behaviour can be years (Sechrest and Cohen 1982). Because of this time lag, the number of possible intervening events that could affect the outcome, are increased.

Outcome Measures in Preventive Health Research

The two main approaches to research in the area of preventive health behaviour have been the medical model approach which uses measures of health status as outcome measures, and health psychology which has tended to use behaviour changes as outcome measures.

The traditional medical model orientation which views health as being the absence of disease has had a profound influence on the focus of health promotion programs and on the criteria and methods used to evaluate the effectiveness of these programs. Research using this model has tended to focus on quantifiable outcome measures such as blood pressure, body weight, levels of morbidity and mortality or the reversal of disease processes, rather than focusing on the process of behaviour change. Measurement of therapeutic outcomes, such as weight change (used by Becker, Maiman, Kirscht, Haefner and Drachman 1977), can be misleading as they are not

direct measures of behaviour and are affected by other physiological, behavioural and social factors (Dunbar 1979; Gordis 1979). By only concerning themselves with specific outcomes, the process involved in change is overlooked. No attention is given to the individual's understanding of the disease process or the means to cure it, his or her self-concept, the development of secondary positive goals or long-term lifestyle changes (Stimson 1974).

Furthermore, outcome measures are usually expressed in terms of group means which give no indication as to the level of success in changing individuals' behaviour or which techniques are responsible for altering behaviour, and it also overlooks important information about patterns of usage and individual change processes. For example, in a study by Lansky (1981), when changes in target behaviours were correlated with weight loss on an individual basis, significant relationships were found but these relationships were not apparent when only group means and other statistics were considered.

There are a number of possible reasons why medical researchers focus on health status measures and ignore behavioural change as an outcome for prevention research. Firstly, most risk factors do not have a simple one-to-one association with a disease process but have a number of consequences. For example, smoking increases the risk of many different cancers along with heart, lung and musculatory diseases. Secondly, the causal link between a risk behaviour and a specific pathological process is usually not clearly established. Thirdly, behavioural interventions are more complex than typical medical interventions. The medical model approach provides no expertise for the manipulation of behaviour and leaves the practitioner without guidelines for preventive intervention. For example, more people are failing to be immunised which has resulted in a decline in the proportion of the population that is protected against infectious diseases (Mortimer 1978). The most advanced technology is virtually useless if techniques are not developed to ensure that it is applied effectively. The medical model is an inadequate framework for educational intervention. It provides information regarding the disease symptomatology and process but the only means of education are

instruction, exhortation and demand. None of these approaches have been demonstrated to be effective (Haynes 1979).

In contrast, health psychology research has been criticised because it doesn't focus on health status as the outcome measure. Many studies use outcome variables such as knowledge change, coping strategies and blood chemistries, which do not directly affect a person's health status. Other variables such as stress, exercise, and smoking are important only in terms of the effect they have on an individual's health status. Kaplan (1984) maintains that health status is the only reasonable focal point for clinical health interventions.

> "The conceptualisation and measurement of health are rarely discussed in health psychology literature" (Kaplan 1984, p 756).

Only a few studies make any attempt to link actual health status to lifestyle practices. One series of studies conducted by Belloc and Breslow (1972) and Belloc (1973) has investigated the relationship between lifestyle practices and health status. They concluded that self-reported health status is significantly related to a number of health practices including: regularity of mealtimes and hours of sleep, moderation in smoking and drug use, and adequate levels of physical activity. Belloc & Breslow (1972) found that men aged 55 who had none of the "bad" habits (excessive eating, being overweight, irregular meals, high alcohol intake, cigarette smoking, and inadequate sleep and exercise patterns), were as healthy as men 20 years younger who had all of these bad habits. A later study by Belloc (1973) studied the health practices of 7000 Californian adults over a five and a half year period. Mortality for those engaging in the largest number of the health practices used in the previous study, was lower than those with a low number of healthy practices, for subjects of all ages. A further follow-up 9 and a half years after the original study, found that men following the seven health practices had a 28% reduction in mortality compared to those following three or less health practices. For women, this figure was 43% (Breslow and Enstrom 1980).

Dishman, Ickes and Morgan (1980) reviewed a number of studies of habitual physical activity, which have attempted to link health behaviours with health status. They found substantial evidence to support the claim that regular physical activity reduces the risk factors of cardiovascular and other diseases and enhances physiological and psychological well-being generally.

Preventive health research needs to measure and analyse behaviour changes (Wallston and Wallston 1981), and assessment should be made of how these changes affect outcome measures. More attention needs to be directed at the reasons why behaviour changes to prevent disease are initiated. Over the long term, reasons for engaging in behaviours often change. The development of secondary benefits which are intrinsically reinforcing and meaningful is certainly desirable and can often be essential to long term maintenance of behaviour change. These secondary benefits include: improved self image, improved well-being, "runners high" and reduction in negative emotions such as depression, and anxiety (Leventhal and Hirschman 1982). The clinical significance of outcome measures such as the amelioration of pain and suffering, an individual's quality of life (Andrew and Withey 1976) and self-assessed health status (Hunt et al 1980) also need to be appraised.

Subjective Perceptions of the Efficacy of Preventive Health Behaviours

Apart from the scientifically verified efficacy of specific health actions, it is also important to consider subjects' perceptions of the efficacy of particular preventive health actions (Kristiansen 1985; North 1983), and how individuals perceive the risks and become motivated to initiate and participate in risk reduction activities (Berkanovic 1976; Herzlich 1973; Kasl 1975; Stimson 1974). The approach taken by Harris and Guten (1979) (which requested subjects to list the three most important things they did to protect their health) acknowledged the importance of subjects' perspectives on appropriate health behaviour and incorporated this information into the research design. However, the discrepancies between scientifically recognised and personal notions of risk and coping with it, are usually not taken into account when the reasons for health actions are investigated.

Compliance to Preventive Health Regimens

Although the direct links between specific lifestyle factors and disease states have not been unequivocally defined through scientific research, it is readily apparent that these factors do play an important role in determining an individual's state of health. For this reason, the emphasis in health care today has moved toward a focus on prevention and early detection of disease. However, many preventive health programs are dependent on the willingness of individuals to accept a more active role in caring for their health. Although ultimately it is the individual who stands to benefit most from any efforts that s/he makes in the way of participation in screening, immunisation and other preventive actions, there is a major gap between what prevention and control measures are possible through health technology and the health recommendations actually being followed, i.e. levels of compliance (Sackett and Snow 1979). Many people continue to follow lifestyle patterns known to increase the risk factors for many diseases and others are still dying or suffering from diseases for which simple immunisations exist. Non-compliance to preventive regimens is one of the most important barriers to the control of most of today's diseases (Becker 1974b). Dr Knowles (1977) stated that:

> "Over 99% of us are born healthy and suffer premature death and disability only as a result of personal misbehaviour and environmental conditions ...the individual has the power - indeed the moral responsibility - to maintain his own health by the observance of simple, prudent rules of behaviour relating to sleep, exercise, diet and weight, alcohol and smoking" (p79-80).

A large amount of research has been conducted in the field of non-compliance to both preventive and curative medical regimens. A number of reviewers have reached the conclusion that no consistent trends are apparent and there appears to be no straightforward explanation to account for the phenomenon of non-compliance (Cohen 1979; Haynes, Taylor and Sackett 1979; Sackett and Snow 1979). Although most of the literature has focused on compliance to curative medical treatments, the research investigating non-compliance to

preventive medical regimens has yielded some useful information towards the understanding of PH behaviour in general.

Compliance can be broadly defined as

> "the extent to which a person's behaviour does not coincide with medical or health advice" (Blackwell and Gutmann 1985 p453).

The term compliance to preventive medical recommendations encompasses a diverse range of behaviours from relatively simple, once-only actions such as obtaining immunisations, to permanent, far-reaching changes in a person's lifestyle. For example, the changes in lifestyle recommended for a hypertensive patient to prevent heart disease, include daily medication-taking, losing weight, reducing salt and fat in the diet, giving up smoking, reducing alcohol consumption, undertaking an exercise program and regular medical checkups (Thompson 1984). The rates of compliance to recommended changes in lifestyle are very low (Becker and Rosenstock 1984; Marston 1970; Mitchell 1974) and are estimated to be between 20 and 50% (DiMatteo and DiNicola 1982; Ley 1982; Sackett and Haynes 1976). Levels of compliance vary according to the type of behaviour required (Davis 1967; Kirscht and Rosenstock 1977) and adherance to different types of health behaviours are not highly correlated (Davidson 1982). For example, adult fitness programs usually have adherence rates of only 40-65% (Dishman et al 1980). From a review of 15 studies Sackett and Snow (1979) found that attendance rates at clinics were approximately 50% when appointments were initiated by practitioners and approximately 75% if patients initiated appointment-making. The greater the amount of behaviour change required on the part of the patient, the more likely non-compliance will occur (Davis 1968; Haynes 1976; Kirscht and Rosenstock 1977; North 1983). Recommendations which add new behaviours are more readily complied to than proscriptive regimens where people are asked to modify, restrict or eliminate certain personal habits (Berkowitz 1963; Davis 1967; Haynes 1976; Marston 1970). Svarstad (1976) suggests that no general trends have been found in compliance research because correlations among different types of compliance behaviours are low. Attempts to understand non-compliance need to take into consideration the

fact that many different behaviour changes are involved and it is not a uni-dimensional concept.

Furthermore there is little evidence that any form of compliance behaviour is stable over time (Davis 1967). The dynamics of compliance are constantly changing with individuals' behaviour changing according to situational factors (McKenney 1981, Svarstad 1976). However most researchers have assumed that being compliant or non-compliant is an enduring characteristic of a person which generalises across various health-related behaviours and across time.

Explanation for Non-Compliance to Preventive Health Regimens

Most researchers agree that the low rate of participation in preventive health actions is a multifaceted and complex problem (Cummings, Becker and Maile 1980) for which a number of explanations have been suggested (Baric 1969). Typically these explanations have focussed on the difference between preventive and curative health behaviours.

As most medical care is based on the disease-oriented medical model of health which sees illness as being time-limited, accompanied by concrete symptoms and generally caused by external invading forces which require powerful drugs and surgery to defeat them (Nerenz and Leventhal 1983), people have come to expect short, convenient medical interventions which result in the alleviation of symptoms. This disease-oriented approach encourages patient and doctor to accept episodic, short term treatments, with long intervening intervals without treatment. Because of this emphasis on symptoms, when people are healthy they tend to underestimate the likelihood of getting sick. Leventhal and Hirschman stated that:

> "If health behaviour is linked exclusively with illness thinking and acute representations of health problems, prevention could well be a lost cause" (Leventhal and Hirschman 1982 p 211).

The sick role usually requires relatively minor changes in personal habits while PH behaviours involve major changes habits which are an integral part of a person's lifestyle, and the behavioural responses required need to be continuous. PH behaviours have no specific aim, have an indefinite time span with no immediate rewards and do not have the motivating influence of a visible health problem or a guarantee that disease will be prevented. Instead they are based on general, future-oriented goals such as protecting oneself against forthcoming disease and increased enjoyment of a wide range of physical, social, and intellectual activities. These are intangible and long-term rewards compared to the concrete and immediate rewards involved in the treatment of acute disease (Leventhal 1973). The person also does not receive feedback associated with illness conditions such as changes in symptomatology and treatment procedures (Kasl 1975).

Concrete symptoms act as triggers for illness behaviour (Mechanic 1972) while PH behaviour may be prompted by any one of a number of less tangible sources eg. mass media, friends, educational materials and past experience with illness (Kasl and Cobb 1966). Furthermore, the cues sustaining unhealthy behaviours are often immediate, commonplace and persistent. For example, the eating behaviour of obese people appears to be triggered by external cues such as taste, time and the act of eating itself (Nisbett and Kanouse 1969). Smoking is maintained by concrete, immediate rewards such as taste, anxiety reduction, stimulation and a sense of belonging.

During the time the sick role lasts, it is continually being legitimised through the medical health care system and others in the person's environment. Inherent in the medical system's approach to illness is the assumption that the patient can adopt a passive role as an obedient, unquestioning recipient of medical instructions (Hart 1980). In contrast, a person engaging in PH behaviour needs to be self-motivated, initiate changes in his/her lifestyle in a very active fashion, receives no formal recognition from the medical profession or society in general, and is constantly having to resist pressures from others, forego pleasures and put up with much inconvenience, in order to maintain a healthy lifestyle.

Furthermore, although the diagnosis of disease brings with it certain obligations it also infers certain rights. A person who has a diagnosed illness may be obligated to comply with treatment recommendations but is also exempt from certain daily social responsibilities and is not expected to cope alone. Preventive health actions lack this balance because they bring responsibilities but no benefits, social obligations remain, and no social recognition of the role is given.

External Frame of Reference

Little attempt has been made to understand non-compliance with preventive health actions from the individual's point of view, as the focus of much of the compliance literature has been to attempt to identify the characteristics of those who do not comply with recommendations. Examining compliance from this external point of view has been largely unproductive (Becker 1979) and has produced complex and abstract explanations with the blame for non-compliance being placed upon the patient and the patient's viewpoint largely being overlooked (North 1983). For example, in a survey by Davis (1966), 61% of junior physicians and 67% of senior physicians attributed non-compliance to a patient's uncooperative personality despite the fact that attempts to identify personality characteristics of non-compliers have been unsuccessful (Zifferblatt 1975). Failure to follow a doctor's instructions is considered inherently abnormal, deviant and/or unreasonable behaviour (Stimson 1974) and is seen as a consistent, dispositional trait. "Good" patients are those who follow the doctor's instructions and do not question his/her judgement or authority (S.E. Taylor 1979). The expert or medical model leaves the practitioner with little understanding of what the patient is actually thinking or doing. This serves as a barrier to mutual understanding and co-operation and limits two-way interaction and participation which is necessary in order to reach therapeutic goals. Non-compliance may be considered abnormal, detrimental to health or deviant from a medical perspective, but it may not necessarily be so from the perspective of the patient's peer or social groups (Becker 1963; Stimson 1974). Other possible reasons for non-compliance are not considered within the medical model and no attempt is made to understand the underlying causes of the non-compliance, or address the problem of long-term change.

Furthermore, the medical model approach treats all people in a uniform fashion, ignoring the varying reasons people have for engaging (or not engaging) in a given behaviour, and the unique features of individuals' problems in complying with medical recommendations. These may have important implications for the methods of treatment adopted. For example, a treatment such as desensitization may be effective for people who smoke to control anxiety but for those who enjoy the taste of cigarettes, an aversive conditioning method may be more fruitful.

It is also important that the patient's perceptions and explanations of her/his behaviour be taken into consideration when trying to understand the phenomenon of non-compliance. Individuals' perceptions of a particular health problem play a critical role in determining any action a person takes. For example, twice as many people in the US. believe themselves to be obese than is actually the case (Abraham & Johnson 1980). Obesity is more often perceived in subjective terms (such as "feeling fat") than in terms of weight range norms. Being overweight may be seen as a risk-factor for illness but the reasons a person may be motivated to lose weight are more likely to be concern about physical appearance and social acceptance. A prevailing belief among people who smoke is that they could stop if they wanted to, without any awareness of the problems of addiction and dependence. In recent years a patient perspective approach has been recommended by a number of researchers (Berkanovic 1976; Herzlich 1973; Kasl 1974; Lewis 1963; Stimson 1974). The main conceptual model which has been formulated to acquire a greater understanding of PH behaviour is the Health Belief Model. It has a phenomenological orientation in that it investigates individuals' perceptions of illness and health behaviour, which it sees as being the determinants of behaviour (Mikhail 1981; Thompson 1984).

CHAPTER THREE

THE HEALTH BELIEF MODEL

The Health Belief Model (HBM) formulated by Rosenstock (1966) is a psychosocial model developed to understand health-related behaviour at the level of individual decision-making (Mikhail 1981). It was originally developed in the 1950's in an attempt to explain why so many people were not taking part in early detection programs such as preventive programs, screening tests for asymptomatic illnesses and immunisation clinics (Rosenstock 1974) and to determine the factors that prevent or interfere with people adhering to health recommendations. Later it was adapted to explain patients' responses to symptoms (Kirscht 1974), compliance to curative medical regimens (Becker 1974b), and to explain health behaviour in chronic disease patients (Kasl 1974).

The HBM is reviewed here as it is the most comprehensive model developed to explain PH behaviour, and it has received the most attention in the research (Becker et al 1977; Langlie 1977). Furthermore, many of the dimensions of the HBM have analogous constructs in other models (Cummings et al 1980). For example, the theoretical formulations of Anderson and Bartkus (1973), Kasl and Cobb (1966), Kosa and Robertson (1969), Rosenstock (1966) and Langlie (1977) all include a variable which assesses the individual's perception of symptoms in relation to a disease threat.

The HBM model is based the work of Lewin (1948) and other well-established psychological and behavioural theory (Becker et al 1977). The social-psychological 'value expectancy' model attempts to describe behaviour or decision-making under conditions of uncertainty (Becker and McClintock 1967). The HBM is based on Atkinson and Feather's (1966) application of this theory to the area of achievement which specifies: 1) the motivation needed to

attain success or to avoid failure; 2) the incentive value of a particular goal and; 3) the person's subjective assessment of the likelihood of a successful outcome (Rosenstock 1960). In the case of PH behaviour, value is seen as the motivation to avoid illness. The subjective likelihood of a successful outcome refers to the belief in the efficacy of specific actions to prevent (or overcome) illness. These variables have been translated into the following four dimensions: Perceived susceptiblity, perceived severity, perceived benefits and perceived barriers. Perceived susceptibility is the patient's view of the likelihood of his/her experiencing a particular illness. Perceived severity involves the patient's perception of the severity of the illness and its expected impact on his/her life. The perceived benefits variable is the patient's estimate of a particular health action's efficacy for reducing the level of vulnerability and severity that s/he perceives. Perceived barriers is the patient's estimate of the costs of engaging in a particular health action, including financial costs, time and effort, inconvenience, possible side effects such as pain and discomfort and giving up normally pleasurable activities such as smoking, drinking and favourite foods. Rosenstock described the relationship among these variables as follows:

> "The combined levels of susceptibility and severity provided the energy or force to act and the perception of benefits (less barriers) provided a preferred path of action" (Rosenstock 1974 p 332).

Also included in the model are 'cues to action' which are stimuli that are required to trigger the decision-making process. They may be internal cues such as symptoms or bodily sensations or external cues such as mass media information, social contact or reminder notices from health services. Becker and Maiman (1975) also emphasize that the variables in the model can be affected by modifying factors such as demographic, ethnic and social factors. The "health motive" variable was introduced into the HBM by Becker et al (1974) and again by Becker et al (1977) to account for the findings of research which has been conducted since Rosenstock's (1966) original formulation of the model. Each of the variables and its relationship to PH behaviour will now be discussed.

Perceived Susceptibility

Perceived susceptibility includes an individual's general beliefs about his/her susceptibility to illness as well as his/her beliefs about a specific health problem. Perceptions of vulnerability may change over time through new experiences and acquired information. This variable has been correlated with preventive health actions over a wide range of disorders including: screening for cancer (Fink, Shapiro and Roester 1972; Haefner and Kirscht 1970; Kegeles 1963); screening for tuberculosis and heart disease (Haefner and Kirscht 1970; Hochbaum 1956); obtaining immunisations (Ogionwo 1973); obtaining vaccinations for Swine Flu (Aho 1979; Cummings, Jette and Rosenstock 1978; Rundall and Wheeler 1979); screening for Tay-Sachs disease (Becker, Kaback and Rosenstock 1975) and high blood pressure (King 1982); participating in breast and self examination (Hallal 1982; Kelly 1979); dental problems (Kegeles 1963); physical activity programs to reduce the chance of a heart attack (Heinzelmann and Bagley 1970); dietary compliance and other preventive measures (Becker et al 1977). Thus the dimension of perceived susceptibility appears to be an important one in predicting PH behaviour.

However, Langlie (1977) in a study of PH behaviours found that for `behaviourally consistent' subjects (those who engaged in consistently high or low levels of PH behaviour), low rather than high levels of perceived vulnerability were associated with appropriate PH behaviour.

Perceived Severity

Even if an individual perceives that s/he is susceptible to an illness, s/he may not engage in the necessary PH behaviour unless there is also the perception that serious organic and/or social problems will occur. Perceived severity is seen as an individual's estimation of the seriousness of his/her condition which may not be the same as medical professionals' estimates. Severity in this

sense includes the potential physical complications of the illness such as the possible disruption to one's life (Masur 1981). No significant relationship exists between medical assessment of severity of a disease and patient compliance (Feuerstein et al 1986).

The relationship between perceived severity and PH behaviour has not been demonstrated as frequently as the relationship with perceived susceptibility. A significant relationship between severity and PH behaviour has been shown for: dental care (Tash et al 1969); accident prevention (Suchman 1967); immunisation (Cummings et al 1978; Rundall and Wheeler 1979); pediatric care (Becker, Drachman and Kirscht 1972); and making regular check-ups or well-child clinic visits (Haefner and Kirscht 1970). However, the severity HBM dimension was not found to be predictive of PH behaviour in a number of studies involving: screening programs (Haefner and Kirscht 1970; Kirscht, Haefner, Kegeles and Rosenstock 1967); obtaining immunisations (Radelfinger 1965; Aho 1979; Rundall and Wheeler 1979); practising breast self examination (Hallal 1982); or dietary compliance (Becker et al 1977).

A moderate level of perceived severity appears to optimise the likelihood of PH behaviour being undertaken when no symptoms are apparent. Low levels of severity appear to be insufficiently motivating while very high levels appear to be inhibiting. For example, in a study by Becker et al (1975) the correlation between perceived severity and participation in a screening program for Tay-Sachs disease was significant but negative. A low or moderate perception of severity appeared to motivate participation but when being a disease carrier was perceived as highly disruptive of future family planning, participation in the screening program was low. Studies of chest X-ray program participation (Hochbaum 1956) have had similar results. Use of fear communications to increase a person's perceived severity is effective in altering health actions when a person is provided with specific instructions on how to manage a threat or reduce the severity. It appears that when these instructions are not provided, defensive mechanisms such as denial may take over to restore emotional well-being without the necessary health action being taken (Leventhal 1965).

Perceived Benefits

The perceived benefits or efficacy dimension of the HBM refers to the belief that a particular therapeutic regimen will be effective in curing or controlling a specific health problem. Becker and Maiman (1975) stated that even if an individual is prepared to act, his/her beliefs about the efficacy of an action in reducing the health threat and the difficulties that might be encountered, will ultimately determine whether that action will be carried out.

The HBM dimension of perceived efficacy was found to be statistically significant in differentiating participants from non-participants in a wide range of preventive health actions including a number of Swine Flu inoculation programs (Aho 1979; Cummings et al 1978; Rundall and Wheeler 1979) and a blood pressure screening program (King 1982). Perceived benefits also distinguished practicers from non-practicers of breast self-examination (Hallal 1982; Kelly 1979); those who engage in a range of appropriate PH behaviours (Langlie 1977); and mothers who complied with dietary restrictions for their obese children (Becker et al 1977). There is also a marked association between income and the extent of belief in the efficacy of alternative procedures for preventing or controlling various health conditions (Rosenstock 1969).

Perceived Barriers

From a comprehensive and critical review of 46 HBM studies, Janz and Becker (1984) concluded that 'perceived barriers' was the most powerful measure within the HBM. If an action is likely to be painful, inaccessible, costly, complex, lengthy, inconvenient or requiring new behaviours to be adopted, action is less likely to be taken (Kegeles 1963; Becker and Maiman 1975; Kirscht and Rosenstock 1977; Tash et al 1969). Furthermore, if the safety of the regimen is doubted, compliance decreases (Becker et al 1977; Kirsch and Rosenstock 1977; Rundall and Wheeler 1979; D. W. Taylor 1979). This also applies if side effects are likely (Caldwell, Cobb and Dowling 1970).

The costs/barriers dimension was a significant predictor of: attendance in a high blood pressure screening program (King 1982); engaging in a recommended exercise program (Tirrell and Hart 1980); dietary restriction instructions for obese children being followed by their mothers (Becker et al 1977); and engaging in a range of PH behaviours (Langlie 1977).

Cues to Action

Cues are needed to prompt action when all other above-mentioned variables are favourable. The intensity of a cue required to initiate action is inversely related to the levels of susceptibility and severity that a person perceives.

What exactly constitutes a cue to action and the effects these cues have on behaviour still requires further research. Some studies suggest that information from mass media or health workers has influenced people to take health actions (Becker and Maiman 1975; Becker et al 1975; Mikhail 1981). The presence of symptoms also serves as a cue to action (Kirscht, Becker and Eveland 1976; Haynes, Sackett and Gibson 1976).

Motivation

Motivation is viewed as an important intervening variable which can affect a person's cognitive and affective responses to a health concern and the expectations and outcomes of intervention (Cox 1985). Motivations in the study by Becker et al (1974) were measured along four dimensions: physical threat, control over health matters, attitude toward medical authority and general health concerns. Concern about health matters in general was also positively correlated with PH behaviour in studies by Harris and Guten (1979) and Ogionwio (1973). Becker et al (1977) defined motivation as the desire or intention to comply. This intentional dimension was found to correspond positively with compliance (Becker et al 1974; Cummings et al 1978). Motivation has been measured in several other ways in both PH behaviour and studies of compliance to medical regimens. Becker and Maiman (1975, p 17) defined the term motivation as the "differential emotional arousal in

individuals caused by some given class of stimuli (eg. health matters)". Motivation, when operationalised by the HBM as a concern about health matters in general, was found to be positively correlated with PH behaviour (Battistella 1971; Becker et al 1974; Harris and Guten 1979; Ogionwo 1973) but no relationship was found in other studies (Becker et al 1975; Gordis, Markowitz and Lilienfield 1969; Mikhail 1981; Rundall and Wheeler 1979). These inconsistent results may be due to the fact that different definitions have been used to conceptualise motivation, and behaviours that affect a person's health status may be motivated by other forces such as concerns about physical appearance and social pressure (Rosenstock and Kirscht 1979). Cox (1985) suggests that:

> "...there is more to motivation of health behaviour than what cognitions (health beliefs) alone can capture. The HBM focuses on the valences of the outcomes of selected health beliefs rather than focusing on the human needs out of which these valences are derived" (p 178).

Originally the motivation concept was essentially a `disease-avoidance' one which only dealt with the negative aspects of health. It has since been recognised that a positive health motivation may exist (the desire to maintain a high level of wellness), and this may provide impetus for PH behaviour. For example, Becker et al (1972) found that mothers who were more concerned with being `good' mothers gave their children special food and vitamins, had a thermometer at home, had high mobility desires for their children and were more likely to follow advice given by their doctors. In a study by Becker et al (1977) mothers with an active preventive orientation were more likely to take their children for checkups than those with a more fatalistic attitude who only brought their children to the doctor after an accident or symptoms had occurred. Subsequent studies have had similar results (Thompson 1984).

Methodological Problems With the Health Belief Model

There are a number of methodological problems associated with many of the studies investigating the dimensions of the HBM.

The majority of studies have used a retrospective design which has measured health beliefs and behaviour at the same time. Causal attributions are thus difficult to make (Feuerstein et al 1986; Janz and Becker 1984). It is unclear whether appropriate health beliefs result in compliance or if compliant behaviour leads people to develop certain health beliefs (eg. to reduce cognitive dissonance (Festinger 1957), or whether there are unknown confounding factors which determine both compliance and health beliefs. Taylor (1979) concluded from a study measuring initial health beliefs and those occurring after some experience with a therapeutic program, that health beliefs, rather than preceding and determining compliance, actually develop along with compliance behaviour as a result of experience with the treatment regimen. The stability of health beliefs over time is also not addressed by the model.

A number of sampling issues are also apparent. Small, non-random samples are used in most of the studies. It is usually not feasible to generalise from these results to larger populations due to the unique sociodemographic characteristics of subjects used in these samples (Becker et al 1975). Drop-out and non-response rates are often quite high and not followed up to determine if these subjects are significantly different from those who complete the program. There is also a potential bias when response rates (eg. to mailed questionnaires) are low (Rundall and Wheeler 1979). These factors are especially important in compliance studies as this is the very phenomenon being investigated.

Furthermore, the HBM dimensions have been interpreted in a number of ways, with different questions used to operationalise the HBM dimensions and few studies attempting to study all the dimensions of the HBM (Becker et al 1974; Rundall and Wheeler 1979). Earlier studies did not include the important motivational dimension which has become central to the model. Some researchers have asked questions regarding general health beliefs (eg. Becker et al 1974), others have asked about specific health conditions, while others have investigated both of these aspects of health beliefs. While some researchers have used a number of questions to gauge subjects' health beliefs, other researchers have used only one question to measure each HBM

dimension (eg. Rundall and Wheeler 1979). This raises questions about the validity and reliability of the HBM dimensions in these studies. The fact that the variables in the model are still able to predict health behaviour to some extent in most studies despite these difficulties, indicates the strength of the model. However, refined and standardised operational definitions and new, more sensitive measures of the dimensions of the model, such as the use of interval or ratio scales, and less "direct" questions, would greatly improve the quality of research and the conclusions derived from it (Becker and Maiman 1975). Some work has already been done towards this end (Jette, Cummings, Brock, Phelps, and Naessens, 1981; Kirscht, et al 1976).

The methods of data analysis used in some studies, are also problematic. The HBM variables appear to have an interactive influence on the likelihood of an individual engaging in health-related action and the combined influence of the variables generally increases the model's predictive power for PH behaviours (Becker and Maiman 1975) but relationships are sometimes negative (Mikhail 1981). Statistical analysis of the variables in the HBM can be complicated by these interactive effects. and researchers often have not considered these interactions adequately when analysing their data. For example, when multiple regression analyses have been conducted, multicollinearity among the variables is often a problem .

The research relating the HBM to PH behaviours is also subject to problems associated with preventive health research in general, which are discussed in the earlier section on PH behaviour.

Limitations of the Health Belief Model

Although the HBM does provide a framework for thinking about the problem of how people take action regarding their health, the model is limited in its usefulness because most of the empirical research reviewed does not assess the importance of one variable relative to another (Tuckett 1978). The model really only exists as a list of variables which need to be considered, rather than a model of how they interact (Mikhail 1981). For example, the way that

modifying variables incorporated in the model such as demographic characteristics influence individuals' beliefs is not clear. Causal links between the health beliefs measured by the model and compliance to preventive regimens have not been established. However, Becker et al (1977) argue that the components of the model can point out which areas need attention in order for a person to adhere to recommended health actions.

Other factors which affect health-related behaviour which are not dealt with adequately within the HBM are: the processes through which patients' perceptions and their subsequent behaviour are formulated (Christensen 1978; Kasl 1974; Leventhal et al 1984); the social environment (including the lay referral system) which influences the decision making process as well as the social support of the intended action (Kasl 1974); and the dynamics of the doctor-patient interaction once treatment is initiated. Leventhal et al (1984) maintain that the HBM places undue emphasis on abstract, conceptual beliefs. They stress the importance of the sensory experience of symptoms and the reactions they elicit: self appraisals, coping responses and emotional reactions. Leventhal et al (1984) consider it necessary to differentiate between conceptual, sensory, imaginal and emotional components of health behaviour. This criticism is echoed by Henderson, Hall and Lipton (1982).

The usefulness of the model appears to be determined by whether or not health beliefs can be changed to increase the likelihood of appropriate health actions. Although health beliefs have been shown to be modifiable (Becker et al 1977; Haefner and Kirscht 1970; Kirscht 1974), the HBM provides few guidelines as to the types of educational techniques and intervention strategies needed to effectively alter health beliefs in order to improve adherence to preventive regimens. The few studies that have examined the impact of interventions on health beliefs have used either improved continuity of care by a person's health practitioner (Becker et al 1974a) or procedures already existing in the experimental literature such as fear-arousing communications (Becker et al 1977), contracting or social support (Cummings, Becker, Kirscht and Levin 1981). Furthermore environmental variables such as barriers to action are potentially more easily modified and suggest that efforts to increase public response should always aim at increasing opportunities to

act, reducing inconvenience and the financial cost of services and providing cues to trigger responses such as reminder notices. Further research needs to be directed towards investigating the application and evaluation of various educational and motivational techniques for increasing adherance to health and medical care recommendations (Becker et al 1977).

The model also makes the assumption that if health beliefs are changed, this will result in changes to health behaviours in the presence of appropriate cues to action. One study by Johnson et al (1977 cited in McKenney 1981) found that changes in health beliefs was statistically correlated with changes in adherence to a prescribed health regimen. However studies of health communications indicate that although health beliefs may be altered in the appropriate direction, this may have no perceptible effect on health behaviour (Leventhal 1970). Rosenstock (1974) found that the arousal of fear which leads to increased perceived severity, has little effect on whether people take recommended health actions, which is contradictory to the predictions of the model. Harris and Guten (1979) found that individuals who saw themselves at risk were no more likely to seek information about the threat or take preventive action than those who did not perceive themselves at risk, although personal vulnerability and the severity of health threats are important dimensions in guiding behaviour according to the HBM.

A lack of data exists on the origins of health beliefs (with the exception of some developmental studies eg. Gochman (1977) which may have practical implications for program implementation especially those designed to alter or form children's health beliefs.

The HBM model is also limited in that it only explains the variance in health behaviour accounted for by a person's attitudes and beliefs (Janz and Becker 1984). A number of other factors, not specified by the model affect a person's decision to take health actions (Janis 1984). For example, the HBM operates from the assumption that health is valued highly by everyone and cues to action are commonly occurring. The usefulness of the model is questionable when these conditions do not prevail.

The HBM, both in its original and modified form, does not take into account the immediate and long term consequences which may result from engaging in an appropriate health action (Masur 1981) including secondary benefits from the action such as increased feelings of well-being (Ardell 1979).

Conclusion to the Health Belief Model

The variables contained in the Health Belief Model appear to have significant associations with PH behaviour. In particular, beliefs about threat to health (perceived susceptibility to, and severity of illness) and about the efficacy or benefits of recommended preventive actions are highly correlated with engaging in preventive health actions (Becker and Rosenstock 1984).

However, the HBM does have severe limitations in its usefulness because of the all-encompassing nature of the model and the lack of specification as to the relationships among the variables in the model. Despite its shortcomings, a number of aspects of the HBM are useful in the area of PH behaviour research. In particular, the phenomenological approach used by the model is an extremely important one. The importance of this approach is illustrated by the 'perceived benefits' variable which measures the perceived efficacy of a particular activity in maintaining or promoting one's health. In order to understand why particular PH behaviours are or are not engaged in, it is necessary to measure subjects' perceptions of their efficacy.

The importance of the modifying variables which have been added to the health belief model have also been recognised, partly as a result of the shortcomings of the model. Two of these modifying variables which have produced useful findings and have subsequently received much attention in the research (Hayes and Ross 1987) are subjects' concern with health (Rosenstock 1966; Becker et al 1977) and the perceived health locus of control construct (Langlie 1977).

CHAPTER FOUR

CONTROL OVER HEALTH

The importance of assessing the nature of the relationship between peoples' expectancies about who or what they perceive as having control over their health and their engaging in various health practices is evident because the effectiveness of many health promotion programs depends on people taking responsibility for their health by initiating healthy lifestyle practices (Kirscht 1972).

The attribution or perception of causality of illness will partly determine a person's readiness to accept responsibility for his/her health (Pill and Stott 1985), and the care seeking or preventive behaviour that a person initiates. Beliefs about who is in control of one's health mediate the attributions that are made about the cause of illness (Nevatt 1981). For example, in the case of chronic illness, Janis and Rodin (1979) state that if people perceive the environmental contingencies relating to their illness as being within their control, they will tend to blame themselves for their condition and are more likely to take action to change those contingencies.

The Locus of Control Construct

The internal-versus-external locus of control concept derived from Rotter's social learning theory states that the likelihood of a person carrying out a behaviour depends on his/her expectancy that the behaviour will lead to a particular outcome and the perceived value of that outcome (Rotter 1966). The social learning approach focuses on the particular behaviour and the environmental concomitants of behaviour change and endeavours to identify and change the determinants of behaviour. Behaviour is determined by

generalised expectancies (which are fairly consistent within an individual and may affect behaviour in various contexts), in combination with specific expectancies. When a situation is considered to be more skill or luck determined, generalised expectancies exert less control over behaviour (Rotter 1966). A generalised expectancy that reinforcement is under a person's control (i.e. contingent upon his/her behaviour or upon his/her own relatively permanent characteristics) is called an "internal locus of control". Conversely, a generalised expectancy that reinforcement is under the control of outside forces such as fate, chance or others is an "external locus of control" orientation. People who are "internal" will make more attempts to control their environment than "externals" (Rotter 1966).

Beliefs in personal control in the area of health should lead to beliefs that health problems can be overcome. Thus it has been hypothesized that it is more likely that internally oriented people will act to correct health problems and take steps to prevent them (Strickland 1978).

Research into Locus of Control in Relation to Health

Initial evidence for the idea that one's locus of control beliefs can have an important bearing on health actions was demonstrated in a study by Seeman and Evans (1962), which used an early version of Rotter's I-E Scale. This study found that hospitalised tuberculosis patients with internal locus of control beliefs knew more about their condition, questioned doctors and nurses more and expressed less satisfaction with the amount of feedback or information they were getting about their condition from hospital personnel, than did external patients. The medical staff also rated internal patients higher in objective knowledge about tuberculosis than external patients.

Research of a similar nature using Rotters I-E Scale was conducted by DuCette (1974 cited in Wallston and Wallston 1982), who found that newly diagnosed diabetics who had internal beliefs knew more about their condition than did externals. This result was not found for long-term diabetics. This may have been because over an extended period of time, externals would

eventually acquire an equivalent level of information regarding their condition as internals possessed. Another interesting finding in this study was that internally oriented patients increasingly missed doctors' appointments and did not adhere to dietary recommendations. DuCette proposed that these results may have occurred because of the somewhat uncontrollable and unpredictable nature of diabetes which caused internals to give up the limited control they had over the state of their health.

Other studies have found that internally oriented individuals have a more favourable attitude toward physical activity (Sonstroem and Walker 1973), while externals are less likely to be successful in weight loss programs (Cohen and Alpert 1978; Lowery and DuCette 1976; Schallow 1975).

Development of the Health Locus of Control Scale

Health-specific locus of control scales were developed to provide a more sensitive measure of the relationship between locus of control beliefs and health behaviour. The first specifically health-related locus of control scale developed by Dabbs and Kirscht (1971) made little impact on research in this area as the validity and utility of the scale was hindered by the inclusion of both expectancy items and motivational items. It is necessary to separate the concept of motivation for control from the expectancy for control construct (which measures the belief that health is under personal control) in order to achieve a theoretically consistent evaluation of locus of control beliefs (Kirscht 1972). When both indices were used, internally oriented subjects were more likely to be innoculated against influenza than externally oriented subjects. When the expectancy items were analysed separately, it was found that internals were less likely to have innoculations.

A second health-related locus of control measure developed by B. S. Wallston, Wallston, Kaplan and Maides in 1976 was called the Health Locus of Control (HLC) Scale. It was comprised of 11 items and had a six point Likert-type response format with five items worded in the internal direction and six items in the external direction. Internal health locus of control was assessed by the

extent to which individuals agree or disagree with statements such as "I am directly responsible for my health" in an interview or questionnaire. External health locus of control belief were assessed using statements such as "Other people play a big part in whether I stay healthy or become sick" and "When I stay healthy, I am just lucky". Although it is specific to health, the HLC Scale can be applied to many health-related behaviours and conditions. Normative data for the HLC Scale was established from a large number of studies which indicated that internally oriented subjects tended to be more involved in PH behaviour and risk-reducing behaviour while externally oriented subjects tended to be patients with chronic diseases and those of lower socioeconomic status. Wallston and Wallston (1981) reached the conclusion that the two dimensions of the HLC Scale were valid measures of health beliefs.

Research with the Health Locus of Control Scale

Scores on the HLC Scale have been found to be related to a range of PH behaviours. Internal locus of control (IHLC) subjects are more likely than externals to be: non-smokers or to have given up or reduced smoking (Coan 1973; James, Woodruff and Werner 1965; Steffy, Meichenbaum and Best 1970; Straits and Sechrest 1963); to use contraception (Lundy 1972; MacDonald 1972); to practice breast self-examination (Fishberg 1979 cited in Wallston and Wallston 1981); to be more successful in weight control programs (Balch and Ross 1975; Dishman et al 1980; K. A. Wallston et al 1976); to use seat-belts and preventive dental care (Williams and Wechsler 1972); and to engage in voluntary exercise programs (Sonstroem and Walker 1973). There is even evidence to suggest that a low sense of personal control may be related to deterioration in physical health and death rates (Croog et al 1971; Seligman 1975).

In the study by K. A. Wallston et al (1976) it was found that females in congruent weight control treatments (i.e. treatments consistent with their locus of control beliefs) were more satisfied with treatment. Weight-loss differences for these subjects compared to control subjects was in the expected direction but did not reach statistical significance.

Other studies have not shown consistent results regarding the relationship between locus of control beliefs and personal health behaviour. For instance, some researchers have found no relationship between locus of control and attempts at weight loss (Bellack, Rozensky and Schwartz 1974; Manno and Marston 1972; Tobias and MacDonald 1977). A study by Olbrisch (1975 cited in Wallston and Wallston 1981) found that there was no difference between gonorrhea patients with external and internal orientations, in their plans to take further precautions to guard against sexually transmitted diseases. McKusker and Morrow (1979) had no success in finding a relationship between HLC beliefs (either on their own or in combination with health value) and cancer-preventive behaviours consisting of: having annual check-ups, stopping or reducing smoking, and practising breast self-examination. However, their sample was drawn from school teachers and administrators and may have been biased in favour of the more "health conscious" as there was a high pre-existing rate of PH behaviours compared with the general population.

The research done in the area of compliance to health behaviour in samples where an illness has been diagnosed, such as medication-taking and appointment-keeping has had mixed results (Danaher 1979; Lichtenstein and Keutzer 1967). Studies investigating hypertensive patients are good examples of this. Internality was found to be positively related to self-reported medication taking for hypertensives who felt they received a high level of assistance in following their regimen (Lewis, Morisky and Flynn 1978). Wallston and McLeod (1979) found that internality was related to dietary compliance among male hypertensives but no relationship was found between locus of control scores and blood pressure control, clinic appointment-keeping or self-reported medication-taking. Sproles (1977 cited in Wallston and Wallston 1981) in a study of a small sample (N=31) of renal dialysis patients found that internals knew more about their condition, sought more information and indicated more willingness to attend classes than their external counterparts.

Following a review of the research, Strickland (1978) concluded that most research indicates that individuals who hold internal expectancies are more likely to engage in health promoting behaviour than those with external expectancies, but the amount of variance accounted for by this construct is

generally small. Janis and Rodin (1979) stated that issues of control are important in dealing with a person's choice of and commitment to health relevant behaviour in general. A review of the literature carried out by Wallston, Wallston and DeVellis (1978) concluded that "the relation between compliance with medical regimens and locus of control is unclear" (p 112). However, later they stated that more variance in PH behaviour would be predicted by measuring the value placed upon health in conjunction with locus of control orientation and that "health locus of control should predict health behaviour only under high health-value conditions" (Wallston and Wallston 1981 p17). The health value variable will be discussed in a later section.

The Multi-Dimensional Health Locus of Control Scale

The Multi-dimensional Health Locus of Control (MHLC) Scale (Forms A and B) was developed by Wallston, Wallston and DeVellis in 1978. It was modelled after the "internal", "powerful others" and "chance" Scales developed by Levenson (1973) who maintained that it was necessary to divide the external dimension of the HLC construct into "fate" or "chance" expectations and the belief in "powerful others" control in order to understand and improve the predictive power of the HLC construct. Another factor involved in the decision to create a multi-dimensional construct was the fact that the HLC Scale accounted for only a small amount of the variance in health-related behaviour and the finding that the internal consistency of the HLC Scale was considerably lower (in the range of .30 to .59) than the .72 which was originally calculated (Wallston and Wallston 1981).

The MHLC Scale contains three dimensions: internal health locus of control (IHLC) which is the belief in personal control over one's health; powerful others health locus of control (PHLC) which is the belief that health is controlled by others; and chance health locus of control (CHLC) which is the belief that one's health status is a function of luck, chance or fate. All items in the new scale were worded to reflect beliefs about personal control whereas the original scale contained items relating to both general and personal control.

Using the multi-dimensional scale, it has become possible to describe a person's belief pattern in terms of a HLC typology, instead of labelling a person as external or internal (Wallston and Wallston 1982). Eight different patterns of HLC expectancies are possible with individuals scoring high or low in each of the three dimensions. Wallston and Wallston (1982) have outlined possible explanations for the different typologies but little research has been done to validate these typologies.

Normative data for the MHLC Scale was presented by Wallston and Wallston (1981). The least internal group consisted of chemotherapy patients while the most internal was a group of women participating in a voluntary weight control program. Patients with chronic diseases were the most chance-external while those engaging in PH behaviour were the least chance-external. Healthy adults and college students fell in the middle of this continuum. With the PHLC, the highest scores were held by chronic patients, and the lowest were held by university students. In between these extremes were healthy adults and people engaging in PH behaviour. No consistent relationships have been found between the MHLC Scale and sociodemographic variables such as age, sex and education (Wallston and Wallston 1981).

Research into Sick Role Behaviours Using the MHLC Scale

A considerable amount of research has tested the relationship between the MHLC Scale and health behaviour in subjects with a diagnosed illness. Hatz (1978) found that less weight gain between treatments was achieved by dialysis patients who scored highly on PHLC although internal and chance HLC beliefs were unrelated to this outcome. Levin and Schulz (1980 cited in Wallston and Wallston 1982) found that IHLC renal dialysis patients adhered more closely to their diets and restricted weight gain compared to those patients who had low IHLC scores. Mothers classified as internals administered anti-convulsants more frequently to their epileptic children than their counterparts who had strong PHLC beliefs (McGraith 1980 cited in Wallston and Wallston 1982). Hershey, Morton, Braithwaite and Reichgott (1980) looked at a number of variables which could possibly be predictive of compliance with medication taking in a group of hypertensive patients. Three

of the five variables - control over health matters, perceived barriers and duration of treatment - contributed independently to the prediction of patient compliance. Goldstein (1980 cited in Wallston and Wallston 1982) found that beliefs in internality and powerful others were positively related to a diabetic management index among adult insulin-dependent diabetics. In a study by DeVellis et al (1980b), the best three predictors of a behavioural index of self-reported health behaviours of subjects with epilepsy, were PHLC, IHLC, and IHLC in conjunction with health value. The behaviours reported were medication taking, refraining from driving and refraining from drinking alcohol. Internality correlated negatively with the behavioural index (when health value was not taken into consideration) which indicated that internals were more likely to admit to driving, drinking and failing to take their medication. When only internals with high health value were considered however, these subjects were more likely to report adherence to the health behaviours.

In reviewing studies of chronically ill patient samples with conditions ranging from cancer, diabetes, epilepsy and respiratory disease, Wallston and Wallston (1981) found that control of one's health in these samples was primarily attributed to chance and powerful others (although IHLC beliefs were similar to those of healthy adults).

Brown, Perman and Dobbs (1981) found that IHLC was significantly correlated with life satisfaction and the will to live among a sample of geriatric patients having had pacemakers implanted recently. Depression Scale scores have been found to significantly correlate with CHLC scores and to a lesser extent with PHLC scores (DeVellis et al 1980).

Thus it would appear that in general, high internal and powerful others locus of control beliefs are a useful adaptation to sick role behaviours. This outcome would appear to have face validity in that a person with a diagnosed illness would need be self-motivated but also be willing to cooperate with health professionals. Further research needs to be conducted in differentiating between different types of adherence behaviour and locus of control typologies.

Research into Preventive Health Behaviours using the MHLC Scale

Locus of control research has been conducted on a wide range of health behaviours carried out by relatively healthy populations. A study by Seeman and Seeman (1983) found that a sense of control was associated with: 1) practicing preventive health measures eg. diet, exercise, alcohol moderation; 2) making an effort to avoid the harm of smoking (by giving up, trying to give up, or simply not smoking); 3) being more optimistic about early medical treatment for cancer; 4) achieving higher self ratings on general health status; 5) reporting fewer episodes of both chronic and acute illness; 6) evidencing a more vigorous management style with respect to illness and; 7) showing less dependence on the use of the physician and having marginally less dependence in terms of medical compliance. A low sense of control was significantly associated with: 1) less self-initiated preventive care; 2) less optimism concerning the efficacy of early treatment; 3) poorer self-rated health; 4) more illness episodes, more bed confinement and greater dependence on physicians. Thus in this study, an internal orientation appears to be either much more adaptive and functional than powerful others or chance beliefs or more easily sustained if the individual possesses good health.

Studies on information-seeking in relation to health locus of control scores have produced inconsistent results (De Vito, Roznikoff and Bogdanowitz 1979; B. S. Wallston, et al 1976; K. A. Wallston et al 1976). The value of these studies is questionable as subjects only role-played potential clinic users. Also these studies only measured the intent to obtain information and no significant relationship has been established between intended and actual information seeking. When actual health-related information seeking was measured by Toner and Manuck (1979) using the original internal-external HLC Scale, older HLC internals sought more information than HLC externals but this difference was not found for a younger sample.

Studies reviewed by Wallston and Wallston (1981) using both the original HLC Scale and the MHLC Scale to predict long-term smoking behaviour have

generally found that internally oriented subjects were more successful in giving up smoking than both chance and powerful other external subjects .

In relation to weight loss programs, a study by Kaplan (1976 cited in Wallston and Wallston, 1981) found that the type of program selected was correlated with a person's health locus of control orientation. Internals tended to prefer self-managed programs while externals preferred therapist-directed programs

A number of unpublished studies cited by Wallston and Wallston (1981) have reported positive (but not statistically significant) relationships between locus of control beliefs and practising breast self-examination, weight control behaviour, and physical activity.

Other studies investigating PH behaviours have also failed to achieve statistically significant results. For example, a study by Saltzer (1982) found that completion of a weight loss program was unrelated to MHLC scores (although it was found to be significantly related to the weight-specific locus of control scale constructed by the author). In the case of weight loss programs, it has been suggested that this may be because actual weight loss is often used as the dependent variable although it is a health status outcome variable rather than a behaviour change outcome variable. Therefore, it is not a direct measure of compliance behaviour. Also the desire to lose weight is usually motivated by concerns about physical appearance rather than the desire to be healthy (Wallston and Wallston 1981).

Likewise, preventive dental habits have shown no relationship to health locus of control beliefs. This may be because oral hygiene behaviours are mainly habitual and established at an early age and, like weight loss attempts, may be motivated more by concerns about physical appearance than health. There were also sampling problems in the studies done in this area (Wallston and Wallston 1981).

A study by Wurtele, Britcher and Saslowsky (1985) failed to find a relationship between locus of control beliefs and several PH behaviours (including getting

sufficient rest and exercise, eating and drinking sensibly, maintaining normal body weight, wearing seat belts, obtaining periodic gynaecological exams, and avoiding smoking), but the subjects used in this study were university students who were highly internally oriented as a group and the fact they were living in university accommodation may have made it difficult for highly internal locus of control beliefs to be translated into health enhancing actions because of the constraints imposed on the students living in a hostel situation (eg. hostel meals, limited budget, and the strong influence of peer group).

Although the research is far from consistent, it appears that health locus of control beliefs contribute significantly to the level of some types of PH behaviours individuals engage in, but not others. The amount of variance in PH behaviour predicted by locus of control beliefs is not large. (These inconsistencies may be due, in part, to the methodological weaknesses inherent in many of the studies which will be discussed at the end of this section.) IHLC and CHLC scores have been found to be more effective predictors of PH behaviour than PHLC scores (Wallston and Wallston 1982). Studies such as the one by Kaplan (1976), indicate the usefulness of tailoring health interventions according to the locus of control beliefs of their participants (Strickland 1978; Wallston et al 1978).

Health Status, Experience with Illness and Perceptions of Control

Health status and experience with illness have an important effect on beliefs about the controllability of health matters. Taylor (1979) found that health beliefs develop partly as a result of experience with illness. Lau (1972) found that practising a variety of health habits as a child was associated with beliefs about the controllability of health i.e. beliefs about the efficacy of self care practices and doctors.

A person who is frequently ill is likely to develop the belief that his/her state of health is not under personal control. Research indicates that the extent of one's experience with a disease may affect one's health beliefs in this way. DeVellis et al (1980) and Nagy and Wolfe (1983) both found that chronically ill patients

had higher CHLC beliefs than control subjects. Lau (1972) found that multiple experiences with sickness in the family were correlated with beliefs that health is not controllable and that trying to prevent ill health by one's actions and the use of doctors is futile. Tolor (1978) found that frequent childhood illnesses and accidents led to stronger external health locus of control beliefs for women but not for men. Winefield (1982) found that locus of control measures were unrelated to current health status or health practices in a sample of healthy socially advantaged people but a sample of men hospitalised for an acute illness had strong beliefs in powerful others. It was suggested that this may have been an adaptive response to their environment.

A review by Wallston and Wallston (1981) found that chronically ill patients attributed beliefs about control primarily to chance and powerful others (although beliefs in internal HLC were similar to those of healthy adults) while those involved in PH behaviours and college samples tended to be internally oriented people. In the case of chronically handicapped people, a review conducted by Strickland (1978) found that, compared to their healthy peers, these people tended to be more externally oriented.

It appears then that a strong relationship exists between locus of control beliefs and experience with illness. However all of the studies conducted in this area have used cross-sectional rather than longitudinal research designs, so no conclusions about causality can be made. It can only be hypothesized that these beliefs develop from experiences with illness. If a person perceives the cause of the illness to be controllable, then an illness episode may actually reinforce that belief. Thus attributions about locus of control may mediate between sickness experiences and health behaviours, but strong direct relationships have yet to be found (Wallston, Wallston, Smith and Dobbins 1987). Beliefs about control over health may influence health behaviour either directly or through subtle physiological processes (such as endorphin secretion or the physical effects of stress), and thereby have consequences for health status (Seeman and Seeman 1983). Studies on animals indicate that the physiological effects of stress, loss of control and unpredictability include various catecholamine, neurohormonal and immune changes which result in tumour growth, gastric ulceration and weight loss (Rodin 1986). From the

longitudinal study conducted over a year by Seeman and Seeman (1983), it would appear that a strong sense of internal control does indeed result in actions and attitudes which are health-enhancing. Internals improved in their health rating over the course of the year as a strong sense of internal control was positively correlated with higher scores on subjects' final self-rated health status, (with initial health status being controlled for). However, a more reciprocal relationship may be operating with health locus of control beliefs being the result of one's experience with health and/or illness but with these beliefs subsequently affecting future health behaviour and consequently health status. Little is known about the complex links between beliefs, attitudes and complex physiological processes (Wallston et al 1987). This is an area which requires a multidisciplinary research approach.

Criticisms of the Health Locus of Control Research

Much of the research that has been done into the locus of control construct in relation to health behaviour suffers from the methodological shortcomings which plague many survey and questionnaire studies. Many of the studies have been correlational in nature, have not used random samples, have lacked control groups and have not assessed the impact of subjects who have dropped out of programs.

Furthermore, research which has produced ambiguous results is often not published. Although the findings of published research is significant, its importance would be diminished somewhat if much of the unpublished research in this area has had no significant findings (Strickland 1978).

Demand characteristics may confound results in that people usually want to present themselves in a favourable light, suggesting that they are motivated, concerned and conscientious (Strickland 1978). Very few studies have included social desirability measures.

Many of the studies contain many of the methodological problems associated with preventive health research in general, which are detailed in the section on

PH behaviour. For example, the range of PH behaviours measured has often been inadequate. Including a broader range of PH behaviours would make it more representative of the construct of PH behaviour and may improve the predictive power of the locus of control construct with regard to health-related behaviour. One indication that this approach to the measurement of the construct of PH behaviour is constructive, is a study by Langlie (1977) who found that participation in a wide range of PH behaviours was positively and significantly correlated with internal locus of control beliefs.

The theoretical framework used by most health locus of control research makes the assumption that beliefs about perceived control influence health behaviour which will be reflected in a person's health status, and therefore behaviour and outcomes are discussed simultaneously (Wallston et al 1987). Some research in this area has attempted to relate health status measures (eg. weight loss in a study by Saltzer (1979 cited in Wallston and Wallston 1981) with health locus of control beliefs while other studies have directly measured behavioural variables (which in the case of weight loss may be reduction in food intake or increased levels of physical activity).

Other research has used healthy subjects who have role-played having various illness conditions with the information-seeking behaviour they exhibit being measured (eg. K. A. Wallston et al 1976; B. S. Wallston et al 1976). The drawbacks of using this method are self-evident.

Research findings may not be as conclusive as hypothesized because of the improper analysis strategies used in some studies (Wallston and Wallston 1981). For example, McCusker and Morrow (1979) measured health value but their analysis did not include a multiplicative term (health value x internal locus of control). If this was done a relationship between locus of control beliefs, health value and cancer-preventive behaviours may have become apparent.

Misconceptions in the Health Locus of Control Research

The locus of control construct has also been subject to misconceptions. Problems can occur when research does not take into consideration all four variables inherent in Rotter's locus of control theory (Arakelian 1980). These variables are behaviours, expectancies, reinforcements and situations:

1) Behaviours: Alternative behaviours to those which are medically endorsed, which are carried out by people to protect their health, are often not considered by research. These alternative behaviours must be considered before predictions of specific behaviours can be made (Rotter 1975).

2) Reinforcement: Many studies have not measured the perceived value of the reinforcement or expected outcome (in this case the maintenance or improvement of health status). Rotter (1975) stated that when a situation is not ambiguous or novel, the value of the reinforcement for the individual is probably a better predictor of behaviour than locus of control beliefs. A considerable amount of research indicates that differences between internals and externals may only become apparent when health value is measured. For example, Seeman and Seeman (1983) found that internals engaged in significantly higher levels of PH behaviour only when their health was valued highly. (Measurement of the value of health will be discussed in the next chapter.)

3) Expectancies: Generalised expectancies are likely to be of greater importance in ambiguous situations where limited knowledge is available about specific illnesses and the efficacy of treatment regimens is questionable (for example, many preventive health actions which have not been scientifically tested or endorsed by medical professionals), or where new symptoms occur regardless of the treatment. Rosenstock (1969) believes that an individual will not engage in health behaviour unless s/he thinks that the action recommended is important for his/her present and future well-being. Many of the studies of PH behaviour do not assess the subjective importance of engaging in specific PH behaviours i.e. whether subjects feel an activity is

effective in maintaining or improving their health. It has been argued that the perceived relevance of a behaviour to one's health is equivalent to locus of control beliefs (i.e. the belief that outcomes are contingent on one's behaviour) (Wallston and Wallston 1981). However, research by Kristiansen (1985) found that behaviourally consistent respondents (as defined in the study by Langlie 1977), exhibited significant differences in the PH behaviours they engaged in compared to behaviourally inconsistent respondents, which were not accounted for by health value or locus of control variables. This finding may be an indication of the importance of assessing the perceived relevance of a particular behaviour to health.

4) Situations: Much of the research has also failed to take into account the ambiguity or novelty of situations. Generalised expectancies, such as locus of control, are more likely to operate when ambiguous situations occur (Arakelian 1980). The more experience a person has with a situation (as in the case of chronic illness), the less likely that generalised expectancies will be an important influence on health behaviour.

The actual environmental contingencies existing in relation to a person's health condition (i.e. the amount of control a person actually has over his or her health in a particular situation) also need to be considered. Some diseases are more able to be controlled than others (eg. a lot more can be done with people with heart disease than cancer in the way of treatment and prevention). A widespread misconception found in the health locus of control research (and in research on the more general internal-external construct) is that it is always adaptive to be internally oriented and maladaptive to be externally oriented (Rotter 1975). This misconception probably developed because internal control has been found to be associated with such qualities as autonomy, competence, achievement motivation and well-being and negatively correlated with hopelessness (Nevatt 1981). The adaptiveness of internal beliefs for all situations has recently been questioned. Internal beliefs have been found to be highly desirable in preventive health and learning situations, and curable illness (Arakelian 1980) but strong internal beliefs are not always appropriate in situations where a person can do little about his or her condition as they may produce feelings of guilt and self-reproach, and increase reactance and stress

(Wortman and Brehm 1975). Internals often react to the discovery of illness initially with denial and defensiveness as they are used to being largely in control (Strickland 1978). For example, Ducette (1974 cited in Wallston and Wallston 1982) found that long-term internally oriented diabetic patients missed a greater number of doctors' appointments and had poorer levels of adherence to dietary restrictions than externally oriented diabetic patients. It has been suggested that Type A individuals may be extremely internally oriented types striving for control (Strickland 1978). Feelings of personal control may also increase stress levels when an individual believes there are actions s/he should be taking (Averill 1973). In the case of some chronic illnesses, it may be largely futile and demoralising to try to alter one's state of health (Wortman, Dunkel and Schetter 1979), especially when one is heavily dependent on health professionals, family and friends to provide the necessary health care. It seems that having an PHLC orientation is likely to be more adaptive in such a situation. Nevertheless, it appears that in most areas of health care, it is useful to hold beliefs about personal control (eg. Janis and Rodin 1979), although extreme internal or external beliefs have been deemed pathological (Rotter 1966). Arakelian (1980) maintains that in chronic or incurable illnesses, belief in personal (internal) control is advantageous to offset adverse emotional responses of hopelessness and frustration. A study by Langer and Rodin (1976) demonstrated the importance of a sense of personal control over one's environment. Their study used a group of nursing home residents, half of whom were told by hospital staff that their personal care, the arrangement of their rooms and decisions about how to spend their time, were up to them. The other half of the residents were told that staff were available to help them and would attempt to provide a pleasant environment. Three weeks after this, 93% of the group who were encouraged to take personal responsibility, were reported by the nursing staff and themselves, to be happier and more active, and more involvement in activities was measured with this group relative to the other group. Most health interventions stress the importance of personal responsiblity and attempt to increase individuals' beliefs in internal control. This should not be seen as an abrogation of responsibility of the health care system (Wikler 1987). Furthermore, until it can be verified that an internal orientation is more likely to lead a person to engage in a particular preventive health action, it would be inappropriate to recommend interventions to change beliefs. It is more important to ensure that

there is congruence between locus of control beliefs and the composition of the intervention (Strickland 1978; Wallston and Wallston 1981). One indication of the value of tailoring interventions according to a person's health beliefs comes from a study by Cromwell, Butterfield, Brayfield and Curry (1977) which found that among cardiac patients, only those in conditions not suited to their expectations (i.e. externals with high participation or internals with low participation in self treatment), returned to the hospital or died with twelve weeks following their hospitalisation.

A number of studies reviewed by Wallston and Wallston (1981) which have used interventions to change subjects locus of control beliefs have not produced significant long-term results although two of the studies involved healthy subjects who had relatively high internal beliefs initially so a ceiling effect may have occurred. Alternatively, there may have been problems with the intervention program as relatively high dropout rates occurred. Analysis of dropouts where pre-test data was provided indicated that those subjects who stayed in the program had higher internal beliefs than dropouts. Thus, internal HLC scores were able to at least partially predict those who would complete programs. Altering interventions to cater for those with low IHLC beliefs may increase program attendance.

Conclusion to the Health Locus of Control Construct

The results of research into the perceived control in relation to health matters overwhelmingly indicates that it is an important variable in the prediction of health behaviour.

> "Individuals who believe that they can exercise some control over the events that happen to them are more likely to take steps to maintain their health, improve their physical functioning and respond more adaptively when stricken with an illness or disorder." (Matarazzo 1984, p 110).

However, predicting the behaviour of chronic patient populations through assessment of locus of control beliefs, has been more successful than the prediction of PH behaviours (Wallston and Wallston 1981).

Differentiating between chance and powerful other external beliefs has increased the predictive power of the HLC Scale. The multitude of studies done with the MHLC Scales indicate that when the study involves PH behaviours engaged in by healthy people, the PHLC scores are generally less predictive of the behaviour than either CHLC or IHLC (Wallston and Wallston 1981, 1982). When a sick-role behaviour is investigated, the PHLC dimension is the most powerful predictor of compliance and is the only scale to have predictive validity across studies (Wallston et al 1987). However the amount of variance accounted for by the health locus of control variables is generally quite small (Strickland 1978). Locus of control beliefs appear to be only one factor which influences health status and behaviours. Janis and Rodin (1979) emphasized that a person's physical state and behaviour will be determined by the interaction of biological disease processes, personal beliefs and environmental factors such as the availability and costs of medical treatment .

Health locus of control scores appear to be shaped by a person's experience with health and/or illness and subsequently also affect future health behaviour. With regard to health interventions, it is most important to have health beliefs which are congruent with one's situation. Although a belief in powerful others is adaptive in situations where a person must rely on health practitioners for the health care needed, it appears that in most areas of health care, increasing individuals opportunities to exert control over health matters is potentially beneficial. At present the health care system is structured toward removing control from the patient especially in hospitals (S. E. Taylor 1979).

Theoretical and methodological shortcomings associated with much of the research and the failure to measure all of the important variables in the locus of control construct have probably contributed to the inconsistency in the results of some studies.

Failure to measure the value an individual places upon the reinforcement (in this instance, health) in relation to locus of control beliefs has been noted as a major methodological shortcoming of much of the research (Rotter, Phares and Chance 1972; Seeman and Seeman 1983; Wallston and Wallston 1984). The next section will deal with this variable.

CHAPTER FIVE

VALUE OF HEALTH

Rotter (1966) stated that the perceived value of the reward for an individual (in this case, good health), needs to be assessed before predictions of behaviour can be made. The probability of a particular behaviour occurring depends on: 1) the expectancy that a particular reinforcement will be a consequence of that behaviour and; 2) the value of that reinforcement to the individual (Rotter, Chance and Phares 1972). The health belief model also emphasized the importance of measuring subjects' perceived efficacy of health behaviours in the 'perceived benefits and barriers' variable, and subjects' concern with health in the variable related to readiness to take action (Rosenstock 1966; Becker et al 1977).

Perceived Efficacy of Health Actions

The expectancy that a particular reinforcement will be a consequence of a particular behaviour (i.e. the perceived efficacy of a PH behaviour), is an important variable which needs to be measured when trying to understand health-related behaviour which people undertake. Previous research which has attempted to measure the usefulness of locus of control beliefs and health value as interactive predictors of PH behaviour, has tended to overlook this important variable. The choice of PH behaviours used in past research has been arbitrary with no attempt being made to gauge whether subjects actually perceive these behaviour as being healthy or not.

Value of Reinforcement

Much of the research done on health attitudes and behaviours has made the implicit assumption that all people value their health highly. However, it would be erroneous to assume that good health is valued equally by all people as it may only be a secondary consideration for some people. When health is not a high priority in a person's life, perceptions of control may not be translated into health behaviours as predicted. Berg (1976) noted that the majority of people know what health-protective behaviours they should be engaging in and often state that they would like to have healthier lifestyles. However, unhealthy lifestyles are maintained for a variety of reasons which include: 1) habit (eg. dietary patterns, smoking); 2) economic factors which may influence decisions and limit choices (eg. living in the city, working in a polluted environment or stressful job, eating cheaper, less healthy foods, (Janz and Becker 1984) and; 3) social pressures such as the mass media and societal expectations. For example, a study conducted by Pill and Stott (1985) found that many of the respondents perceived their lifestyles as intrinsically unhealthy but other priorities like unemployment, lack of money and job problems frequently determined their behaviour.

A person who does not exhibit any symptoms may well have more salient motives than health which determine their behaviour. Competing values such as social status, career or financial gains, family considerations, wealth, love, social status, knowledge, beauty, security, acceptance and self esteem may take precedence over and often conflict with health-oriented behaviours. The importance of health motives also varies with age, sex, occupation, education, cultural values and personal disposition. People who are deeply involved in pursuing other goals, will be relatively unaffected by admonitions about possible health threats. Those who are high achievers may consciously endanger their health in order to achieve other goals. Less salient motives may be postponed, unless a crisis of some sort such as the development of symptoms, occurs to alter the situation.

Health-promoting behaviours may also be engaged in for non-health reasons. For example, dieting and weight maintenance practices are often engaged in

to improve physical appearance, and social pressures often motivate people to give up smoking or take up jogging. For example, in a study by Hayes and Ross (1987), concern about appearance as well as concern with health, had important effects on eating habits. Furthermore some people find considerable secondary benefits from illness behaviour particularly those who have difficulty coping with their life situation (Balint 1964).

Inconsistencies found in the health belief research, may be partially explained by the fact that the value a person places on his/her health is an important variable which needs to be measured or controlled. Rotter (1975) maintained that when a situation is not ambiguous or novel, the value of the reinforcement for the individual is probably a better predictor of behaviour than locus of control beliefs.

A standardised measure of health value does not exist (Wurtele et al 1985). Most of the studies which have measured health value have used a modified version of Rokeach's (1968) Value Survey (eg. Kristiansen 1985; McKusker and Morrow 1979; Wallston and Wallston 1981; Wurtele et al 1985), while a few studies have used the Health Value Index (eg. Seeman and Seeman 1983, Wurtele et al 1985) which consists of four items which gauge a subject's concern about health (eg. "My health is the most important consideration in my life"). Scores for the four items are added to obtain a composite health index score.

Rokeach's Value Survey is a system whereby values are ranked within a hierarchy. Many people claim to value their health (Rokeach 1973) but the Health Value Survey requires subjects to rank health in relation to other values. It is a useful tool for making choices and resolving conflicts between desirable alternative values. This conflict often arises in the context of health behaviours where unhealthy behaviours often have more appeal because they may involve more immediate reinforcement, whereas health behaviours often involve self-discipline and persistent effort.

Kristiansen (1985), using the modified version of Rokeach's Value Survey, found that people who value their health highly perform more PH behaviours than those who have health as a low priority. Locus of control beliefs were not measured in this study. Wallston and Wallston (1981) found that psychiatric patients were more likely to comply to medication taking when their health was valued highly. Wurtele et al (1985), using the HV-Index, found that healthy undergraduate women had higher levels of participation in health-enhancing behaviours when their health value (in combination with health status) was high, compared to those with comparatively low health value.

Research which has measured health value has found that the locus of control construct is predictive of PH behaviour only when a subject values his/her health highly. A study by Saltzer (1982) found that weight loss goals were more likely to be achieved by internals who valued their health highly than those with low health value. K.A. Wallston et al (1976) found that internals who valued their health highly, had stronger intentions to obtain health-related information. Two studies done with elderly populations found that internals with high health value were more likely to engage in PH behaviours than those with low health value (Mechanic and Cleary 1980; Seeman and Seeman 1983). Kaplan and Cowles (1978) found that among subjects in a smoking cessation program, those who had an internally oriented belief system and who valued their health highly, were more likely to be successful in achieving and maintaining changes in their smoking behaviour. While controlling the initial number of cigarettes consumed, the study found that those who valued their health highly, regardless of their locus of control orientation, smoked fewer cigarettes at the end of the program than those who placed less value on their health.

Other studies have reported less success in obtaining a significant interactive effect between health value and locus of control. DeVito et al (1982) found that neither locus of control nor health value were predictive of information-seeking. McKusker and Morrow (1979) found no relationship between PH behaviours aimed to prevent cancer and either locus of control beliefs or health value. Research into preventive dental behaviour has found the health value construct ineffective in predicting oral hygiene behaviours.

Criticisms of Health Value Research

Wallston and Wallston (1981) claim that the inconsistent results which have occurred in this area of research may be due to the nature of the PH behaviours which have been measured, as they have tended to be highly learned, habitual, often established at an early age, and engaged in for reasons other than health maintenance. Inconsistent research results may also have occurred due to the fact that only a limited selection of PH behaviours were used in the studies. For example, McKusker and Morrow (1979) used only PH behaviours relevant to cancer (participation in cancer screening tests, frequency of breast self-examination and smoking reduction) to measure the construct of PH behaviour (this is discussed in more detail in the section on PH behaviour). Rokeach's value hierarchy is of a general nature whereas the health behaviours being predicted from a knowledge of the value hierarchy, are very specific. There needs to be an equivalent level of specificity used between measures of the predicting variable and the behaviour in order to predict one from the other (Ajzen and Fishbein 1972). A general PH behaviour score (based on involvement with a range of health behaviours) would match the specificity of the value scale (Weigel and Newman 1976). However, Kristiansen (1985) found that values accounted for as much of the variation in specific PH behaviours as they did for a general PH behaviour score. This may have because behavioural self-report measures were assessed simultaneously with the value survey so subjects may have been likely to respond consistently across PH behaviour items.

Furthermore, the internal locus of control measure of subjects in some of the groups was initially high among all subjects so a ceiling effect may have occurred (McKusker and Morrow 1979).

The use of different methods of measuring health value and the varying methods of analysis may also have confounded research results. Differentiating between those who have high health value and those with low health value is usually done by splitting subjects above and below the mean for that sample. The means for the samples in each study vary considerably (especially as most studies have used non-random samples), which makes

interpretation and comparison of results problematic (especially for those studies which contain large numbers of subjects who value their health highly). Some studies have used a multiplicative term combining the health locus of control subscale scores with health value to determine whether an interactive effect is occurring, while other studies have only looked at the effects of these variables individually.

The necessity of measuring health value in conjunction with locus of control beliefs has been clearly illustrated in the health behaviour research. A standardised measure of health value which has proven reliability and validity and a uniform means of analysing the variables in relation to one another would make interpretation of research findings much more meaningful.

CHAPTER SIX

SUMMARY OF PREVENTIVE HEALTH BEHAVIOUR

In recent years there has been an increasing concern about matters relating to health and in particular, personal preventive health behaviour. This interest has arisen for a number of reasons. The twentieth century has seen a change in disease patterns from those that are primarily acute and infectious to more chronic types of disorders. There has also been recognition that the etiology of today's diseases is a complex interaction of a number of physiological, psychological, social and environmental factors. As many of these diseases are caused or aggravated by lifestyle factors over which people have varying degrees of control, disease prevention is now seen as largely a behavioural problem. Because of this trend, as well as the growing concern about the cost of present health care services, more research attention is being directed at gaining an understanding of the reasons why people do or do not participate in health promoting behaviours.

In order to be able to understand and predict health-related behaviour, it is necessary to be able to define what is meant by health and health behaviour. The issue of what constitutes health behaviour has not yet been adequately resolved, as the nature of health behaviour varies depending on one's definition of health, health status and perceptions of the effectiveness of various behaviour in maintaining or promoting health. One reason for the inconsistencies found in the results of research in this area may be related to the difficulty in operationalising the construct of PH behaviour. Researchers have used a number of different definitions and various PH behaviours to represent the construct of PH behaviour as a whole, but have mostly tested only a narrow range of medically endorsed behaviours, overlooking a wide range of supplementary and alternative behaviours many people engage in. Researchers have then proceeded to make generalisations, based on their findings, about PH behaviour as if it were a unidimensional construct. Intercorrelations among various PH behaviours have been low, so the

appropriateness of this approach is questionable. It is unclear whether PH behaviours are conceptually related or are a set of unrelated activities. Only a few studies have used a wide range of PH behaviours (including both PH behaviours recommended and those not recommended by the medical profession), to obtain a general index of PH behaviour and these studies have produced more consistent results. Conceptualisation of the phenomenon is further complicated by difficulties in ascertaining an objective assessment of the efficacy of many health behaviours. Reasons for this difficulty revolve mainly around the multidimensional etiologies of most of today's preventable diseases and the lengthy time span involved in their development. Consequently PH behaviours usually require lengthy periods of participation for their effects to become apparent. A final consideration which makes the identification and conceptualisation of PH behaviour difficult, relates to the reasons why these behaviours are carried out. Many activities which serve to maintain or promote health are motivated by reasons other than the maintenance of health such as concern about personal appearance or social pressures.

The widespread problem of non-compliance to both preventive and curative health regimens is a major issue affecting the health care system and has important implications in terms of the treatment and prevention of most of today's major illnesses. Research into the area of compliance has provided some useful insights into the understanding of PH behaviour. Criticisms which have been made of research in the compliance area include: the external frame of reference adopted by most studies which overlooks the individual's perspective; and the uniform approach taken to the phenomenon which actually includes a wide range of behaviours and reasons for engaging or not engaging in them. These and other methodological and theoretical shortcomings may explain why very few consistent trends in the compliance research have emerged. Reasons proposed to explain the reluctance to comply with PH regimens include: the lengthy time span involved; the major lifestyle changes involved in many preventive actions; the lack of concrete symptoms to act as motivating influences; social and cultural pressures; and the lack of social and medical legitimisation of preventive actions.

Of the few models developed to attempt to explain health behaviour, the Health Belief Model has received the most attention by researchers. This model suggests that readiness to initiate a particular health action is determined by the following variables: subjective perceptions of susceptibility to an illness; perceived severity of the illness; perceived benefits of the action; the presence of cues to stimulate the action; and general concerns about health. Research generally indicates that these variables are useful for predicting health behaviour to a limited extent. The model has a number of major limitations which restrict its usefulness which include the lack of uniform definitions of the model's variables and the lack of specification about the relationships of the variables to one another. However, an important aspect of the model is the phenomenological approach it has used in an attempt to understand PH behaviour from a subject's point of view. Furthermore a variable included in the Health Belief Model which has been used (in a modified version) in much of the research on PH behaviour is the measure of an individual's concern about his or her health. Another variable from this model which has been used in the present study is the perceived beliefs about the efficacy of PH behaviours.

The other main area of research into the understanding of PH behaviour which is based on the social learning theory, has investigated the relationship between a behaviour and its expected outcome, i.e. the relationship between various health practices and individual expectancies about control over health matters. Reviews of the research have generally found that those people who have more internally-oriented locus of control beliefs (i.e. those who believe their health is under their personal control), engage in more health-promoting behaviour compared to externals (those who believe health to be controlled by others or a matter of chance). However, the amount of variance in PH behaviour accounted for by the locus of control construct has been quite small in most studies.

The Multidimensional Health Locus of Control (MHLC) Scale was developed by Wallston et al (1978) in an effort to achieve a more accurate prediction of health-related behaviour. The three dimensions measured within the MHLC Scale are: internality (IHLC) or the belief that personal control over health is held; powerful others (PHLC), the belief that health is controlled by other

people (eg. doctors, family); and chance (CHLC) the belief that health is a matter of luck, chance or fate. Although research has not been entirely consistent, overall trends indicate that the MHLC beliefs make a significant contribution to the prediction of PH behaviour. A number of studies which have used the MHLC Scale in relation to both PH behaviour and sick role behaviour have been able to account for a greater amount of variation in PH behaviour than the general locus of control scale. However, some studies have failed to find any significant relationship between PH behaviours and locus of control beliefs, using either the original HLC Scale or the MHLC Scale. In response to this, Wallston and colleagues have commented that much of the research has not measured the important variable of health value. Wallston et al (1978) maintain that the value placed upon health needs to be high in order for locus of control orientations to be predictive of health behaviour. This relates back to Rotter's original locus of control statements which specify that the value of the outcome or reinforcement (in this case health) needs to be considered when attempting to predict behaviour (Rotter 1966). Furthermore, people often have different motivations for engaging in PH behaviour which may not necessarily be health-related. Research incorporating the health value by locus of control interaction has had mixed results. However, Rotter et al (1972) stated that the probability of a particular behaviour occurring depends on the expectancy that a particular reinforcement will be a consequence of that behaviour as well as the value of that reinforcement to the individual. Very few studies utilising the health locus of control construct have asked subjects about their beliefs regarding the relevance or efficacy of specific health-related behaviours in promoting or maintaining their health. This variable was found to be an important predictor of health behaviour in research on the Health Belief Model.

To conclude, it appears that in order to gain a greater understanding of health-related behaviour, the level of an individual's involvement in a wide range of PH behaviours needs to be measured to obtain an adequate index which reflects an individual's general level of PH behaviour participation. It is also necessary to assess not only an individual's locus of control beliefs but also the value which an individual places upon health and the individual's perceptions as to the efficacy of a particular health action.

AIMS OF THIS RESEARCH

The primary purpose of this research was to test the hypothesis that the level of preventive health behaviour a person engages in, will be partially predicted by:

a) an individual's perceived locus of control beliefs (i.e. whether s/he believes that s/he has personal control over his/her health), in conjunction with the value which s/he places on health. Specifically it is predicted that high levels of preventive health behaviour involvement would be associated with highly internal locus of control subjects who valued their health highly.

b) the belief that a person has about the efficacy of PH behaviours in promoting or maintaining his or her health.

c) A further hypothesis is that the variables being investigated in this study (health locus of control beliefs and health value), will be more predictive of PH behaviour which subjects perceive as being very healthy than of arbitrarily selected PH behaviours.

This study contains important methodological differences to those previously conducted in this area:

1) It uses a much more comprehensive range of PH behaviours to operationalise the concept than have been used in previous studies. It also includes a number of PH behaviours not officially endorsed by the medical profession. Because this is likely to provide a more accurate reflection of the level of PH behaviour involvement, it is hypothesized that the relationship between locus of control beliefs and PH behaviour involvement will be stronger than has been found in previous studies.

2) It measures the perceived efficacy of engaging in specific health-related behaviours in conjunction with self-reported participation in those behaviours which has not been done in previous locus of control studies. A further refinement of the PH Behaviour scale has been composed which measures the level of self-reported participation only in those behaviours strongly believed to be health enhancing by subjects.

The study also compares the usefulness of the two measures used to gauge the value a person places on his/her health.

A measure of health status consisting of both subjective items and more objective items, is also included to determine its relationship to preventive health beliefs and preventive health actions and specifically to determine whether these actions vary significantly according to health status.

CHAPTER SEVEN

METHOD

Subjects

The subjects in this study consisted of 213 undergraduate psychology student volunteers enrolled at Massey University (140 females and 73 males). The subjects ranged in age from 18 to 56 with the majority being under 26 years of age (98.2%).

Research Instruments

The data-gathering instrument used in this study was a composite questionnaire (a copy of which can be found in Appendix A). It consisted of a number of different scales and a consent form (which was detached before the questionnaire was returned to ensure subjects' anonymity). The original questionnaire was revised slightly after informal pilot testing which identified additional health-promoting behaviours which were not included in the original questionnaire[2].

A questionnaire rather than an interview format was used as it avoided interviewer bias, there were less demand characteristics, and there was potential to obtain a larger sample than would be obtainable through interviewing (Bulpitt and Fletcher 1985).

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[2] In order to do this, an additional question was included in the draft questionnaire at the end of the section on reported frequency of PHBs which asked "Are there any other things you do or avoid doing specifically to protect your health? (Yes/No) Please list..."

Content and Format of the Questionnaire

The composite questionnaire used in this study was designed to measure a number of variables which were hypothesized to be predictive of levels of individuals' PH behaviour.

Section one requested demographic information - sex, age, race, marital status, education level and income. The format of the questions used was adapted from a study by Lau and Ware (1981).

The next section consisted of Form A of the Multi-dimensional Health Locus of Control (MHLC) Scale devised and tested by K. A. Wallston and Wallston (1978). The MHLC Scale contains 18 health-related items which are divided into three subscales ("internal" health locus of control [IHLC]; "powerful others" health locus of control [PHLC]; and "chance" health locus of control [CHLC]) with six items in each subscale. Each item consists of a statement to which subjects are asked to respond on a five point Likert-type scale ranging from 1 (strongly agree) to 5 (strongly disagree). The maximum score possible for each subscale is 30 and each subject receives three scores which represent the extent to which s/he attributes outcomes to personal (internal), chance or powerful others control.

The three subscales of the MHLC Scale are moderately independent statistically. IHLC and CHLC are negatively correlated but share less than 10% of common variance. CHLC and PHLC are moderately correlated (+.20) (Wallston and Wallston 1981).

Alpha reliabilities for the MHLC subscales have been found to be in the range of .67 to .77 (K.A. Wallston et al 1978). Only the CHLC was correlated significantly with a shortened version of the Marlowe-Crowne (1960) Social Desirability Scale (r= -.24).

Some degree of concurrent and discriminant validity of the MHLC subscales has been established through their high correlation with Levenson's (1973)

Internal, Powerful Others and Chance Scales. Independent factor analyses have established that the three independent measures do exist (Wallston and Wallston 1981).

Winefield (1982) tested the reliability and validity of the HLC Scale by factor-analysing the results of the scale administered to 153 medical students, 52 healthy middle-aged men and 53 male patients recovering from myocardial infarctions. The internal health locus of control subscale was reliable over seven months as was the powerful others subscale. Only the chance sub-scale showed little stability over time.

A large number of studies have used the MHLC Scales including: DeVellis et al (1980); Hatz (1978); Kaplan and Cowles 1978; Levin and Schulz (1980); Saltzer 1982; Seeman and Seeman 1983; K. A. Wallston et al 1976; Wallston and Wallston (1981).

The next section of the questionnaire contained a set of questions designed to measure subjects' beliefs about the efficacy of various activities in promoting one's health (Preventive Health Beliefs Scale - PH Beliefs), using a five-point Likert-type scale with responses ranging from 'very healthy' to 'very unhealthy'. The idea of determining subjects' perceived efficacy of PH behaviours was adapted from one of the variables contained in the Health Belief Model which assesses the perceived benefits and costs of engaging in behaviours to reduce health threats. The PH Belief items were scored from -2 (very unhealthy) to +2 (very healthy) and those items in the questionnaire (Appendix A) which are asterisked were reverse coded. A total PH Beliefs score was obtained by adding the scores from all of the items in the scale.

The next section of questions asked respondents to indicate the frequency with which they engaged in the behaviours listed in the PH Beliefs scale, using a five point Likert-type scale with responses ranging from 'always' to 'never' (PH Behaviour scale). The PH Behaviour items were scored from 4 (always) to 0 (never). Those items which are asterisked in the questionnaire (Appendix A) were reverse coded. A total PH Behaviour score was obtained by adding the

scores of the items in the scale. Two of the items in the list of PH behaviours ('keeping immunisations up to date' and 'having screenings for medical conditions'), were not included in the analysis as they did not have corresponding items in the PH Beliefs Scale.

The range of PH behaviours used in this study were selected because they were either: (a) used as dependent variables in the following studies: Belloc and Breslow (1972), Langlie (1977), Seeman and Seeman (1983), Steele and McBroom (1972), Williams and Wechsler (1972), Wurtele et al (1985); or (b) they were suggested by the literature or from the informal pilot study in accordance with the broad definition proposed by Harris and Guten (1979) who defined Health Protective Behaviour as:

> "any behaviour performed by a person, regardless of his or her perceived or actual health status, in order to protect, promote, or maintain his or her health, whether or not such behaviour is objectively effective toward that end" (p18).

Some of the preventive health actions used in this study have had scientific verification of their effectiveness in maintaining or promoting good health, while others have not. As noted in the chapter on PH behaviour, most of the previous research in this area has used only a small number of medically endorsed PH behaviours to measure this phenomenon and have then discussed their results in terms of a general concept of PH behaviour. Since intercorrelations among PH behaviours are generally low and it is thought to be a multidimensional phenomenon (Harris and Guten 1979; Steele and McBroom 1972; Turk et al 1984), it was hypothesized that a more accurate measure of PH behaviour would be obtained by measuring subjects' participation in the wide range of health-related behaviours.

The wording of the items in the PH Beliefs and PH Behaviour scales was designed to gauge subjective perceptions of levels of health-enhancing and health-detracting PH behaviours which subjects engaged in, rather than quantifiable measures of them. For example, some of the items included:

"overworking", "drinking too much coffee", "drinking too much alcohol" and "doing things in moderation. This enabled subjects to respond from what they perceived as healthy levels of these activities.

The questionnaire also contained two short scales which measured the value that subjects placed upon their health. Both value measures were included so a comparison could be made of the effectiveness of these two measures of health value in predicting PH behaviour. The health value measures were:

1) the health value ranking Scale (HV-Rank), a shortened version of Rokeach's (1973) Health Value Survey which has been used in a number of studies investigating locus of control beliefs and health-related behaviour including Lau and Ware (1981) and Wallston and Wallston (1978). Subjects are asked to rank a list of values in order of importance to them. The shortened version of Rokeach's Survey contains a random selection of eight of the original 18 values with an additional value also included (Good Health - physical and mental well-being). Responses on this scale were scored according to the ranking they gave to health (eg. a ranking of 1 for health produced a score of 1). Therefore, high scores were equated with low health rankings and low scores were equated with high health rankings (range 1-9).

2) the health value index (HV-Index), used by a number of researchers including Seeman and Seeman (1983) and Wurtele et al (1985). It consists of four items with a five point Likert-type format from 'strongly agree' to 'strongly disagree'. Responses were scored from 1 to 5 with items 3 and 4 reverse coded. Subjects' scores on all four items were added to obtain a HV-Index (range 4-20).

The final section of the questionnaire asked subjects to rate their personal health status using a five question scale which has been used in previous research (eg. Harris and Guten 1979; Lau and Ware 1981; Wurtele et al 1985). Two of the items were designed to gauge the subjects' perceived health status by requesting subjects to rate their health in relation to others on a three point scale from better (1), to worse (2), and rate their health on a four point scale

from excellent (1) to poor (2). These two items were reverse coded. The other three items were designed to obtain a more objective assessment of subjects' health status (as they were specific questions about the frequency of recent illnesses) with possible responses of yes (1) and no (2). The five items were added to obtain an index of health status (range 5-10). A high score indicated a low health status.

Administration

The questionnaire was administered to undergraduate students on the 27th of April 1988, as part of a lecture which they were attending for a first year Psychology paper. Participation in the study was voluntary, and informed consent was given. Subjects were given a very general indication as to the nature of the study before the questionnaire was distributed. Subjects were assured of confidentiality as forms were completed anonymously. The following week at the same lecture time, students were given feedback regarding the nature of the study and the hypotheses being tested.

Statistical Analysis

The data collected was computer analysed using the Statistical Package for the Social Sciences, Revised SPSSx (Norusis 1985). A combination of descriptive, bivariate and multivariate statistics were obtained to:

1) identify and compare the variables which make a significant contribution to explaining the variance in levels of general PH behaviours and those PH behaviours which subjects perceive as being health-promoting,

2) explore the interrelationships among these variables, and

3) investigate the nature of the relationship between the two measures of health value used in this study of PH behaviour.

1. Firstly, descriptive (univariate) statistics were computed which summarised the characteristics of the sample. These included means, standard deviations, frequencies, variances and cross-tabulations.

2. Bivariate statistics, including Pearson's Product Moment Correlations (r's) were computed for each of the variables in the study (sex, age, race, marital status, education, income, the three health locus of control subscales, PH Beliefs and PH Behaviour, HV-Rank, HV-Index and health status).

Because one of the hypotheses being investigated in this study was that subjects are more likely to engage in PH behaviours which they perceive to be effective in maintaining health (and health locus of control beliefs in conjunction with health value would also be more likely to show a significant relationship with these PH behaviours), a more detailed analysis of this relationship between PH Beliefs and PH Behaviour was conducted by investigating PH behaviours on an individual item basis. A new PH behaviour scale (known as PH Behaviour-endorsed) was composed which only included those items from the original PH behaviour scale which were rated as very healthy on the corresponding items in the PH Belief scale. A second PH behaviour scale was composed which included items if they were rated as very healthy or healthy. However this scale was not used as it did not have good discriminating power. This was because most of the PH behaviours (an average of 31 of the 39 items) were endorsed as being healthy or very healthy so the scale did not differ appreciably from the original PH Behaviour scale.

Pearson's correlations were computed for all variables in the study with the newly created PH Behaviour-endorsed scale and the corresponding PH beliefs-endorsed scale.

3. Multivariate Analyses: The first multiple regression was run to determine how much of the variance in PH Behaviour (the dependent variable) was accounted for by the variables used in this study. This analysis used an all-in regression procedure whereby all variables are introduced into the analysis as a block and the variance accounted for by each variable takes into account the

presence of the other variables in the analysis. An equivalent all-in multiple regression was run using the PH Behaviour-endorsed scale as the dependent variable. A further all-in multiple regression analysis was conducted using the PH Behaviour scale as the dependent variable, omitting the PH Beliefs variable as PH Beliefs scores were found to be highly correlated with PH Behaviour scores. [3]

A number of multiple regressions were then carried out to explore more fully the relationships among the variables. All analyses were conducted using both PH Behaviour and PH Behaviour-endorsed (the list of preventive health behaviours perceived as being very healthy by subjects) as the dependent variables. Two stepwise multiple regressions were conducted to determine which subset of variables was the most effective predictor of PH Behaviour and PH Behaviour-endorsed scores. The stepwise procedure steps in the variable that accounts for the most variance in the dependent variable first and steps in further variables which contribute a significant amount of variance, in descending order of importance. (The variables already in the equation are re-assessed at each step.)

Two stepwise regressions were run which omitted the PH Beliefs variable to determine which subset of variables (whose variance overlapped with PH Beliefs), was most effective in the prediction of PH Behaviour and PH Behaviour-endorsed.

Two hierarchical regression analyses were conducted which omitted the variables age, HV-Index, PHLC, CHLC and health status. Age was omitted because the sample was composed mainly of first-year university students around 18-20 years of age. The HV-Index was omitted because it had a moderately high correlation with the HV-Rank and it was not a significant predictor of PH behaviour in the previous all-in regressions. The variables CHLC, PHLC and health status were omitted because they were not expected to be significant contributors to PH Behaviour and results of the previous all-in regression had confirmed this. The IHLC subscale was retained because it

[3] The PH Beliefs variable was omitted for all analyses using the PH Behaviour-endorsed as the dependent variable, because PH Beliefs were already taken into account in this variable.

was hypothesized that it would make a significant contribution to PH behaviour (which was confirmed in the all-in regression). Hierarchical regression analyses involve the forced entry of variables in a specified order. The order in which variables were entered was based on a historical perspective in that sex is the first determining variable, followed by health value. Internal locus of control and PH Beliefs were selected next as it was thought that these beliefs would develop later.

To test whether locus of control beliefs and health value had an interactive effect on PH behaviour, two all-in multiple regression analyses were conducted using deviation scores[4] with the addition of three product terms - IHLC x HV-Rank, CHLC x HV-Rank and PHLC x HV-Rank. The analysis using the PH Behaviour scale as the dependent variable found that one of the product terms had an important interactive effect on PH behaviour. Because one of the hypotheses being investigated in this study proposed that locus of control beliefs would have a more significant relationship to PH behaviour when health value is high, and the fact that product term regressions only test for uniform effects (Finney, Mitchell, Cronkite and Moos 1984), it was decided to investigate the relationship further by looking at subgroups of the sample in terms of health value.

Subjects were divided into two groups according to their health value using a median split. Those subjects who ranked health 1 to 4 (inclusive) on the HV-Rank were assigned to the high health value group (55.9% of the sample) while those who ranked health from 5-9 (inclusive) were assigned to the low health value group (44.1% of the sample). Two hierarchical multiple regressions were run, using only high health value subjects, with PH Behaviour and PH Behaviour-endorsed as the respective dependent variables and omitting the variables age, health status, HV-Index and HV-Rank. The variables age and health status were omitted because of their lack of association with PH behaviour in previous multiple regressions. The two health value measures were omitted because health value had already been

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[4] Using deviation score in product-term regression deals with the problem of multicollinearity ie. high correlations between the product term and one or more of its constituents (Finney, Mitchell, Cronkite and Moos 1984).

incorporated into the analyses through the selection of high health value subjects only. Equivalent hierarchical and stepwise multiple regression analyses were run with low health value subjects.

A further multiple regression was run using PH Beliefs as the dependent variable to investigate whether PH Beliefs were predicted by the same variables as PH Behaviour and to assess the relationship of the PH Beliefs scale to other variables in the study. An equivalent analysis was run using the PH Beliefs-endorsed scale as the dependent variable.

A multiple regression was run using health status as the dependent variable to determine which variables accounted for a significant amount of the variance in health status.

CHAPTER EIGHT

RESULTS

Descriptive statistics of the sample are followed by both bivariate and multivariate analyses to test the hypotheses proposed in this study.

DESCRIPTIVE STATISTICS

Sociodemographic Variables

The frequencies, means and standard deviations of the sociodemographic variables used in this study are given in Appendix B. From these statistics it can be seen that the sample is predominantly young, single, European and female (91% of the sample are European, 88.7% are single, the mean age is 21.4 years of age, with 71.2% being under the age of 21 and 65.7% are female). Subjects come from families with a wide range of education and income levels although both education and income are higher than would be found in a random sample (37.6% of subjects' head(s) of the household had some university education and 31.8% of annual family incomes were over $40,000).

Multidimensional Health Locus of Control (MHLC) Scale

Scores on the MHLC Scale (Form A) were grouped into three subscale scores according to procedures outlined by K. A. Wallston et al (1978)[5]. K. A. Wallston (personal communication 1988) states that the three scores should not be combined as it is important that one does not end up with a single score indicating an individual's internal or external tendency. Wallston recommends that each MHLC subscale should be treated as a separate continuous variable

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[5] Details of the scoring convention can be found in Appendix C.

when multiple regression analyses are being conducted. The scores obtained on the three subscales of the MHLC Scale are shown in table one.

Table 1: Multidimensional Health Locus of Control Scores for Sample#

SUBSCALE	MEAN	STANDARD DEVIATION	RANGE*
IHLC	26.94	3.91	15-36
CHLC	16.41	4.84	6-30
PHLC	15.06	4.70	6-28

low numbers denote low levels of beliefs on that subscale
high numbers denote high levels of beliefs on that subscale
* possible range of scores for all subscales is 6-36.

Results indicate that overall, the sample holds high internal beliefs and low chance and powerful others beliefs which appears to be similar to the norms computed for college students which are shown in table two.

Table 2: Mean Scores for MHLC Scale Summarised Across Types of Subjects

SAMPLE	N	IHLC	CHLC	PHLC
Chronic patients	609	25.78	17.64	22.54
College students	749	26.68	16.72	17.87
Healthy adults	1287	25.55	16.21	19.16
Persons engaged in PHBs	700	27.38	15.52	18.44

Source: K.A. Wallston (personal communication 1988)

Preventive Health Beliefs

The range of possible scores for the PH Beliefs Scale extend from -99 (lowest possible score) to +57 (highest possible score). The range of scores obtained for this sample were -34 to +6. The mean was -12.16 (standard deviation = 6.49). As there are no norms for this scale, it is impossible to say whether this sample had unusually high or low levels of beliefs about the efficacy of specified PH behaviours. Table three displays the 15 PH Belief items most frequently endorsed (as very healthy or very unhealthy depending on the nature of the item).

Table 3: Frequencies of Most and Least Believed in PH Behaviour Items

Item	Belief about Item	Percentage of Subjects
Fifteen Most Frequently Believed in Items		
Smoking	Very unhealthy	85.4
Eating a healthy, balanced diet	Very healthy	73.6
Washing hands after going to the toilet	Very healthy	72.3
Taking time out to relax	Very healthy	64.3
Wearing a seatbelt when driving	Very healthy	64.3
Drinking too much alchohol	Very unhealthy	63.4
Getting enough sleep to function well	Very healthy	62.0
Swimming, taking long walks or bike rides	Very healthy	58.7
Engaging in active sports	Very healthy	53.8
Doing physical exercises, aerobics or yoga	Very healthy	49.8
Eating breakfast	Very healthy	46.9
Destroying old and unused medicines	Very healthy	45.5
Having dental checkups	Very healthy	43.9
Breaking traffic rules when		

driving	Very unhealthy	43.7
Having a first aid kit at home	Very healthy	42.7

Six Least Frequently Believed in Items

Taking dietary supplements	Very healthy	1.9
Eating snacks between meals	Very unhealthy	2.8
Eating too many dairy products	Very unhealthy	6.1
Sharing a cup, hairbrushes or towels	Very unhealthy	10.8
Crossing the street against the lights when walking	Very unhealthy	18.3
Getting chilled	Very unhealthy	18.3

In summary, the fifteen most frequently believed in items in the questionnaire included three items related to exercise, two related to safe driving practices, two related to dietary practices, two related to the use of medicines, and one item about each of: hygiene practices, dental check-ups, sleep and relaxation, smoking and alcohol consumption. The six PH behaviours which were believed in by the least number of subjects included three items related to dietary practices, and one item about each of: hygiene practices, safety and getting chilled.

Preventive Health Behaviours

The range of possible scores on the PH Behaviour scale was 0 (indicating no participation in the PH behaviours listed) to 156 (maximum participation in the PH behaviours listed). The range for this sample was from 56 to 133. The mean was 96.98 (standard deviation = 13.89). It is impossible to determine whether these scores are unusually high or low as this PH Behaviour scale was created for this study and norms have not been established. The range of scores on the PH Behaviour-endorsed scale was 8 to 103. The mean was 41.19 (standard deviation = 18.51). These statistics were expected to be lower than for the PH Behaviour scale as fewer items were being measured in the endorsed scale. However the average rating for each item in the PH Behaviour-endorsed scale was 2.92 compared with an average rating of 2.49

for the PH Behaviour scale. A t-test confirmed that the differences between these average scores was statistically significant ($p<.001$).

Health Value Scales

Scores on the HV-Rank ranged from 1 to 9 (from a possible range of 1 to 9), with a mean score of 4.24 (standard deviation = 2.20). Subjects' scores on the HV-Rank were coded in such a way that negative scores reflected high health values while high positive scores reflected low health values. Scores on the HV-Index ranged from 4 to 20 (from a possible range of 4 to 20), the mean score was 10.87 (standard deviation = 2.97) and the distribution approximated a normal curve. Subjects' scores for this variable were coded so that high scores denoted high health value and low scores denoted low health value. Because of methodogical differences, it is difficult to make comparisons of the health values of subjects in this sample with those of other studies. For example, the study by Wurtele et al (1985) which also had a university student sample, used the HV-Index with a four-point Likert scale while the present study used a five-point scale. Other studies have not published statistics on measured health values.

Health Status

Possible scores on the health status index range from 5 (low health status) to 10 (high health status). Subjects in this sample obtained scores ranging from 5.3 to 10.0. The mean score obtained was 8.56 (S.D.= 1.07) which indicates that subjects in this sample were generally very healthy. This is in accordance with results from Woolford and Law (1980) and the National Health Statistics (1981) for the age group 15-24, which found that young people in NZ are very healthy, relative to other age groups.

Reliability Tests

Alpha reliability tests were computed for all variables in the study. The results are included in Appendix F. Results indicate that the internal consistency

reliability of all items in each of the scales in the composite questionnaire were good. In particular, alphas for the PH Belief and PH Behaviour scales were .81 and .78 respectively. This compares favourably with the alpha of .57 for the PH behaviour index used in the study by Seeman and Seeman (1983) which was composed of nine items.

The alpha reliability analysis revealed that six items from the PH Belief scale were poorly correlated with the overall correlation of items in the scale. These items were: watching weight; taking dietary supplements; letting things "get you down"; wearing comfortable clothes and shoes; doing what you want to and not what other people expect, and eating red meat. Ten items from the PH Behaviour scale were poorly correlated with the overall intercorrelation for the scale. These items were: taking dietary supplements; taking time out to relax; eating breakfast; engaging in active sports; doing physical exercise, aerobics or yoga; taking medication prescribed by your doctor; doing what you want and not what other people expect; overworking; getting chilled, and eating red meat. The Items which were common to both scales which suffered from poor correlations pertained to: the use of dietary supplements; eating red meat; and doing what you want rather than what others expect.

BIVARIATE STATISTICS

Pearsons Product Moment Correlations were obtained to examine the correlates of PH Behaviour participation. As expected, PH Behaviour was positively correlated with PH Beliefs (r=.42, p<.0001). However, PH-Behaviour-endorsed was more highly correlated with the PH Beliefs-endorsed scale (r=.93, p<.0001). The PH Behaviour scale was correlated significantly with the PH Behaviour-endorsed scale (r=.62, p<.001).

The correlations for the PH Beliefs, PH Behaviour and PH Behaviour-endorsed scales are shown in table four (refer to Appendix D for Pearsons Product Moment Correlation Coefficients for all variables).

Table 4: Pearsons Product Correlations for PH Beliefs and PH Behaviour scales

Variable	PH Beliefs	PH Behaviour	PH Behaviour endorsed
age	.17**	.25***	.14
sex	.22**	.16	.19**
race	-.05	-.08	-.01
marital status	-.01	.06	-.04
education	-.12	-.01	-.04
income	-.06	.02	-.05
IHLC	.10	..19**	.19**
CHLC	-.13	-.13	-.13
PHLC	.01	.05	.01
HV-Rank	-.09	-.31***	-.13
HV-Index	-.20**	-.21**	-.20**
status	-.03	.03	.01

** p < .01 *** p < .001

From this table it can be seen that subjects' ages were highly correlated with the beliefs they held about preventive health behaviours (PH Beliefs), but not with participation in those behaviours (PH Behaviour and PH Behaviour-endorsed). Sex was significantly correlated with PH Beliefs and with the PH Behaviour-endorsed scale but not with the PH Behaviour scale. Other sociodemographic variables were not significantly correlated with the PH belief and behaviour scales.

With regard to PH behaviour and the three health locus of control subscales, both PH Behaviour and PH Behaviour-endorsed were positively and significantly correlated with internal HLC ($r=.19$, $p<.01$ for both scales). PH Behaviour and PH Behaviour-endorsed scores were not significantly correlated with PHLC or CHLC scores. PH Beliefs were not correlated significantly with IHLC, PHLC, or CHLC Beliefs.

As hypothesized, PH Behaviour was significantly correlated with both measures of health value: HV-Rank ($r=-.31$, $p<.001$) and HV-Index ($r=-.21$ $p<.01$). In contrast, PH Behaviour-endorsed and PH Beliefs were significantly correlated with HV-Index ($r=-.20$ $p<.01$, $r=-.20$ $p<.01$, respectively), but not with HV-Rank.[6] A significant correlation occurred between the two measures of health value: HV-Rank and HV-Index ($r=.30$, $p<.0001$).

PH Beliefs and PH Behaviour were not related to subjects' health status as these variables were not significantly correlated with either PH Beliefs, PH Behaviour or PH Behaviour-endorsed.

Investigation of the correlations among the three subscales of the MHLC Scale (see Appendix D) indicate that internal HLC subscale scores were significantly and negatively correlated with CHLC subscale scores ($r=-.29$, $p <.0001$), but not with PHLC subscale scores. CHLC subscale scores were significantly and positively correlated with PHLC subscale scores ($r=.34$, $p <.0001$).

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[6] The negative correlations were due to the way that the two health value measures were coded. High health value was coded with low scores while low health value was coded with high scores.

Because of the high number of significant correlations among the variables in this study, and because it was hypothesized that the interaction of a number of variables would influence PH behaviour, it was considered necessary to investigate the relationships among the variables further, using multivariate analysis.

MULTIVARIATE STATISTICS

Predictors of Preventive Health Behaviour

The results of the first three all-in multivariate analyses conducted on the sample data are shown in table five. These analyses use the scores from the list of original comprehensive PH Behaviours and PH Behaviour-endorsed as dependent variables. (Appendix E contains a summary of all the multivariate analyses conducted on the data collected in this study.)

Table 5: Results of the 'All-In' Multiple Regressions

DEPENDENT VARIABLE	INDEPENDENT VARIABLES	BETA	F
PH Behaviour	sex	.08	1.08
	age	.23	2.80**
	race	-.11	-1.63
	marital status	-.11	-1.28
	income	.08	1.09
R Square = .30	IHLC	.13	1.81
F for model = 5.66 (p < .0001)	HLCC	.02	.21
	HLCP	.04	.56
	PH Beliefs	.34	4.71***
	HV Index	-.05	-.69
	HV Rank	-.23	-3.34**
	status	.04	.56
PHB	sex	.15	2.06*
	race	-.12	.71
(omitted	marital status	-.16	-1.89
PH Beliefs)	income	.10	1.39
	IHLC	.16	2.07*
R Square = .21	HLCC	-.01	.14
F for model = 3.88 (p < .0001)	HLCP	.06	.67
	HV-Index	-.11	-1.40
	HV-Rank	-.21	-2.85**
	status	.06	.85

PHB-endorsed	sex	.21	2.81**
	age	.27	2.98**
(omitted	race	-.01	-.09
PH Beliefs)	marital status	-.24	-2.70**
	income	.03	.41
R Square = .16	IHLC	.17	2.18*
F for model = 2.56 (p < .01)	HLCC	-.06	-.72
	HLCP	-.02	-.20
	HV-Index	-.18	-2.28*
	HV-Rank	-.01	-.09

* p < .05 ** p < .01 *** p < .001

Correlates of Preventive Health Behaviour

From the first regression analysis it can be seen that the variables used in this study as a set accounted for 30% of the variance in PH Behaviour and that three of the variables made a statistically significant contribution to the prediction of PH Behaviour[7]. Those variables were: PH Beliefs (beta = .33, p<.0001), age (beta = .23, p<.01) and HV-Rank (beta = -.23, p<.01). However, because the PH Beliefs variable accounted for a large proportion of the variance and was highly correlated with PH Behaviour, a second all-in regression analysis was run omitting PH Beliefs. The variables as a set now accounted for 21% of the variance of PH Behaviour and apart from the two variables which made a statistically significant contribution to the prediction of PH Behaviour in the previous analysis (age (beta=.32, p<.001) and HV-Rank (beta=-.21, p<.05)), another variable, internal HLC was also a statistically significant variable (beta =.16, p<.05). This could have indicated that the variance in PH Behaviour accounted for by the internal HLC variable overlapped with the variance accounted for by the PH Beliefs variable. However, the simple correlation between PH Beliefs and internal HLC (r=.10, p=.08) was not significant which would indicate that more complex intercorrelations involving other variables may exist.

[7] Unless otherwise specified, the significance level is p<.05.

The all-in regression using PH Behaviour-endorsed as the dependent variable revealed that the variables which made a significant contribution were: sex (beta=.21, p<..01), age (beta=.27, p<.01), marital status (beta=-.24, p<.05), internal HLC (beta=.17, p<.05), and HV-Index (beta=-.18, p<.05). The variables as a set accounted for 16% of the variance in endorsed PH Behaviour.

A stepwise multiple regression, with PH Behaviour as the dependent variable, found three variables to be the best subset of predictors of PH Behaviour and they accounted for 25% of the variability in PH Behaviour. These variables were: PH Beliefs (beta[8]=.37, p<.0001); HV-Rank (beta=-.24, p<001); and age (beta=.16, p<.05). When the PH Beliefs variable was omitted from the analysis, HV-Rank (beta=-.25, p<.001) and age (beta=.22, p<.01) were the only significant variables and they accounted for 12% of the variance in PH Behaviour. Using PH Behaviour-endorsed as the dependent variable and omitting PH Beliefs, HV-Index (beta=-.19, p<.01), internal HLC (beta=.19, p<.01), and sex (beta=.18, p<.05) were found to be the best predictors and accounted for 10% of the variance in PH Behaviour.

When a hierarchical multiple regression was run (with PH Behaviour as the dependent variable), which omitted the variables age, CHLC, PHLC, HV-Index and health status, the three variables found to be significantly predictive of PH Behaviour were PH Beliefs (beta=.37, p<.0001), HV-Rank (beta=-.25, p<.0001) and internal HLC (beta=.13, p<.05). An equivalent analysis using PH Behaviour-endorsed and omitting PH Beliefs, found that again internal HLC (beta = .20, p<.01) was a significant predictor and another variable, sex (beta = .19, p<.01) was also selected as a significant predictor of PH Behaviour-endorsed.

Combined effects of health value and locus of control beliefs

To test whether locus of control beliefs and health value had an interactive effect on PH Behaviour, an all-in multiple regression was conducted which

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[8] The betas cited here are the final betas when all the variables have been introduced into the analysis.

included product terms (IHLC x HV-Rank, PHLC x HV-Rank, and CHLC x HV-Rank). This analysis found that the variables PH Beliefs (beta=.33, p<..0001), HV-Rank (beta=-.21, p<.01), age (beta=.24, p>.01) and the IHLC x HV-Rank product term (beta=.15, p<.05) made significant contributions to the prediction of PH Behaviour. However, using the endorsed PH Behaviour scale as the dependent variable, the product term IHLC x HV-Rank (beta=.13, p=.32) was not a significant predictor but the variables IHLC (beta=.17, p<.05) and HV-Index (beta=-.18, p<.05) were. (Other significant variables in this analysis were: age (beta=.27, p<.01), sex (beta=.19, p<.05), and marital status (beta=-.18, p<.01)).

A further analysis was conducted to explore the nature of the relationship of health value and internal HLC beliefs on PH Behaviour by dividing the subjects in the sample according to their health value. Descriptive statistics were obtained for the high and low health subject groups (see Appendix G). Comparisons of these two groups revealed that high health value subjects had higher means for the variables internal HLC, PH Behaviour and PH Behaviour-endorsed than low health value subjects which indicates that subjects who value their health highly have higher internal HLC beliefs, and engage in higher levels of PH behaviour than those subjects who place less importance on their health.

A hierarchical multiple regression analysis was conducted using only high health-value subjects, to test whether internal health locus of control beliefs was an important predictor of PH Behaviour when health was valued highly. Results of the analysis (see table six) showed that for high health-value subjects, internal HLC beliefs made a significant contribution to the prediction of the PH Behaviour-endorsed scale (beta=.24, p<.05) but did not make a significant contribution to the PH Behaviour scale (beta=-.003, p=.97). In fact the only significant predictor of PH Behaviour for high health value subjects was PH Beliefs (beta=.38, p<.0001). The stepwise regressions using high health value subjects had similar results, with internal HLC beliefs making a significant contribution to PH Behaviour-endorsed (beta=.22, p<.05) but not to PH Behaviour, even when PH Beliefs was omitted from the analysis.

Table 6: Comparison of Significant Variables for High and Low Health Value Subjects

Type of Analysis	DV	High Health Value	Low Health Value
hierarchical	PHB	-	IHLC**
hierarchical	PHB-e	IHLC*	sex*
stepwise	PHB	-	IHLC** age** race*
stepwise	PHB-e	IHLC*	age*

NB: * $p < .05$ ** $p < .01$ *** $p < .001$

A further hierarchical analysis found that internal HLC was a significant predictor of PH Behaviour when the data from low health value subjects only was analysed (beta=.31, p<.01). In contrast, internal HLC was not a significant predictor of PH Behaviour-endorsed for low health subjects (beta=.13, p=.25). Stepwise analyses showed similar results with internal HLC only being a significant predictor of PH Behaviour (beta=.30, p<.01). The PHLC and CHLC subscales were not significant predictors of either PH Behaviour or PH Behaviour-endorsed.

Comparison of Health Value Measures

Major differences became apparent between the two health value measures when multiple regressions were computed. The HV-Rank was a consistently significant predictor of PH Behaviour but the HV-Index measure was not. In

contrast, HV-Index was a significant predictor of the PH Behaviour-endorsed scale, while HV-Rank was not.

Preventive Health Beliefs

A stepwise multiple regression was run using the PH Beliefs Scale as the dependent variable. The only significant predictors of this variable were sex (beta=.20) and age (beta=.15).

Health Status

When health status was used as the dependent variable in a multiple regression, the only variables to be significantly predictive were sex (beta=-.14, $p<.01$), age (beta=-.23, $p<.05$) and HV-Index (beta=-.17, $p<.05$).

CHAPTER NINE

DISCUSSION

The major purpose of the present study was to enhance the understanding and prediction of personal preventive health behaviour by investigating the relationships among the constructs of locus of control, health value, and a wide range of preventive health actions. The specific hypotheses being tested were as follows:

1. The level of PH behaviour a person engages in, will be partially predicted by that person's internal locus of control beliefs (i.e. the extent of beliefs about personal control over health), in conjunction with the value s/he places on health. Specifically it was predicted that subjects with high internal locus of control beliefs who valued their health highly would engage in high levels of PH behaviour.

The findings of the present study confirmed this hypothesis. Although an initial multiple regression analysis revealed that the value placed upon one's health had an independent and significant relationship with PH Behaviour but internal locus of control beliefs did not, a further analysis omitting the PH Beliefs variable (because of its high correlation with PH Behaviour), found that the internal health locus of control variable was a significant predictor of PH behaviour independently of health value. Furthermore, when the PH behaviour scale using only those PH behaviours which subjects perceived as being very healthy, was used (PH Behaviour-endorsed), internal locus of control beliefs and health value were independently significant predictors of PH behaviour. When health value and internal locus of control scores were considered together as an interactive variable, they were found to be significant predictors of PH behaviour but not of PH Behaviour-endorsed.

2. The second hypothesis stated that a person's beliefs about the efficacy of particular PH behaviours will be a significant predictor of the level of PH

behaviour that s/he engages in, and those behaviours perceived as being very healthy will tend to be participated in to a greater extent than those behaviours perceived as being less healthy.

This hypothesis was also confirmed. In all the multivariate analyses conducted in this study, beliefs about the efficacy of various PH behaviours (PH Beliefs) were the most significant predictors of PH Behaviour, and accounted for a large percentage of the variance in this scale. Furthermore, there was a moderately high positive correlation between PH Behaviour scores and PH Belief scores ($r = .42$, $p < .0001$). The higher correlation which occurred between PH Behaviour-endorsed and PH Beliefs (.92) was due in part to the items in the endorsed scale being conditional upon the PH beliefs scale.

The average score for items in the PH Behaviour scale (from a possible range of 0 to 4) was 2.49 while the average score for items in the PH Behaviour-endorsed was 2.92. This indicates a 10.75% increase in the participation levels of PH Behaviours which are perceived as being very healthy. A t-test found that the difference in these average scores was statistically significant. Thus it appears that PH behaviours which are believed to be effective in promoting one's health are more likely to be engaged in than those behaviours perceived as being less than very healthy.

3. The third hypothesis stated that internal locus of control beliefs and health value will be better predictors of those PH behaviours which subjects perceive as being very healthy (PH Behaviour-endorsed), than a more comprehensive list of PH behaviours, which does not take into account subjects' perceptions of efficacy (PH Behaviour).

The results of this study also confirmed this hypothesis. A number of stepwise multiple regression analyses found that the best set of predictors of PH Behaviour were health value and age, whereas sex, health value and internal locus of control beliefs were found to be the best set of predictors of the PH Behaviour-endorsed scale. For those subjects with high health values, the internal locus of control variable predicted a significant amount of the variance

in PH Behaviour-endorsed but not in PH Behaviour. Thus, the use of the endorsed PH Behaviour scale produced results more in accord with studies by Mechanic and Cleary (1980), Saltzer (1982), Seeman and Seeman (1983) and K. A. Wallston et al (1976) which found that subjects who valued their health highly and had high internal locus of control beliefs were more likely to engage in the PH behaviours being investigated. The findings of this study are also support Wallston and Wallston's prediction that:

> "health locus of control beliefs should predict health behaviour only under high health value conditions" (Wallston and Wallston 1981 p 17).

The findings of this study contrast with Wallston and Wallston's (1982) review of the health locus of control literature, which concluded that internal locus of control and health value are not predictive of most PH behaviours, other than smoking. (They concluded that these variables were more successful at predicting compliance to curative medical regimens.) For example, studies by Wurtele et al (1985) and Winefield (1982) found that health locus of control beliefs were unrelated to PH behaviour even for those subjects who rated the importance of their health relatively highly. However the subjects of both of these studies were university students who characteristically are young, have been shown to have high internal beliefs and have limited control over their lifestyle because of such restrictions as hostel life, limited budgets and the strong influence of peer groups (Wurtele et al 1985). In contrast, the use of older adult subjects in those studies by Mechanic and Cleary (1980), and Seeman and Seeman (1983) resulted in significant relationships occurring between health locus of control beliefs, health value and PH behaviour. The present study also used university students as subjects, and the fact that significant relationships were found may have been due to the important methodological differences between the studies.

The findings of this study using both the original PH behaviour scale and the endorsed PH behaviour scale are in accord with predictions based on Rotter's (1966) social learning theory. Rotter (1972) stated that the probability of a particular behaviour occurring depends on the expectancy that that behaviour

will lead to a particular reinforcement, as well as the value of that reinforcement to the individual.

The results of this study also indicate that beliefs about the efficacy of PH behaviours are an important predictor of participation in preventive health actions. This finding supports research conducted into the 'perceived benefits' variable of the Health Belief Model which found that the likelihood of engaging in the preventive health actions investigated in a number of studies, was positively correlated with beliefs about the effectiveness of those actions to reduce the disease threat (review by Becker and Rosenstock 1984). For example, a study by Langlie (1977) found that the two most significant variables to account for the variance in PH behaviours were: perceptions of control over health and perceptions that the benefits of PH behaviour are high or the costs are low.

The importance of investigating PH behaviours which subjects perceive as being effective in promoting or maintaining their health to investigate the phenomenon of PH behaviour, is illustrated by the contrasting results which emerged from the comparison of the two PH behaviour scales. A substantial amount of the variation in PH behaviour participation can be explained by differences in individuals' perceptions of the relevance of those behaviours to promoting and maintaining one's health. A original list of PH behaviours produced different predictor variables than a selection of only those PH behaviours which subjects perceived as being healthy (the PH Behaviour-endorsed scale).

However, the predictor variables explained more of the variance in the PH Behaviour scale than in the PH Behaviour-endorsed scale. This may have been because it was not possible to use the PH Beliefs variable as a predictor variable when using the PH Behaviour-endorsed scale, (although evidence from other analyses indicated that potentially it would explain a substantial amount of the variance in PH behaviour). The variable could not be used because PH Beliefs had already been incorporated into the endorsed scale in the selection process of items for this scale (refer to the Method for details). Another explanation for this finding may be that the two PH behaviour scales

were different sizes (PH Behaviour-endorsed is approximately half the size of the PH Behaviour scale), which affected on their variances. The variance of the PH Behaviour scale (192.85) was considerably smaller than the variance of the PH Behaviour-endorsed scale (342.65). This would explain why a smaller amount of variance in the PH Behaviour-endorsed scale was accounted for by the predictor variables.

Methodological Issues

One of the factors which may account for the contradictory results which have occurred in previous research, is the small selection of medically-endorsed PH behaviours which have been used in the majority of studies in this area. Results have then been discussed in terms of a general phenomenon of PH behaviour as if it were a unidimensional concept. (eg. Haefner and Kirscht 1970; Kasl and Cobb 1966; Suchman 1964; Tash, O'Shea and Cohen 1969). An important methodological difference in this study is that a wider selection of PH behaviours (including a number of actions not currently recommended by medical practitioners), was used in this study to measure the phenomenon of PH behaviour, than has been used in previous research. Intercorrelational reliablity tests conducted among the PH behaviour items used in this study indicate that while many significant correlations exist among the various behaviours, it is by no means a unidimensional concept.

Contradictory results which have arisen in past studies may also be explained by the fact that these studies have not measured subjects' perceived efficacy of the PH behaviours which they investigated. Therefore subjects may not have been consistent in their participation in these PH behaviours, as these behaviours may not have been seen as being healthy, and subjects may well have had other reasons for engaging in those behaviours. According to Bem and Allen (1974), consistency across a range of behaviours is likely to occur when those behaviours

> "...are perceived as functionally equivalent in terms of their relation to some common criterion" (Bem and Allen 1974 p 512).

This study has shown that if behaviours are perceived as being health-promoting, then they are more likely to be engaged in for that purpose and people are more likely to be consistent in their participation in these behaviours.

The importance of measuring subjects' perceptions of PH behaviour was also reflected in the phrasing of items in the PH Beliefs and PH Behaviour scales of the questionnaire used in this study (eg. "doing things in moderation" and drinking too much alcohol"). The possible responses to the items range from "always", "often" to "never", and were designed to gauge subjective perceptions of the level of health-enhancing and health-detracting behaviours which they engaged in rather than objective, quantifiable estimates of the levels of PH behaviour participation. The health status measure used in this study also included a combination of subjective ranking of health status and more quantifiable measures.

The salience of measuring subjects' perceptions of health and health behaviour has been acknowledged by the self-regulation perspective which emphasizes the importance of being aware of the processes underlying a person's actions. These processes include the individual's perceptions of the risk of particular illnesses, the causes of those illnesses, the feedback the individual receives from behaviour changes s/he makes to reduce the risk of illness, and the attribution of change to his/her own efforts in generating effective behaviours (Leventhal 1983). People adopt a wide range of actions both to treat and prevent illness without medical advice, as part of the experimentation process which the self-regulation approach views as a vital component of preventive health behaviour.

The amount of variance accounted for by internal locus of control beliefs, the value a subject places upon his/her health, and beliefs about the efficacy of PH behaviour was moderate but reasonable. However, the variables tested here are only some of the many variables which have been shown to influence people's participation in PH behaviour (Steele and McBroom 1972). The actions people take to maintain or promote their health involve a complex range of behaviours which are determined by a multitude of factors including a

host of external and situational factors such as symptoms, costs and accessibility to health care services. Wallston and Wallston (1981, 1982) have always emphasized the importance of other factors which need to be taken into account in the prediction of preventive health behaviour, including the actual enviromental contingencies operating in a situation, as well as behavioural expectancies. This study was not designed specifically to maximise the prediction of PH behaviour by including all possible variables influencing PH behaviour-participation.

FURTHER FINDINGS OF THIS STUDY

High and Low Health Value Subjects

For those subjects with high health values, the internal locus of control variable predicted a significant amount of the variance in PH Behaviour-endorsed but not in PH Behaviour. In contrast, for those subjects with low health values, results were reversed. Internal locus of control beliefs predicted a significant amount of the variance in PH Behaviours but not in PH Behaviour-endorsed. Reasons for the unexpected results obtained for the low health value group could be statistical, methodological or theoretical.

Firstly a statistical reason for this result is that the variances in PH Behaviour, PH Behaviour-endorsed and internal locus of control beliefs in the two groups compared (low and high health value subjects) were different. The low health value group was found to have much higher variances for all three variables than the high health value group (refer to Appendix G for details of variances), thus making prediction of this group more difficult.

Secondly, a methodological reason for the findings is that the way in which the subjects were split into two groups in terms of health value. This study assigned subjects with health value rankings of between 1 and 4 (inclusive) to the high health value group while those with rankings of 5 to 9 were assigned to the low health value group (as this median split produced two groups approximately equal in size). The distribution of health value scores from

sample to sample often varies, so dividing the sample into two equal sized groups may produce splits at different health values. For example, 49% of the sample studied by McCusker and Morrow (1979) ranked health as first priority so a median split meant that those who ranked health second or less were assigned to a low health value group. Furthermore, an alternative split for other reasons would also produce different results.

Finally, a theoretical explanation for the findings is that high health value subjects with high internal beliefs, were motivated to engage in PH behaviours which they perceive as being health-promoting because they perceived themselves to be in control of their health and they valued health highly. When a wider range of PH Behaviours was used (including those behaviours which subjects have not rated as very healthy), internal locus of control beliefs no longer predicted PH behaviour because, although these subjects believed they had personal control over their health, they did not perceive these behaviours to be health-promoting, so they chose not to engage in them. Because the PH Behaviour scale includes behaviours not perceived of as very healthy, this weakened the ability of internal locus of control beliefs to predict PH Behaviour. In contrast, low health value subjects with high internal locus of control beliefs, may not have the same degree of motivation to engage in PH behaviours which they perceived as being health-promoting because they valued their health less. However, when a wider range of PH Behaviours was measured, other reasons for engaging in these behaviours may have become motivating factors. Thus it appears that subjects who valued their health highly, engaged in PH behaviours for the purpose of promoting good health while for subjects who have low health value, the PH behaviours which they engaged in may not have specifically been for the promotion or maintenance of good health.

It is impossible to determine which of the explanations accounts for the results of this study but it is likely that they are due to a combination of these reasons.

Health Value Measures

The comparison made by this study of the two measures of health value commonly used in this area of research found that a moderately significant correlation occurred between the two health value measures, HV-Rank and HV-Index ($r=.30$, $p<.0001$). This result supports a previous study by Wurtele et al (1985) which also found that the two measures were significantly correlated ($r=.29$, $p<.001$). This correlation was not as high as expected considering the two scales both claim to measure the value an individual places upon his or her health.

The two health value scales also behaved quite differently in both the bivariate and multivariate analyses. In the study by Wurtele and colleagues, HV-Rank had no significant relationship with the PH Behaviour index used in their research. However in the present study, HV-Rank was correlated significantly with both PH Behaviour and with PH Beliefs and the HV-Index was significantly correlated with self-reported PH Behaviour but not with PH Beliefs. In contrast, HV-Rank was not significantly correlated with the endorsed PH Behaviour scale or its corresponding PH Beliefs scale while HV-Index was found to be significantly correlated with both. Furthermore, a number of all-in multiple regression analyses using the PH behaviour scale found that HV-Rank was a significant contributor to the prediction of PH behaviour whereas HV-Index was not. However the HV-Index was consistently found to be a better predictor of endorsed PH Behaviour than the HV-Rank scale. Although significant correlation between the two health value measures, tolerance levels in the analyses were not exceeded so these results cannot be attributed to multicollinearity. Instead, it appears that the two scales may be measuring two different aspects of health value. While the HV-Index appears to measure general concerns about health, the HV-Rank requires subjects to prioritise health within a number of other values. Although health may be considered important, when forced to choose between health and other values such as happiness, true friendship and a world at peace, health may very well receive less than first priority. This finding has important implications for the interpretation of research results of research conducted in this area as researchers have tended to use either health value scale on an arbitrary basis,

with the underlying assumption that they are measuring the same thing. This may be another contributing factor to the inconsistent results of research conducted in this area.

Locus of control Beliefs

Among the locus of control subscales, some interesting findings were noted. The results of a series of multivariate analyses indicated that, of the three subscales of the locus of control construct, internal locus of control was the only subscale to be a significant predictor of PH Behaviour and PH Behaviour-endorsed. The chance and powerful others subscales were insignificant in all of the multivariate analyses. The study also found that the internal locus of control beliefs subscale was significantly and negatively correlated with the chance beliefs subscale but not with the powerful others subscale. This is in accord with results of previous studies which have found that beliefs about powerful others control were largely independent of beliefs in personal (i.e. internal) control over health outcomes (Wallston et al 1978).

Perceived Control

Beliefs about the efficacy of PH behaviours (PH Beliefs) were not highly correlated with internal locus of control beliefs ($r=.10$ $p=.079$), which would indicate that the effect of internal locus of control beliefs on PH behaviour are not mediated by subjects' beliefs about the efficacy of particular PH behaviours. Wallston and colleagues (Wallston et al 1987) defined perceived control as "the belief that one can determine one's own internal states and behaviour, influence one's environment and/or bring about desired outcomes" (p 6). This is a broader definition than has been used in past research by these and other researchers investigating the locus of control concept. For example, Smith, Wallston, Wallston, Forsberg and King (1984) only measured perceived control over health care processes, while reviews by Wallston and Wallston (1981 and 1982) have discussed locus of control in terms of perceived control over behaviour and outcomes. It has been argued that the perceived relevance of a behaviour to one's health is equivalent to internal locus of control beliefs

(i.e. the belief that outcomes are contingent on one's behaviour) (Wallston and Wallston 1981). The fact that significant correlations were not found between PH Beliefs and locus of control beliefs indicates that the perceived relevance of a behaviour to health (which was measured in the PH Beliefs variable in this study) is not the same as the construct of internal health locus of control or beliefs that health outcomes are dependent on one's behaviour (Kristiansen 1985). This is in accord with Nelson and Cohen (1983) who found that perceived control is not lessened by a lack of relationship between behaviour and outcome.

Wallston et al (1987) emphasized that it is necessary to distinguish between perceptions of control over one's behaviour and perceptions of control over one's outcomes or reinforcements. The perception of control over one's behaviour is known as self-efficacy (Bandura 1977), or the belief that one is capable of carrying out a particular health action. If a person has low self-efficacy in relation to a specific health behaviour, this is likely to decrease the likelihood of that person engaging in that behaviour. However, self-efficacy, although a necessary condition for the execution of PH behaviours, it is not the only thing needed as a person may lack the motivation to engage in PH behaviours. Two studies discussed by Wallston et al (1987) have supported the idea that perceived control over outcomes is mediated by perceived control over behaviour. Further research into the measurement of self-efficacy may provide greater insight into the relationship between perceived control and health-related behaviours.

Beliefs about control also need to be differentiated from desire for control, because although a person may believe that s/he is able to control her/his health, this does not necessarily mean that s/he wants that control or conversely wanting control over health does not necessarily mean that a person is able to control his/her health. Control over health also needs to be differentiated from responsibility for health as this equates with what one should do, while control is concerned with what one is able to do (Wallston et al 1987). It is also necessary to distinguish between perceived control over the cause of a health condition and control over its solution. This has not been

done in many studies. Further research is needed to investigate the relationships among these constructs.

Health Status

Health status and experience are likely to be influential in determining a person's perceptions of the controllability of health matters. The more experience a person has with ill health, the weaker are likely to be his/her beliefs about personal control over health. Although a reciprocal relationship has been thought to exist between health beliefs and health status (i.e. health beliefs affect health status directly or indirectly and in turn, health status or experience with illness, has an effect on health beliefs), in this study no relationships were found among locus of control beliefs, PH behaviour, (or PH Behaviour-endorsed) and health status. Health status was not found to be highly correlated with PH Behaviour or PH Beliefs and was not significantly predicted by either of these variables. It appears then, that the level of PH behaviour subjects engaged in was unrelated to their health status. Because the sample consisted of mainly young people, the effects of health beliefs were probably not yet reflected in the subjects' health status (Winefield 1982) and in turn, having had little experience with ill health, this factor has not influenced health beliefs. These results support findings from other studies including the longitudinal study conducted by Seeman and Seeman (1983) which used random adult samples and found that internal locus of control beliefs were significant in determining levels of PH behaviour at the end of the year-long study when subjects' initial health status ratings were controlled for. Thus, the relationship between subjects' health beliefs and health behaviour was not explained by their health status. Harris and Guten (1979), using a randomly selected adult sample, also found that health-related behaviours did not vary as a function of health status. In contrast, Wurtele et al (1985), using a sample of university students, found that health status combined with health value were better predictors of PH behaviour than internal locus of control beliefs. However this study used only part of the health status index formulated by Lau and Ware (1981) in which subjects rated their health status in terms of perfect, excellent, good, fair or poor. In contrast, the present study used the whole health status index (Lau and Ware 1981) which consisted of a subjective rating

of health status as well as a more objective rating. The alternative measure of health status and the different method of data analysis used in the study by Wurtele and colleagues may account for the contrasting results achieved.

Gender and Preventive Health Behaviour

Sex was one of the demographic variables which was significantly correlated with PH Beliefs and the PH Behaviour-endorsed scale, but not with the PH Behaviour scale. Two multiple regression analyses selected sex as a significant variable in predicting PH Behaviour (when PH Beliefs was omitted), while five of the analyses using PH Behaviour-endorsed selected sex as a significant predictor. These results indicate that female subjects were more likely to engage in PH behaviour than males and this relationship was more evident with endorsed PH Behaviour.

Age of the Sample

Another variable found to be predictive of PH behaviour was age. As the subjects used in this study were first year university students, most were between 17 and 20 years of age (71.3 %), and a total of 98.2 % were between the ages of 17 and 26. However, the sample also contained a few older subjects including three subjects over the age of 50. These outlying subjects would have increased the overall mean of the sample and may explain why age was one of the significant predictors of PH behaviour. Because this sample was not random in terms of age, is not possible to extrapolate the findings of this study to a more general population. However, it would be expected that if an older sample of people were investigated, the significance of internal locus of control beliefs would become even more apparent as they are likely to have had more experience with illness, and this has been shown in previous studies to strengthen the relationship between locus of control beliefs and health behaviour (eg. Seeman and Seeman 1983).

METHODOLOGICAL LIMITATIONS OF THIS STUDY

The Sample

This study used a sample of first year university students with an average age of 21.4 years. Young people have generally had little experience with ill health so they are less likely to have made conscious decisions about their lifestyles and the behaviour they engage in to prevent illness. Also the effects of locus of control beliefs on the sample's health status is unlikely to have had an effect on this young sample. First year university students are also less likely to show a strong relationship between internality and PH behaviour as they usually have less control over their lifestyle (because of a limited budget, living in hostels with meals provided, the strong influence of peer groups and other factors) so even if strong internal beliefs were held, they may not be evidenced by high levels of PH behaviour participation.

Furthermore the sample tended to be of higher socioeconomic status than a random sample would be. People of high socioeconomic status are more likely to hold internal beliefs and to practice PH behaviours (Langlie 1977; McCusker and Morrow 1979). From a comparison of the normative data generated by K. A. Wallston, it is apparent that the overall level of internal locus of control beliefs was higher than that of a more random sample. No normative data exists on the PH Behaviour scale used, so it is impossible to draw conclusions about the level of PH behaviour participation of this sample compared to more random samples.

The fact that significant relationships were found in this sample despite these limitations, indicates the strength of the relationship between internal locus of control beliefs, health value and PH behaviour involvement.

Methodology

This study may also have been limited in that PH behaviour participation was not measured directly but relied on self-report measures. Furthermore although questions in the health value measures were phrased in different ways, these measures were not dissociated from the PH behaviour participation measures so it is possible that respondents tried to answer the questionnaire consistently across the PH behaviour items and health value measures (Heberlein and Black 1976). Furthermore, the correlational nature of this study makes it impossible to draw causal conclusions about whether having internal locus of control beliefs and valuing health highly causes people to engage in more preventive health behaviour.

CHAPTER NINE

CONCLUSION

The results of this study indicate that the internal locus of control beliefs variable is an important predictor of preventive health behaviour, particularly when considered in conjunction with health value and when a comprehensive range of preventive health behaviours is measured. Independently both internal locus of control beliefs and health value were significant predictors of preventive health behaviour but prediction was enhanced when they were considered in conjunction with each other. The study has illustrated the importance of measuring a wide range of preventive health actions which subjects actually perceive as being health-promoting, in order to achieve an accurate indication of the level of subjects' participation in preventive health behaviour. When this is done, the relationship between locus of control and health behaviours is much more evident than when only small numbers of arbitrarily selected preventive health behaviours are investigated. This relationship is even more apparent when subjects' health value is also taken into account. This study also found that when beliefs about the effectiveness of various actions in maintaining or improving health are measured in conjunction with participation in those actions, it is apparent that those behaviours which are perceived as being healthy are more likely to be engaged in.

These outcomes illustrate the importance of designing research to incorporate subjects' perspectives rather than designing it from a medical perspective (Dowie 1975; Harris and Guten 1979) as ultimately this is the important determinant of participation in these activities.

The results of this study provide an important new development in the research into locus of control beliefs in relation to preventive health behaviour. The results of previous studies have been inconsistent, with some studies establishing that locus of control beliefs were a significant predictor of

preventive health behaviour while other studies have found no such relationship. In all studies, the variance explained by this construct has been small. The methodological changes instigated in this study have increased the amount of variance explained by the locus of control construct. However it is important to remember that the actions people take to maintain or promote their health involve a range of behaviours which are determined by a number of factors including situational factors.

Further Research

Because of the limitations of using university students as subjects, it would be useful to carry out this study using a more random sample and compare the results. Longitudinal studies also need to be conducted in order to determine if a causal relationship exists among health beliefs and preventive health behaviour.

Research also needs to continue to delineate the links between health-risk-increasing and health-enhancing behaviours and their effects on health status, particularly using longitudinal research designs to establish causal relationships. Existing measures of health status such as morbidity and changes in disease states are inadequate when used in isolation, as they convey little about the effects of lifestyle changes on a person's overall quality of life experience (Kaplan 1984; Sechrest and Cohen 1982; Stone 1979a).

Further research needs to be conducted into the dimensions of PH behaviour in terms of what actions are actually involved (Harris and Guten 1979) and to develop uniform operational definitions, so that comparisons of research results will be more meaningful. In addition, relationships among various preventive health behaviours need to be investigated. Some attempts have been made to classify a range of PH behaviours into categories. For example, Langlie (1977) has attempted to derive a more conceptually consistent measure of PH behaviour by classifying behaviours into direct risk (those behaviours in which "inappropriate behaviour involves a direct risk (eg driving or walking recklessly or putting yourself in contact with smoke or germs has a

direct potential for producing injury or disease)" and indirect risk behaviours as those that involve "a failure to follow medical recommendations...(or behaviour that is) not hazardous in and of itself... (eg. failure to be immunised)" (p 248). All of the intercorrelations among the direct risk behaviours and 90.5% of intercorrelations among the indirect risk behaviours, were significantly positive and the strength of the association within these two subject groups was much larger than those found with the range of PH behaviours taken as a whole. These results were clearly confirmed by factor analysis.

More research needs to be carried out on the validity of the two health value measures used in this study, using different population samples, as this study and one by Wurtele et al (1985) have found that the two scales may actually be measuring different aspects of health value.

Attribution Theory

An extension of the locus of control construct is attribution theory which is concerned with how an individual ascribes a cause to an effect (Weiner 1979). Attribution theory is linked ideologically with the locus of control construct as it supports Rotter's (1966) theory that the probability of behaviour occurring depends on the expectancy for reinforcement together with the value placed upon that reinforcement. However it deals with causal relationships which are inferred for outcomes that have occurred in the past, while the locus of control construct deals with expectancies for future events. Attribution theory maintains that causes tend to fall along several dimensions: stability, whether the cause is enduring or variable; locus, whether the cause is internal of external to the person; and control, whether or not the individual has control over the cause (Lowery 1981). Weiner (1979) maintains that where the locus and control dimensions are confounded, inconsistencies in results occur. Weiner refers to the locus of control dimension as the locus of causality because he views the source of reinforcement (internal of external) as distinct from its controllability. The relationship between controllability and internality is unclear. Some studies (eg. DuCette and Keane, 1984 cited in Wallston 1987) suggest that there is an almost perfect positive correlation between the two dimensions but other studies have questioned this result. For example, although a person may

feel that the cause of an illness is internally located, that person may still feel no personal control over the symptoms of that illness (Wallston 1987). Future research may well benefit from differentiating locus of control along the two dimensions of locus of causality and controllability (Wallston and Wallston 1980).

Practical Implications of Study Findings

The findings of this study indicate that internal locus of control beliefs are more likely to be associated with high levels of PH behaviour particularly for those people who value their health highly and strongly believe in the efficacy of those behaviours. Therefore it would appear that interventions designed to increased levels of preventive health behaviour should aim at increasing people's beliefs regarding their ability to exert personal control over their health where this is appropriate, and the health care system should be oriented to giving as much personal responsibility to people as is practicably possible. Strong beliefs about personal control over health encourage people to take responsibility and become more active participants in the maintenance and protection of their health. Martlatt and Gordan (1980) suggest that being an active agent in one's health care may be very important in motivating and effecting long term behavioural change. Beliefs about personal control have also been associated with feelings of competence, and long term behaviour change is facilitated if a person perceives him or herself as being competent (Bandura 1977). Furthermore the belief in one's capacity to be effective in performing certain actions may be critical for resisting pressures to adopt risk behaviours (Bandura 1977). People with low self-esteem have difficulty in carrying out appropriate behaviours when their health is threatened (Brockner 1979). Individuals with a positive sense of self are more likely to be future oriented in that they will be concerned with and will prepare for their future welfare as well as having a greater sense of personal autonomy (Cottle, Howard and Pleck 1969; McClelland 1978).

Preventive health interventions also need to endeavour to increase people's beliefs about the efficacy of those PH behaviours which have proven efficacy in the maintenance of good health, as this study has shown that strong beliefs

about the efficacy of PH behaviours is a necessary prerequisite to engaging in them. In a study by Haefner and Kirscht (1970) increasing subjects' beliefs in the benefits of following professional health advice (as well as increasing their perceived threat of illness) led to a statistically significant increase in the number of check-up appointments, when no symptoms were apparent.

The Future of Preventive Health Care

Although a great deal of attention has been paid to the concept of preventive health care, it has largely been overshadowed by the dramatic advances in drug and surgical therapies seen in the last century. The disease-oriented approach continues to dominate the training and perspectives of most medical practitioners. Most of the advances made in preventive health care in this century have been brought about by improvements in living standards throughout the Western world (Bolden 1980). Deaths from preventable diseases such as cardiovascular disease continue to rise and the effectiveness of some immunisation programs is declining. The present health care system is facing criticism from consumers of health care, health pressure groups and self-help groups who are questioning the established forms of health care delivery based upon a disease-oriented model. The medical care system places excessive emphasis on medical technology and specialisation, and overlooks environmental, social, economic and behavioural factors in the etiology of illness (Taylor 1980). Womens Health Centres are an example of consumer resistance which has lead to the creation of alternative forms of health care which have emphasized the need to share information and power. Increased patient participation and control in the primary health care field is needed. In order for this to occur, the medical system needs to become more sensitive and flexible to consumer needs, so that people can exert a certain amount of control both over their own health and within the medical health system at large.

REFERENCES

Abraham, S., & Johnson, C. (1980). Prevalence of severe obesity in adults in the US. American Journal of Clinical Nutrition, 33, 364-369.

Aho, W. R. (1979). Smoking, dieting and exercise: Age differences in attitudes and behaviour relevant to selected Health Belief Model variables. Rhode Island Medical Journal, 62, 85-92.

Ajzen, I., & Fishbein, A. (1977). Attitude-behaviour relations: A theoretical analysis and review of empirical research. Psychological Bulletin,84, 888-918.

Anderson, J. G., & Bartkus, D. E. (1973). Choice of medical care: A behavioural model of health and illness behaviour. Journal of Health and Social Behaviour, 14, 348-362.

Antonovsky, A. (1987). Unraveling the Mystery of Health. How People Manage Stress and Stay Well. San Francisco: Jossey Bass.

Arakelian, M. (1980). An assessment and nursing application of the concept of locus of control. Advances in Nursing Science, 3, 25-39.

Ardell, D.B. (1979). High Level Wellness. New York: Bantam.

Atkinson, J. W., & Feather, N., (Eds.). (1966). A Theory of Achievement Motivation. New York: John Wiley and Sons.

Averill, J. R. (1973). Personal control over aversive stimuli and its relationship to stress. Psychological Bulletin, 80, 286-303.

Balch, P., & Ross, A. W. (1975). Predicting success in weight reduction as a function of locus of control: A unidimensional and multidimensional approach. Journal of Consulting and Clinical Psychology, 43, 119 (brief report).

Balint, M. (1964). The Doctor, His Patient and the Illness. London: Pitman.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behaviour change. Psychological Review, 84, 191-215.

Baric, L. (1969). Recognition of the 'at risk' role: A means to influence health behaviour. International Journal of Health Education, 12, 24-34.

Battistella, R. M. (1971). Factors associated with delay of the initiation of physicians' care among late adulthood persons. American Journal of Public Health, 61, 1348-1361.

Becker, M. H. (1972). Motivations as predictors of health behaviour. Health Services Reports, 87, 852-862.

Becker, M. H. (1974a). The health belief model and personal health behaviour. Health Education Monographs, 2, 326-473.

Becker, M. H. (1974b). The health belief model and sick role behaviour. Health Education Monographs, 2, 409-419.

Becker, M. H., Drachman, R. H., & Kirscht, J. P. (1972). Predicting mother's compliance with pediatric medical regimens. Journal of Pediatrics, 81, 843-845.

Becker, M. H., Drachman, R. H., & Kirscht, J. P. (1974). A new approach to explaining sick-role behaviour in low income populations. American Journal of Public Health, 64, 205-216.

Becker, M. H., Haefner, D. P., Kasl, S. V., Kirscht, J. P., Maiman, L. A., & Rosenstock, I. M. (1977). Selected psychosocial models and correlates of individual health-related behaviour. Medical Care, 15, 27-48.

Becker, M. H., Kaback, M. M., & Rosenstock, I. M. (1975). Some influences on public participation in a genetic screening program. Journal of Community Health, 1, 3-14.

Becker, M. H., & Maiman, L. A. (1975). Sociobehavioural determinants of compliance with health and medical care recommendations. Medical Care, 13, 10-24.

Becker, M. H., Maiman, L. A., Kirscht, J. P., Haefner, D. P., & Drachman, R. (1977). The health belief model and prediction of dietary compliance: A field experiment. Journal of Health and Social Behaviour, 18, 348-366.

Becker, M. H., Radius, S. M., & Rosenstock, I. M. (1978). Compliance with a medical regimen for asthma: A test of the health belief model. Public Health Reports, 93, 268-277.

Becker, M. H. & Rosenstock, I. M. (1984). Compliance with medical advice. In A. Steptoe & A. Mathews (Eds.), Health Care and Human Behaviour (pp. 175-208). London: Academic Press.

Bellack, A. S., Rozensky, R., & Schwartz, J. A. (1974). Comparison of two forms of self-monitoring in a behavioural weight reduction program. Behaviour Therapy, 5, 523-530.

Belloc, N. B. (1973). Relationship of health practices and mortality. Preventive Medicine, 2, 67-81.

Belloc, N. B. & Breslow, L. (1972). Relationship of physical health status and health practices. Preventive Medicine, 1, 409-421.

Belloc, L., & Enstrom, J. E. (1980). Persistence of health habits and their relationship to mortality. Preventive Medicine, 9, 469-483.

Bem, K. J., & Allen, A. (1974). On predicting some of the people some of the time. The search for cross-situational consistencies in behaviour. Psychological Review, 81, 506-520.

Berg, R. L. (1976). The high cost of self-deception. Preventive Medicine, 5, 483-495.

Berkanovic, E. (1976). Behavioural science and prevention. Preventive Medicine, 5, 92-105.

Berkowitz, N. H., Malone, M. F., Klein, M. W., & Eaton, A. (1963). A patient follow-through in the outpatient department. Nursing Research, 12, 16-22.

Blackwell, B. (1976). Treatment adherance. British Journal of Psychiatry, 129, 513-531.

Blackwell, B., & Gutmann, M. C. (1985). Compliance. In C. J. Bulpitt (Ed.), Handbook of Hypertension Vol 6: Epidemiology of Hypertension (pp. 453-464). New York: Elsevier.

Bolden, J. J. (1980). Preventive care. In J. Fry (Ed.), Primary Care (pp.373-394). London: Heinemann.

Breslow, L. (1977). A policy assessment of preventive health practice. Preventive Medicine, 6, 242-251.

Breslow, L. & Enstrom, J. E. (1980). Persistence of health habits and their relationship to mortality. Preventive Medicine, 9, 469-483.

Brockner, J. (1979). Self esteem, self consciousness and task performance: Replications, extensions and possible explanations. Journal of Personality and Social Psychology, 37, 447-461.

Brown, J. S., Perman, B. S., & Dobbs, J. L. (1981). The will to live. Research on Aging, 3, 182-201.

Brownell, K. D., & Stunkard, A. J. (1978). Behaviour therapy and behaviour change. Uncertainties in programs for weight control. Behaviour Research and Therapy, 16, 301 (brief report).

Bulpitt, C. J., & Fletcher, A. E. (1985). Quality of life in hypertensive patients on different anti-hypertensive treatments: Rationale for methods employed in a multicenter randomised controlled trial. Journal of Cardiavascular Pharmacology, 7, 5137-5145.

Burish, T. G., & Bradley, L. A. (1983). Coping with chronic disease: Definitions and issues. In T.G. Burish & L.A. Bradley (Eds.), Coping with Chronic Illness: Research and Applications (pp. 3-37). New York: Academic Press.

Caldwell, J., Cobb, S., Dowling, M. D., & Jongh, D. D. (1970). The dropout problem in anti-hypertensive treatment. Journal of Chronic Disease, 22, 579-592.

Charney, E. (1975). Compliance and prescribance. American Journal of Disabled Children, 129, 1009-1010.

Chrisman, N. J. (1977). The health seeking process: An approach to the natural history of illness. Culture, Medicine and Psychiatry, 1, 351-377.

Christensen, D. B. (1978). Drug-taking compliance: A review and synthesis. Health Services Research, 13, 171-189.

Clarke, A. M., & Viney, L. L. (1979). The primary prevention of illness: A psychological perspective. Australian Psychologist, 14, 7-20.

Clark, C. M. (1979). In S. J. Cohen (Ed.), New Directions in Patient Compliance (pp xiii-xiv). Massachusetts: Lexington Books.

Coan, R. W. (1973). Personality variables associated with cigarette smoking. Journal of Personality and Social Psychology, 26, 86-104.

Coburn, D., & Pope, C. R. (1974). Socio-economic status and preventive health behaviour. Journal of health and Social Behaviour, 15, 67-78.

Cohen, N. J., & Alpert, M. (1978). Locus of control as a predictor of outcomes in the treatment of obesity. Psychological Reports, 42, 805-806.

Cohen, S. J. (Ed.). (1979). New Directions in Patient Compliance. Massachusetts: Lexington Books.

Cottle, T. J., Howard, R., & Pleck, J. (1969). Adolescent perception of time: The effects of age, sex and social class. Journal of Personality, 37, 636-650.

Cox, C. L. (1985). The Health Self-determinism Index. Nursing Research, 34, 177-183.

Cromwell, R. L., Butterfield, E. C., Brayfield, F. M., & Curry, J. J. (1977). Acute myocardial infarction: Reaction and recovery. St. Louis, Missouri: Mosby.

Crowne, D. P., & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. Journal of Consulting Psychology, 24, 349-354.

Cummings, K. M., Becker, M . H., Kirscht, J. P., & Levin, N. (1981). Intervention strategies to improve compliance with medical regimens. Journal of Behavioural Medicine, 4, 111-127.

Cummings, K. M., Becker, M. H., & Maile, M. C. (1980). Bringing the models together: An empirical approach to combining variables uses to explain health actions. Journal of Behavioural Medicine, 3, 123-145.

Cummings, K. M., Jette, A. M., & Rosenstock, I. M. (1978). Construct validation of the Health Belief Model. Health Education Monographs, 6, 394-405.

Dabbs, J., & Kisrcht, J. P. (1971). Internal control and the taking of influenza shots. Psychological Reports, 28, 959-962.

Danaher, K. (1979). Education for self care. In Management of Minor Illness (pp. 69-86) London: King Edward's Hospital Fund for London.

Davidson, P. O. (1982). Issues in patient's compliance. In T. Millon, C. Green, & R. Meagher (Eds.), Handbook of Clinical Health Physiology (pp. 54-67). New York: Plenum Press.

Davis, M. S. (1967). Predicting non-compliant behaviour. Journal of Health and Social Behaviour, 8, 265-271.

Davis, M. S. (1968). Physiologic, psychological and demographic factors in patient compliance with doctor's orders. Medical Care, 6, 115-122.

Dawber, T. R., Meadors, G. F., & Moore, F. E. (1951). Epidemiological approaches to heart disease: The Framington Study. American Journal of Public Health, 41, 279-286.

DeLeon, P. H., & Pallak, M. S. (1982). Public health and psychology: An important, expanding interaction. American Psychologist, 37, 934-965.

DeVellis, R. F., DeVellis, B. M., Wallston, K. A., & Wallston, B. S. (1980). Epilepsy and learned helplessness. Basic and Applied Social Psychology, 1, 241-253.

De Vito, A. J., Bogdanawicz, J., & Reznikoff, M. (1982). Actual and intended health related information seeking and health locus of control. Journal of Personality Assessment, 46, 63-69.

DiMatteo, M. R., & DiNicola, D. D. (1982). Achieving Patient Compliance. New York: Pergamon Press.

Dingle, J. H. (1973). The ills of man. Scientific American, 229, 77-84.

Dishman, R. K., Ickes, W., & Morgan, W. P. (1980). Self-motivation and adherance to habitual physical activity. Journal of Applied Social Psychology, 10, 115-132.

Dowie, J. (1975). The portfolio approach to health behaviour. Social Science and Medicine, 9, 619-631.

Dunbar, J. (1979). Issues in assessment. In S.J. Cohen (Ed.), New Directions in Patient Compliance (pp. 41-58). Massachusetts: Lexington Books.

Festinger, H. (1957). A Theory of Cognitive Dissonance. Illinois: Row Peterson.

Feuerstein, M., Labbe, E. E., & Kuczmierczyk, A. R. (1986). Health Psychology. A Psychobiological Perspective. New York: Plenum Press.

Fink, R., Shapiro, S., & Roester, R. (1972). Impact of efforts to increase participation in repetitive screenings for early breast cancer detection. American Journal of Public Health, 62, 328-336.

Gartner, A., & Reisman, F. (1976). Self help models and consumer intensive health practices. American Journal of Public Health, 66, 783-786.

Glazier, W. H. (1973). The task of medicine. Scientific American, 228, 13-17.

Gochman, D. S. (1977). Perceived vulnerabiltiy and its psychosocial context. Social Science and Medicine, 11, 115-120.

Gordis, L. (1979). Metholoigical issues in the measurement of patient compliance. In D. L. Sackett & R. B. Haynes (Eds.), Compliance with Therapeutic Regimens (pp. 51-66). Baltimore: John Hopkins University Press.

Gordis, L., Markowitz, M., & Lilienfield, A. M. (1969). Why patients don't follow medical advice: A study of children on long-term anti-streptococcal prophylaxis. Journal of Pediatrics, 75, 957-968.

Haefner, D. P., & Kirscht, J. P. (1970). Motivational and behavioural effects of modifying health beliefs. Public Health Reports, 85, 478-484.

Haggerty, R. J. (1979). Changing lifestyles to improve health. Preventive Medicine, 6, 276-289.

Hallal, J. C. (1982). The relationship of health beliefs, health locus of control and self concept to the practive of breast self-examination in adult women. Nursing Research, 31, 137-142.

Harris, D. M., & Guten, S. (1979). Health protective behaviour: An exploratory study. Journal of Health and Social Behaviour, 20, 17-29.

Hart, J. T. (1980). Hypertension. New York: Churchill Livingstone.

Hayes, D., & Ross, C. E. (1987). Concern with appearance, health beliefs and eating habits. Journal of Health and Social Behaviour, 28, 120-130.

Hayes-Bautista, D. E. (1976). Modifying the treatment: Patient compliance, patient control and medical care. Social Science and Medicine, 10, 233-238.

Haynes, R. B. (1976). A critical review of the "determinants" of patient compliance with therapeutic regimens. In D. L. Sackett & R. B. Haynes (Eds.), Compliance with Therapeutic Regimens (pp. 26-39). Baltimore: John Hopkins University Press.

Haynes, R. B. (1979). Introduction. In R. B. Haynes, D. W. Taylor & D. L. Sackett (Eds.), Compliance in Health Care (pp. 1-7). Baltimore: John Hopkins University Press.

Haynes, R. B., Sackett, D. L., & Gibson, E. S. (1976). Improvement of medication compliance in uncontrolled hypertension. Lancet ,1, 1265-1268.

Haynes, R. B., Taylor, D. W., & Sackett, D. L. (Eds.). (1979). Compliance in Health Care. John Hopkins University Press: Baltimore.

Heberlein, T. A., & Black, J. S. (1976). Attitudinal specificity and the prediction of behaviour in a field setting. Journal of Personality and Social Psychology, 33, 474-479.

Heinzelmann, F., & Bagley, R. W. (1970). Response to physical activity programs and their effects on health behaviour. Public Health Reports, 85, 905-911.

Henderson, J. B., Hall, S. M., & Lipton, H. L. (1982). Changing self-destructive behaviours. In G. C. Stone, F. Cohen, & N. E. Adler (Eds.). Health Psychology. A Handbook (pp. 141-160). San Francisco: Jossey-Bass.

Hershey, J. C., Morton, B. G., Davis, J. B., & Reichgott, M. J. (1980). Patient compliance with antihypertensive medication. American Journal of Public Health, 70, 1081-1089.

Herzlich, C. (1973). Health and Illness. New York: Academic Press.

Hochbaum, G. M. (1956). Why people seek diagnostic x-rays. Public Health Reports, 71, 377-380.

Hochbaum, G. M. (1970). Health Behaviour. California: Wadsworth.

Hulka, B. S., & Cassel, J. C. (1973). The AAFP-UNC study of the organization and assessment of primary medical care. American Journal of Public Health, 63, 494-501.

Hulley, S. B., Rosenman, R. H., Bawol, R. D., & Brand, R. J. (1980). Epidemiology as a guide to clinical decisions. New England Journal of Medicine, 302, 1383-1389.

Hunt, S. M., McKenna, S. P., McEwen, J., Backett, E. M., Williams, J., & Papp, E. (1980). A quantitative approach to perceived health status: A validation study. Journal of Epidemiology and Community Health, 34, 281-286.

Illich, I. (1976). Medical Nemesis: The Expropriation of Health. New York: Pantheon.

James, W. H., Woodruff, A. B., & Werner, W. (1965). Effect of internal and external control upon changes in smoking behaviour. Journal of Consulting Psychology, 29, 184-186.

Janis, I. L. (1984). The patient as decision maker. In W.D. Gentry (Ed.), Handbook of Behavioural Medicine (pp. 326-368). New York: Guilford Press.

Janis. I. L., & Rodin J. (1979). Attribution, control and decision making: Social psychology and health care. In G. C. Stone, F. Cohen, & N. E. Adler (Eds.). Health Psychology. A Handbook (pp. 487-521). San Francisco: Jossey-Bass.

Janz, N. K., & Becker, M. H. (1984). The Health Belief Model: A decade later. Health Education Quarterly, 11 (1), 1-47.

Jette, A. J. (1980). Health status indicatiors: The utility and chronic disease evaluation research. Journal of Chronic Diseases, 33, 567-579.

Jette, A. M., Cummings, M., Brock, B. M., Phelps, M. C., & Naessens, J. (1981). The structure and reliability of health belief indices. Health Services Research, 16, 81-98.

Kaplan, G. D., & Cowles, A. (1978). Health locus of control and health value in the prediction of smoking reduction. Health Education Monographs, 6, 129-137.

Kaplan, R. M. (1984). The connection between clinical health promotion and health status. A critical overview. American Psychologist, 39, 755-765.

Kasl, S. V. (1974). The health belief model and behaviour related to chronic illness. Health Education Monographs, 2, 433-454.

Kasl, S. V. (1975). Issues in patient adherance to health care regimens. Journal of Human Stress, 1, 5-48.

Kasl, S. A., & Cobb, S. (1966). Health behaviour, illness behaviour and sick role behaviour. 1. Health and illness behaviour. Archives of Environmental health, 12, 246-266.

Kegeles, S. S. (1963). Why people seek dental care: A test of a conceptual formulation. Journal of Health and Human Behaviour, 4, 166-173.

Kelly, P. T. (1979). Breast self-examinations: Who does them and why? Journal of Behavioural Medicine, 2, 31-38.

King, J. B. (1982). The impact of patients' perceptions of high blood pressure on attendance at screening: An extension of the Health Belief Model. Social Science and Medicine, 16, 1079-1091.

King, N. J., & Remenyi, A. (Eds.). (1986). Health Care, A Behavioural Approach. Sydney: Grune & Stratton.

Kirscht, J. P. (1972). Perceptions of control and health beliefs. Canadian Journal of Behavioural Science, 4, 225-237.

Kirscht, J. P. (1974). The Health Belief Model and illness behavour. Health Education Monographs, 2, 387-408.

Kirscht, J. P. (1977). Psychological and social factors as predictors of medical behaviour. Medical Care, 14, 422-431.

Kirscht, J. P., Becker, M. H., & Eveland, J. P. (1976). Psychological and social factors as predictors of medical behaviour. Medical Care, 14, 422-431.

Kirscht, J. P., Haefner, D., Kegeles, S., & Rosenstock, I. M. (1967). A national study of health beliefs. Journal of Health and Human Behaviour, 7, 248-254.

Kirscht, J. P., & Rosenstock, I. M. (1977). Patient adherance to antihypertensive medical regimens. Journal of Community Health, 3, 115-124.

Kleinman, J. C., Feldman, J. J., & Monk, M. A. (1979). The effects of changes in smoking habits on coronary heart disease mortality. American Journal of Public Health, 69, 795-802.

Knowles, J. (1977). Doing Better and Feeling Worse: Heatlh in the US. New York: Norton.

Kobasa, S. C. (1982). The hardy personality: Toward a social psychology of stress and health. In G.S. Sanders & J. Suls (Eds.), Social Psychology of Health and Ilnness (pp.3-32). Hillsdale, New Jersey: Erlbaum.

Kohn, K. H., Last, J., Lepper, N. H., Paul, O., Schonenberger, J. A., Smith, J. M., & Wissler, R. W. (1978). Reply to Dr Mann. New England Journal of Medicine, 298, 109-110.

Kosa, J., Antonovsky, A., & Zola, I. K. (1969). Poverty and Health: A Sociological Analysis. Cambridge, Massachusetts: Harvard University Press.

Kristiansen, C. M. (1985). Value correlates of preventive health behaviour. Journal of Personality and Social Psychology, 49, 743-758.

Langer, E. J., & Rodin, J. (1976). The effects of choice and enhanced personal responsibility for the aged: A field experiment in an institutional setting. Journal of Personality and Social Psychology, 34, 191-198.

Langlie, J. (1977). Social networks, health beliefs and preventive health behaviour. Journal of Health and Social Behaviour, 18, 224-260.

Langlie, J. (1979). Interrelationships among preventive health behaviours: A test of competing hypotheses. Public Health Reports, 94, 216-225.

Lansky, D. (1981). A methodological analysis of research on adherance to weight loss. Behaviour Therapy, 12, 144-149.

Lau, R. R. (1972). Origins of health locus of control beliefs. Journal of Personality and Social Psychology, 42, 322-334.

Lau, R. R., & Ware, J. F. (1981). Refinements in the measurement of health-specific locus of control beliefs. Medical Care, 19, 1147-1157.

Lefcourt, H. M. (1976). Locus of Control: Current Trends in Theory and Research. New York: John Wiley and Sons.

Levenson, H. (1973). Multidimensional locus of control in psychiatric patients. Journal of Consulting and Clinical Psychology, 41, 397-404.

Leventhal, H. (1965). Fear communications in the acceptance of preventive health practices. Bulletin of the New York Academy of Medicine, 41, 1144-1168.

Leventhal, H. (1970). Findings and theory in the study of fear communications. In L. Berkowitz (Ed.), Advances in Experimental and Social Psychology (Vol 5) (pp 120-186). New York: Academic Press.

Leventhal, H. (1973). Changing attitudes and habits to reduce risk factors in chronic disease. American Journal of Cardiology, 31, 571-580.

Leventhal, H., & Cleary, P. D. (1980). The smoking problem: A review of the research and theory in behavioural risk reduction. Psychological Bulletin, 88, 370-405.

Leventhal, H., & Hirschman, R. S. (1982). Social psychology and prevention. In G.S. Sanders & J. Suls (Eds.), Social Psychology of Health and Illness (pp. 183-226). New Jersey: Erlbaum.

Leventhal, H., Nerenz, D., & Strauss, A. (1980). Self-regulation and the mechanisms for symptom appraisal. In D. Mechanic (Ed.), Psychosocial Epidemiology (pp42-56). New York: Neale Wilson.

Leventhal, H., Safer, M. A., & Panagis, D. M. (1983). The impact of communications on the self regulations of health beliefs, decisions and behaviour. Health Education Quarterly, 10, 3-29.

Leventhal, H., Zimmerman, R., & Gutmann, M. (1984). Compliance: A self regulation perspective. In W.D. Gentry (Ed.), Handbook of Behavioural Medicine (pp369-436). New York: Guilford.

Levin, L. L., Katz, A. H. & Holst, E. (1977). Self Care: Lay Iniatives in Health. London: Craom Helm.

Lewin, K. (1948). Resolving Social Conflicts. New York: Harper & Brothers.

Lewis, F. M., Morisky, D. E., & Flynn, B. S. (1978). A test of the construct validity of health locus of control: Effects on self reported compliance for hypertensive patients. Health Education Monographs, 6, 138-148.

Lewis, L. S. (1963). Rational behaviour and the treatment of illness. Journal of Health and Social Behaviour, 4, 235-242.

Ley, P. (1982). Satisfaction, compliance and communication. British Journal of Clinical Psychology, 21, 241-254.

Lichtenstein, E., & Keutzer, C. S. (1967). Further mormative and correlation data on the internal-external (I-E) control of reinforcement scale. Psychological Reports, 21, 1014-1016.

Lowery, B. (1981). Misconceptions and limitations of locus of control and the internal-external scale. Nursing Research, 30, 294-298.

Lundy, J. R. (1972). Some personality correlates of contraceptive use among unmarried female college students. Journal of Personality, 80, 9-14.

MacDonald, A. P. (1972). More on the Protestant Ethic. Journal of Consulting and Clinical Psychology, 39, 116-122.

Malcolm, L. A. (1987). Recent trends in prescribing rates and costs in NZ. Paper prepared for publication in the New Zealand Medical Journal. Wellington, Dept of Communitiy Health, Wellington Hospital.

Manno, B., & Marston, A. R. (1972). Weight reduction as a function of negative covert reinforcement (sensitisation) versus positive covert reinforcement. Behaviour Research and Therapy, 10, 201-207.

Marston, M. (1970). Compliance with medical regimens: A review of the literature. Nursing Research, 19, 312-323.

Martlett, G. A., & Gordon, J. R. (1980). Determinants of relapse: Implications for the maintenance of behaviour change. In P.O. Davidson and S.M. Davidson (Eds.), Behavioural Medicine: Changing Health Lifestyles (pp. 410-452). New York: Brunner/ Mazel.

Masur, F. T. (1981). Adherance to health care regimens. In C. Prokop & L. A. Broadley (Eds.), Medical Psychology: Contributions to Behavioural Medicine (pp. 455-470). New York: Academic Press.

Matarazzo, J. D. (1980). Behavioural health and behavioural medicine: Frontiers for a new health psychology. American Psychologist, 35, 807-817.

Matarazzo, J. D. (1982). Behavioural health's challenge to academic, scientific and professional psychology. American Psychologist, 37, 1-14.

Matarazzo, J. D. (1984). Behavioural health: A 1990 challenge for the health sciences professions. In J.D. Matarazzo, S.M. Weiss, J.A. Herd, N.E. Miller, S.M. Weiss (Eds.). Behavioural Health: A Handbook of Health Enhancement and Disease Prevention (pp. 3-40). New York: John Wiley and Sons.

McClelland, D. C. (1978). Managing motivation to expand human freedom. American Psychologist, 33, 201-210.

McCusker, J., & Morrow, G. (1979). The relationship of health locus of control to preventive health behaviour and health behaviours. Patient Consulting and Health Education, 1, 146-150.

McKenney, J. M. (1981). Methods of modifying compliance behaviour in hypertensive patients. Drug Intelligence and Clinical Pharmacology, 15, 8-14.

McKinlay, J. B., & McKinlay, S. M. (1981). Medical measures and the decline of mortality. In P. Conrad & R. Kern (Eds.), The Sociology of Health and Illness: Critical Perspectives (pp192-203). New York: St Martin's Press.

Mechanic, D. (1972). Social-psychological factors affecting the presentation of bodily complaints. New England Journal of Medicine, 286, 1132-1139.

Mechanic, D., & Cleary, P. D. (1980). Factors associated with the maintenance of positive health behaviour. Preventive Medicine, 9, 805-814.

Mikhail, B. (1981). The Health Belief Model: A review and critical evaluation of the model, research and practice. Advances in Nursing Science, 4, 65-82.

Milsum, J. H. (1980). Lifestyle changes for the whole person: Stimulation through health hazard appraisal. In P. O. Davidson & S. M. Davidson (Eds.). Behavioural Medicine: Changing Health Lifestyles (pp. 116-150). New York: Brunner/Mazel.

Mitchell, J. H. (1974). Compliance with medical regimens: An annotated bibliography. Health Education Monograms, 2, 75-82.

Moos, R. (1979). Social ecological perspectives on health. In G. Stone, F. Cohen, & N. Adler (Eds.), Health Psychology (pp. 523-548). London: Jossey Bass.

Mortimer, E. E. (1978). Immunisation against infectious disease. Science, 200, 902-907.

Nagy, V. T., & Wolfe, G. R. (1983). Chronic illness and health locus of control beliefs. Journal of Social and Clinical Psychology, 1, 58-65.

National Health Statistics Centre (1981). Hospital and Selected Morbidity Data. Wellington: Dept of Health.

Nelson, D. W., & Cohen, L. H. (1983). Locus of control and control perceptions and the relationship between life stress and psychological disorder. American Journal of Community Psychology, 11, 705-722.

Nerenz, D. R., & Leventhal, H. (1983). Self-regulation theory in chronic illness. In T. Burish & L. Bradley (Eds.), Coping With Chronic Illness: Research and Applications (pp. 162-185). New York: Academic Press.

Nevatt, E. A. (1981). A Study of Individual Health Beliefs and Practices in Relation to Propensity for Self Care. Unpublished master's thesis, Massey University, Palmerston North.

Nisbett, R. E., & Kanouse, O. E. (1969). Obesity, food deprivation and supermarket shopping behaviour. Journal of Personality and Social Psychology, 12, 289-294.

North, N. (1983). Compliance from the Perspective of Tuberculosis Patients. Unpublished master's thesis. Massey University, Palmerston North.

Ockene, J. K., Sorensen, G., Kabat-Zinn, J., Ockene, I. S., & Donnelly, G. (1988). Clinical perspectives: Benefits and costs of lifestyle change to reduce risk of chronic disease. Preventive Medicine, 17, 224-234.

Ogionwo, W. (1973). Socio-psychological factors in health behaviour: An experimental study on methods and attitude change. International Journal of Health Education, 16, Supplement 1.

Oliver, R. L., & Berger, P. K. (1979). A path analysis of preventive health care decision models. Journal of Consumer Research, 6, 113-122.

Peck, C., & King, N. J. (1986). Medical compliance. In N.J. King & A Remenyi (Eds.), Health Care. A Behavioural Approach (pp. 185-192). Sydney: Grune & Stratten Inc.

Pender, N. (1975). A conceptual model for preventive health behaviour. Nursing Outlook, 23, 385-391.

Pill, R., & Stott, N. (1985). Choice or chance: Further evidence on ideas of illness and responsibility for health. Social Science and Medicine, 20, 981-991.

Pomerleau, O. F. (1979). Behavioural medicine. The contribution of the experimental analysis of behaviour in medical care. American Psychologist, 34, 654-663.

Pratt, L. (1971). The relationship of socioeconomic status to health. American Journal of Public Health, 61, 281-291.

Prokop, C. K., & Bradley, L. A. (1981). Medical Psychology: Contributions to Behavioural Medicine. New York: Harcourt Brace Jovanovich.

Quah, S. R. (1985). The health belief model and preventive health behaviour in Singapore. Social Science and Medicine, 21, 351-363.

Radelfinger, S. (1965). Some effects of fear-arousing communications on preventive health behaviour. Health Education Monographs, 19, 2-17.

Rodnick, J. E. (1982). Health behaviour changes associated with health hazard appraisal counselling in an occupational setting. Preventive Medicine, 11, 583-594.

Rokeach, M. (1968). Beliefs, Attitudes and Values: A Theory of Organisation and Change. San Francisco: Jossey-Bass.

Rokeach, M. (1973). The Nature of Human Values. New York: Free Press.

Rosenstock, I. M. (1960). What research in motivation suggests for public health. American Journal of Public Health, 50, 295-302.

Rosenstock, I. M. (1966). Why people use health services. Milbank Memorial Fund Quarterly, 44, 94-127.

Rosenstock, I. M. (1969). Prevention of illness and maintenance of health. In J. Kosa (Ed.), Poverty and Health: A Sociological Analysis (pp. 214-243). Massachusetts: Harvard University Press.

Rosenstock, I. M. (1974). Historical origins of the health belief model. Health Education Monographs, 2, 323-335.

Rosenstock, I. M., Kirscht, J. P. (1979). Why people seek health care. In G.C. Stone, F. Cohen, N.E. Adler (Eds.), Health Psychology. A Handbook (pp. 161-188). San Francisco: Jossey-Bass.

Rotter, J. B. (1966). General expectancies for internal versus external control of reinforcement. Psychological Monographs, 80, (1 Whole No. 609).

Rotter, J. B. (1975). Some problems and misconceptions related to the construct of internal versus external control of reinforcement. Journal of Consulting and Clinical Psychology, 43, 56-67.

Rotter, J. B., Chance, J. E., & Phares, E. J. (1972). Applications of a Social Learning Theory of Personality. New York: Holt, Rinehart and Winston.

Rundall, T. C., & Wheeler, J. R. C. (1979). Factors associated with utilization of the Swine Flu vaccination program among senior citizens. Medical Care, 17, 191-200.

Sackett, D. L. & Haynes, R. B. (Eds.). (1976). Compliance with Therapeutic Regimens. Baltimore: John Hopkins University Press.

Sackett, D. L., & Snow, J. C. (1979). The magnitude of compliance and non-compliance. In R. B. Haynes, D. W. Taylor, & D. L. Sackett (Eds.), Compliance in Health Care. Baltimore: John Hopkins University Press.

Saltzer, E. B. (1982). The Weight Locus of Control (WLOC) Scale: A specific measure for obesity research. Journal of Personality Assessment, 46, 620-628.

Sanders, G. S., & Suls, J. (1982). Social Psychology of Health and Illness. Hillsdale, New Jersey: Erlbaum.

Schallow, J. R. (1975). Locus of control and success at self-modification. Behaviour Therapy, 6, 667-671.

Sechrest, L., & Cohen, R. Y. (1982). Evaluating outcomes in health care. In G. C. Stone, F. Cohen, & N. E. Adler (Eds.), Health Psychology. A Handbook (pp369-394). San Francisco: Jossey-Bass.

Seeman, M., & Evans, J. W. (1962). Alienation and learning in a hospital setting. American Sociological Review, 27, 772-783.

Seeman, M., & Seeman, T. E. (1983). Health behaviour and personal autonomy: A longitudinal study of the sense of control in illness. Journal of Health and Social Behaviour, 24, 144-160.

Seyle, H. (1957). The Stress of Life. London: Longmans, Green and Co.

Siegal, H. (1973). The universe of health: A developmental study. American Journal of Public Health, 68, 995-1000.

Sonstroem, R. J., & Walker, M. I. (1973). Relationship of attitude and locus of control to exercise and physical fitness. Perceptual and Motor Skills, 36, 1031-1034.

Steele, J. L., & McBroom, W. H. (1972). Conceptual and empirical dimensions of health behaviour. Journal of Health and Social Behaviour, 13, 382-392.

Steffy, R. A., Meichenbaum, D., & Best, J. A. (1963). Aversive and cognitive factors in the modification of smoking behaviour. Behaviour Research and Therapy, 8, 115-125.

Stimson, G. (1974). Obeying doctor's orders: A view from the other side. Social Science and Medicine, 8, 97-104.

Stone, G. C. (1979a). Patient compliance and the role of the expert. Journal of Social Issues, 35, 34-59.

Stone, G. C. (1979b). Health and the health system: A historical overview and coneptual framework. In G. C. Stone, F. Cohen, & N. E. Adler (Eds.). Health Psychology. A Handbook (pp. 1-18). San Francisco: Jossey-Bass

Straits, B., & Sechrest, L. (1963). Further support of some findings about the characteristics of smokers and non-smokers. Journal of Consulting Psychology, 27, 282 (brief report).

Strickland, B. R. (1978). Internal-external expectancies and health related behaviours. Journal of Consulting and Clinical Psychology, 46, 1192-1211.

Suchman, E. A. (1964). Sociomedical variations among ethnic groups. American Journal of Sociology, 70, 319-331.

Suchman, E. A. (1966). Health orientation and medical care. American Journal of Public Health, 56, 97-105.

Suchman, E. A. (1967). Preventive health behaviour: A model for research on community health campaigns. Journal of Health and Social Behaviour, 8, 197-209.

Svarstad, B. (1976). Physician-patient communication and patient conformity with medical advice. In D. Mechanic (Ed.), The Growth of Bureaucratic Medicine. New York: Wiley.

Tash, R. H., O'Shea, R. M., & Cohen, L. K. (1969). Testing a preventive symptomatic theory of dental health behaviour. American Journal of Public Health, 59, 514-521.

Taylor, D. W. (1979). A test of the health belief model in hypertension. In R. B. Haynes, D. W. Taylor, D. L. Sackett (Eds.), Compliance in Health Care (pp. 103-109). Baltimore: John Hopkins Uni Press.

Taylor, J. (1980). Alternative strategies for health. In J. Fry (Ed.), Primary Care (pp. 289-302). London: Heinemann.

Taylor, S. E. (1979). Hospital patient behaviour: Reactance, helplessness or control? Journal of Social Issues, 35, 156-189.

Thompson, J. (1984). Compliance. In R. Fitzpatrick, J. Hinton, S. Newman, G. Scambler, J. Thompson, The Experience of Illness (pp. 109-131). London: Tavistock.

Tirrell, B. E., & Hart, L. K. (1980). The relationship of health beliefs and knowledge to exercise compliance in patients after coronary bypass. Heart Lung, 9, 487-493.

Tobias, L. L., & MacDonald, M. L. (1977). Internal locus of control and weight loss: an insufficient condition. Journal of Consulting and Clinical Psychology, 45, 647-653.

Tolor, A. (1978). Some antecedents and personality correlates of health locus of control. Psychological Reports, 43, 1159-1165.

Tuckett, D. (1978). An Introduction to Medical Sociology. London: Tavistock.

Turk, D. C., Rudy, T. E., & Salovey, P. (1984). Health protection: Attitudes and behaviours of LPNs, teachers and college students. Health Psychology, 3, 189-210.

Twaddle, A., & Hessler, R. (1977). A Sociology of Health. St Louis: CV Mosby.

Wallston, B. S., Wallston, K. A., Kaplan, G. D., & Maides, S. A. (1976). Development and validation of the health locus of control scale. Journal of Consulting and Clinical Psychology, 44, 580-585.

Wallston, B. S., & Wallston, K. A. (1978). Locus of control and health: A review of the literature. Health Education Monographs, 6, 107-117.

Wallston, B. S., & Wallston, K. A. (1984). Social psychological models of health behaviour. In A. Baum, S. Taylor, & J. E. Singer (Eds.), Handbook of Psycholgy and Health (pp. 23-51). Hillsdale, New Jersey; Erlbaum.

Wallston, K. A., Maides, S. A., & Wallston, B. S. (1976). Health related information-seeking as a function of health related locus of control and health value. Journal of Research in Personality, 10, 215-222.

Wallston, K. A., & Wallston, B. S. (1980). Health locus of control scales. In H. Lefcourt (Ed.), Advances and Innovations in Locus of Control Research (pp. 189-243). New York: Academic Press.

Wallston, K. A., & Wallston, B. S. (1981). Health locus of control scales. In H. Lefcourt (Ed.), Research with the Locus of Control Construct (Vol 1) (pp. 189-243). New York: Academic Press.•

Wallston, K. A., & Wallston, B. S. (1982). Who is responsible for your health? The contruct of health locus of control. In G.S. Saunders and J. Suls (Eds.), Social Psychology of Health and Illness (pp. 65-95). Hillsdale, New Jersey: Erlbaum.

Wallston, K. A., & Wallston, B. S. (1983). Expectancies about control over health: Relationship to desire for control of health care. Personality and Social Psychology Bulletin, 9, 377-385.

Wallston, K. A., Wallston, B. S., & DeVellis, R. (1978). Development of the multidimensional health locus of control scale. Health Education Monographs, 6, 160-170.

Wallston, K. A., Wallston, B. S., Smith, S., & Dobbins, C. J. (1987). Perceived control and health. Current Psychological Research and Reviews, 6, 5-25.

Weigel, R. H., & Newman, L. W. (1976). Increasing attitude-behaviour correspondence by broadening the scope of the behavioural measure. Journal of Personality and Social Psychology, 33, 793-802.

Weiner, B. (1976). Social learning (locus of control) versus attributional (causal stability interpretations of expectancy of success. Journal of Personality, 44, 52-68.

Weiner, H. (1979). Psychobiology of Essential Hypertension. New York: Elsevier.

Wikler, D. (1987). Who should be blamed for being sick? Health Education Quarterly, 14, 11-25.

Williams, A. F., & Wechsler, H. (1972). Interrelationship of preventative actions in health and other areas. Health Services Reports, 87, 969-976.

Williamson, J. D., & Danaher, K. (1978). Self-care in health. New York: Neale Academic Publications.

Wilson, G. T. (1976). Obesity, binge eating and behaviour therapy. Some clincial observations. Behaviour Therapy, 7, 700-701.

Winefield, H. R. (1982). Reliability and validity of the health locus of control scale. Journal of Personality Assessment, 46, 614-619.

Woolford, G., & Law, M. (1980). Youth in Perspective. Wellington: National Youth Council.

World Health Organization (1960). Constitution. World Health Organization: Geneva.

Wortman, C. G., & Brehm, J. W. (1975). Responses to uncontrollable outcomes. An integration of reactance theory and the learned helplessness model. In L. Berkowitz (Ed.), Advances in Experimental Social Psychology (Vol 8) (pp. 277-336). New York: Academic Press.

Wurtele, S. K., Britcher, J. C., & Saslawsky, D. A. (1985). Relationships between locus of control, health value and preventive health behaviours among women. Journal of Research in Personality, 19, 271-278.

Zifferblatt, S. M. (1975). Increasing patient compliance through the applied analysis of behaviour. Preventive Medicine, 4, 173-182.

APPENDICES

APPENDIX A

THE QUESTIONNAIRE USED IN THIS STUDY

This is a questionnaire designed to determine the way in which different people view certain important health-related issues.
Please make sure you answer every item with only one answer.
Please answer these items carefully, but do not spend too much time on any one item. As much as you can, try to respond to each item independently. When making your choice, do not be influenced by your previous choices. It is important that you respond according to your actual beliefs and not according to how you feel you should believe or how you think we want you to believe.
These questions measure your personal beliefs; there are no right or wrong answers.

Please circle the answer which applies to you

DO NOT WRITE IN THIS COLUMN

Sex 1. Male 2. Female ☐

Age: ..... ☐☐

Race: 1. European 2. Maori 3. Polynesian
4. Other (specify) ..... ☐

Marital Status: 1. Single 2. Married 3. Defacto
4. Separated 5. Divorced 6. Widowed
7. Other (specify) ..... ☐

What is the highest level of education obtained by the head of the household in which you were raised? (parent, step-parent, grand-parent, etc.)

1. Less than School Certificate
2. School Certificate
3. University Entrance
4. Some University education
5. University Graduate
6. Post-graduate study

☐

Finally, what was your total family income for the past year? (i.e. your parents' income, if you are dependent or partially dependent on them, or your own family's income if totally financially independent from your parents)

1. Under $10,000
2. $10,001 - $20,000
3. $20,001 - $30,000
4. $30,001 - $40,000
5. $40,001 - $50,000
6. Over $50,000

☐

For each item of this question, circle the number that represents how much you disagree or agree with the statement.

	Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree	COMPUTER USE ONLY DO NOT WRITE IN THIS COLUMN
1. If I get sick, it is my own behaviour which determines how soon I get well again.	1	2	3	4	5	6	
2. No matter what I do, if I am going to get sick, I will get sick.	1	2	3	4	5	6	
3. Having regular contact with my physician is the best way for me to avoid illness.	1	2	3	4	5	6	
4. Most things that affect my health happen to me by accident.	1	2	3	4	5	6	
5. Whenever I don't feel well, I should consult a medically trained professional.	1	2	3	4	5	6	
6. I am in control of my health.	1	2	3	4	5	6	
7. My family has a lot to do with my becoming sick or staying healthy.	1	2	3	4	5	6	
8. When I get sick, I am to blame.	1	2	3	4	5	6	
9. Luck plays a big part in determining how soon I will recover from an illness.	1	2	3	4	5	6	
10. Health professionals control my health.	1	2	3	4	5	6	
11. My health is largely a matter of good fortune.	1	2	3	4	5	6	
12. The main thing which affects my health is what I myself do.	1	2	3	4	5	6	
13. If I take care of myself, I can avoid illness.	1	2	3	4	5	6	
14. When I recover from an illness, its usually because other people (e.g. doctors, nurses, family, friends) have been taking good care of me.	1	2	3	4	5	6	
15. No matter what I do, I'm likely to get sick.	1	2	3	4	5	6	
16. If it's meant to be, I will stay healthy.	1	2	3	4	5	6	

For each item of this question, circle the number that represents how much you disagree or agree with the statement.	Strongly disagree	Moderately disagree	Slightly disagree	Slightly agree	Moderately agree	Strongly agree	COMPUTER USE ONLY DO NOT WRITE IN THIS COLUMN
17. If I take the right actions, I can stay healthy.	1	2	3	4	5	6	
18. Regarding my health, I can only do what my doctor tells me to do.	1	2	3	4	5	6	

Please use the following scale in answering the next question

VERY HEALTHY	MODERATELY HEALTHY	NEITHER HEALTHY NOR UNHEALTHY	MODERATELY UNHEALTHY	VERY UNHEALTHY
1	2	3	4	5

COMPUTER USE ONLY
DO NOT WRITE IN THIS COLUMN

In the long run, how good for your health is it to engage in the following activities:-

Watching my weight	☐	☐
Eating a healthy, balanced diet	☐	☐
Wearing a seatbelt when driving	☐	☐
Exceeding the speed limit when driving	☐	☐
Signalling turns when driving	☐	☐
Breaking traffic rules when driving	☐	☐
Washing hands before touching food	☐	☐
Washing hands after going to the toilet	☐	☐
Crossing the street against the lights when walking	☐	☐
Sharing a drinking cup, hairbrushes or towels	☐	☐
Having medical checkups	☐	☐
Having dental checkups	☐	☐
Eating foods with high sugar content	☐	☐
Eating foods with a high salt content	☐	☐
Eating fried foods	☐	☐
Eating snacks between meals	☐	☐

	VERY HEALTHY 1	MODERATELY HEALTHY 2	NEITHER HEALTHY NOR UNHEALTHY 3	MODERATELY UNHEALTHY 4	VERY UNHEALTHY 5	COMPUTER USE ONLY DO NOT WRITE IN THIS COLUMN
Taking dietary supplements				☐		☐
Getting enough sleep to function well				☐		☐
Taking time out to relax				☐		☐
Eating breakfast				☐		☐
Engaging in active sports				☐		☐
Swimming, taking long walks or bike rides				☐		☐
Doing light work such as gardening				☐		☐
Doing physical exercises, aerobics or yoga				☐		☐
Having a first aid kit at home				☐		☐
Overworking				☐		☐
Getting chilled				☐		☐
Letting things "get you down"				☐		☐
Smoking				☐		☐
Drinking too much alcohol				☐		☐
Drinking too much coffee				☐		☐
Destroying old and unused medicines				☐		☐
Doing things in moderation				☐		☐
Checking the condition of electrical appliances				☐		☐

VERY HEALTHY 1	MODERATELY HEALTHY 2	NEITHER HEALTHY NOR UNHEALTHY 3	MODERATELY UNHEALTHY 4	VERY UNHEALTHY 5	COMPUTER USE ONLY DO NOT WRITE IN THIS COLUMN
Taking medication prescribed by your doctor			☐		☐
Wearing comfortable clothes and shoes			☐		☐
Doing what you want to and not what other people expect			☐		☐
Eating red meat			☐		☐
Eating too many dairy products			☐		☐

Please indicate how often you engage in the following behaviours by ticking the column which most applies to you (Always/Regularly/Often/Sometimes/ Never)	Always	Regularly	Often	Sometimes	Never	DO NOT WRITE IN THIS COLUMN
Wear a seatbelt when driving						
Signal turns when driving						
Wash hands before touching food						
Wash hands after going to the toilet						
Have medical checkups						
Have dental checkups						
Keep immunisations up to date						
Have screening for medical conditions (e.g. hearing, vision, cervical smears)						
Eat healthy, balanced meals						
Take dietary supplements e.g. vitamins, herbs etc.						
Get enough sleep to function well						
Take time out to relax						
Eat breakfast						
Engage in active sports						
Swim, take long walks or bike rides						
Work in the garden						
Do physical exercises, aerobics or yoga						
Have a first aid kit at home						

Please indicate how often you engage in the following behaviours by ticking the column which most applies to you (Always/Regularly/Often/Sometimes/ Never)	Always	Regularly	Often	Sometimes	Never	DO NOT WRITE IN THIS COLUMN
Destroy old and unused medicines						
Do things in moderation						
Check the condition of electrical appliances						
Take medication prescribed by your doctor						
Maintain your weight approximately to the recommended weight range for your age and height						
Wear comfortable clothes and shoes						
Do what you want to do and not what other people expect						
Exceed the speed limit when driving						
Break traffic rules when driving						
Cross the street against the lights when walking						
Share drinking cup, hairbrushes or towels						
Eat foods with a high sugar content						
Eat foods with a high salt content						
Eat fried foods						
Eat snacks between meals						
Overwork						
Get chilled						
Let things "get you down"						

Please indicate how often you engage in the following behaviours by ticking the column which most applies to you (Always/Regularly/Often/Sometimes/ Never)	Always	Regularly	Often	Sometimes	Never	DO NOT WRITE IN THIS COLUMN
Smoke						
Drink too much alcohol						
Drink too much coffee						
Eat dairy products						
Eat red meat						

HVS

Please indicate how much you agree/disagree with the following statements by ticking the most appropriate column	Strongly agree	Mildly agree	Neutral	Mildly disagree	Strongly disagree	DO NOT WRITE IN THIS COLUMN
My health is the most important consideration in my life						☐
Whenever I'm ill, no matter how mild the symptom, I take it seriously						☐
I only think about my health from time to time						☐
I almost never take the illnesses I get seriously						☐

Here is a list of nine values listed in alphabetical order. Your task is to number them in order of their importance to you, as guiding principles in YOUR life. Study the list carefully and pick out the one value which is most important for you. Place a "1" in the box alongside it. For the value which is the next most important to you, place a "2" in the box alongside it. Continue until you have ranked all nine values in order of importance

An exciting Life (a stimulating active life) ☐

A World at Peace (free of war and conflict) ☐

Freedom (independence, free choice) ☐

Good health (physical and mental well-being) ☐

Happiness (contentedness) ☐ ☐

Inner Harmony (freedom from inner conflict) ☐

Mature Love (sexual and spiritual intimacy) ☐

True Friendship (close companionship) ☐

Wisdom (a mature understanding of life) ☐

DO NOT WRITE IN THIS COLUMN

Compared with others your age, how would you rate you health?

better | about the same | worse | (please circle one only) ☐

In general, how would you describe your health?

excellent | good | fair | poor | (please circle only only) ☐

Do you have any acute illness, chronic condition or physical disability now?

yes | no | (please circle one only) ☐

Have you contacted a physician for illness or injury in the last two weeks?

yes | no | (please circle one only) ☐

Have you restricted normal activity because of illness or injury in the last six months?

yes | no | (please circle one only) ☐

To whom it may concern

The aim of this research is to investigate various aspects of what people think about their health.

The research involves asking a group of people to complete the accompanying questionnaire. Most of the questions used are part of standardised questionnaires which have been used in past research. The information which you supply in the questionnaire will be kept in the strictest confidence. The person analysing your responses will have no idea of your identity and your responses will be grouped anonymously with others for analysis.

If you are prepared to participate in this research, please sign your name below. If you wish to receive a summary of the results of this research, leave a contact address also.

Thank you.

Karolle Gjaltema
Graduate Psychology Student

I agree to participate in this study by completing this questionnaire.

Signature: ..... Date: .....

Address: .....

.....

.....

APPENDIX B

Descriptive Statistics of Sociodemographic variables

VARIABLE	VALUE	FREQUENCY	PERCENTAGE
sex	male	73	34.3
	female	140	65.7
age	17-18	92	43.4
	19-20	59	27.9
	21-30	40	18.9
	31-40	14	6.6
	41-50	5	2.5
	51+	2	1.0
race	European	194	91.5
	Maori	7	3.3
	Polynesian	1	0.5
	other	10	4.7
marital status	single	189	89.2
	married	15	7.1
	defacto	1	0.5
	separated	3	1.4
	divorced	3	1.4
	widowed	1	0.5

education level of head(s) of household	< School Certificate	49	23.3
	School Certificate	51	24.3
	University Entrance	31	14.8
	some uni education	32	15.2
	uni graduate	26	12.4
	post-graduate	21	10.0
family income	< $10.000	30	14.9
	$10,001-20,000	26	12.9
	$20,001-30,000	45	22.4
	$30,001-40,000	36	17.9
	$40,001-50,000	31	15.4
	>50,000	33	16.4

APPENDIX C

Scoring Convention for the MHLC Scale (Form A or B)

The scores on each of the following items (which ranged from 1 to 5), was summed to form the three subscales.

Internal Items:	1, 6, 8, 12, 13, 17
Chance Items:	2, 4, 9, 11, 15, 16
Powerful Other Items:	3, 5, 7, 10, 14, 18

APPENDIX D

Pearson's Correlation Coefficients for All Variables used in the Study

(a) Demographic variables:

	sex	age	race	marital status	education	income
sex	1.0	-0.02	-0.12*	0.04	-0.10	-0.06
age	-	1.0	-0.01	0.56***	-0.15*	-0.01
race	-	-	1.0	-0.02	0.03	-0.03
marital Status	-	-	-	1.0	-0.11	0.01
education	-	-	-	-	1.0	0.27***
income	-	-	-	-	-	1.0
IHLC	-0.07	0.05	0.07	0.02	-0.01	-0.03
CHLC	-0.04	-0.07	0.05	-0.04	0.04	0.03
PHLC	-0.04	-0.07	0.14*	-0.06	0.12*	0.12*
PH Bel	0.22***	0.17**	-0.05	-0.01	-0.12*	-0.06
PHB	0.16*	0.25***	-0.08	0.06	-0.01	0.02
PHB-e	0.18**	0.14*	-0.01	-0.04	-0.05	-0.04
HV-Index	-0.02	-0.03	-0.07	-0.05	0.05	0.19**
HV-Rank	-0.10	-0.09	-0.10	-0.11	0.01	0.07
status	-0.12*	-0.18**	0.07	-0.15*	0.01	0.07

*p < .05 **p < .01 ***p < .001

(b) Other study variables:

	IHLC	CHLC	PHLC	PH Bel	PHB	PHB-e	HV-Index	HV-Rank	status
IHLC	1.0	-0.29***	-0.12*	0.10	0.19**	0.19**	-0.05	-0.14*	0.04
CHLC	-	1.0	0.34***	-0.13*	-0.13*	-0.13*	0.01	0.18**	0.07
PHLC	-	-	1.0	0.01	0.15	0.01	-0.29***	-0.03	-0.12
PH Bel	-	-	-	1.0	0.42***	-	-0.20**	-0.09	-0.03
PHB	-	-	-	-	1.0	0.62***	-0.21	-0.31***	0.03
PHB-e	-	-	-	-	-	1.0	-0.21***	0.13*	0.01
HV-Index	-	-	-	-	-	-	1.0	0.30***	0.08
HV-Rank	-	-	-	-	-	-	-	1.0	-0.16*
status	-	-	-	-	-	-	-	-	1.0

*p <.05 **p < .01 ***p < .001

APPENDIX E

Summary of Multiple Regressions

Type of Analysis and DV	Omitted Variables	Independent Variables	Accumulated R Sq	Final Beta	
all-in		sex	.30***	.08	1.08
		age		.23	2.75**
PH Behaviour		race		-.11	-1.63
		marital status		-.11	-1.28
		income		.08	1.09
		IHLC		.13	1.81
		CHLC		.02	.21
		PHLC		.04	.56
		PH Beliefs		.33	4.71***
		HV-Index		-.05	-.69
		HV-Rank		-.23	-3.34**
		status		.04	.56
F for model = 5.66 (p < .0001)					
all-in	PH Beliefs	sex	.21***	.15	2.06*
		age		.32	1.41***
PH Behaviour		race		-.12	.71
		marital status		-.16	-1.89
		income		.10	1.39
		IHLC		.16	2.07*
		CHLC		-.01	.14
		PHLC		.06	.67
		HV-Index		-.11	-1.40
		HV-Rank		-.21	-2.85**
		status		.06	.85
F for model = 3.88 (p < .0001)					
all-in	PH Beliefs	sex	.16**	.21	2.81**
		age		.27	2.98**
PH Behaviour-endorsed		race		-.01	-.09
		marital status		-.24	-2.70**
		income		.03	.41
		IHLC		.17	2.18*
		CHLC		-.06	-.72
		PHLC		-.02	-.20
		HV-Index		-.18	-2.28*
F for model = 2.56 (p < .01)		HV-Rank		-.01	-.09

stepwise		PH Beliefs	.16***	.37	5.56***
		HV-Rank	.23***	-.24	-3.65***
PH Behaviour		age	.25*	.16	2.37*
F for model = 18.69 (p < .0001)					
stepwise	PH Beliefs	HV-Rank	.07***	-.25	-3.53***
PH Behaviour		age	.12**	.22	3.02***
F for model = 11.39 (p < .0001)					
stepwise	PH Beliefs	HV-Index	.04**	-.19	-2.60
PH Behaviour-		IHLC	.07*	.19	2.62**
endorsed		sex	.10*	.18	2.45*
F for model = 6.83 (p < .01)					
hierarchical	HV-Index	sex	.02*	.06	0.97
	PHLC	HV-Rank	.11***	-.25	-3.93***
PH Behaviour	CHLC	IHLC	.14*	.13	1.96*
	age	PH Beliefs	.27***	.37	5.75***
	marital status				
	race				
	income				
	education				
	status				
F for model = 16.69 (p < .0001)					
hierarchical	HV-Index	sex	.03*	.14	2.68*
	PHLC	HV-Rank	.05	-.28	-1.36
PH-Behaviour-	CHLC	IHLC	.08**	.17	2.87**
endorsed	age				
	marital status				
	race				
	income				
	education				
	status				
	PH Beliefs				
F for model = 5.98 (p<.001)					

* p < .05 ** p < .01 *** p < .001

all-in		sex	.31***	.10	1.36
		age		.24	2.87**
PH Behaviour		race		-.12	-1.70
		marital status		-.12	-1.39
		education		.06	.89
		income		.07	.90
		IHLC		.12	1.68
		CHLC		.02	.25
		PHLC		.01	.13
		PH Beliefs		.33	4.63***
		HV-Rank		-.21	-2.86**
		HV-Index		-.07	-.90
		status		.04	.53
		HV-Rank x IHLC		.15	2.05*
		HV-Rank x CHLC		-.03	.42
F for model = 4.83 (p < .001)		HV-Rank x PHLC		.04	.48
all-in	PH Beliefs	sex	.24**	.16	2.12*
		age		.33	3.75***
PH Behaviour		race		-.14	-1.90
		marital status		-.18	-2.09*
		education		.04	.51
		income		.07	.97
		IHLC		.15	2.07*
		CHLC		.01	.13
		PHLC		.03	.39
		HV-Rank		-.26	-3.28**
		HV-Index		-.13	-1.73
		status		.06	.80
		HV-Rank x IHLC		.13	1.58
		HV-Rank x CHLC		-.11	-1.30
F for model = 3.40 (p = .0001)		HV-Rank x PHLC		.02	.25
all-in	PH beliefs	sex	.18**	.19	2.45*
		age		.27	2.97**
PH Behaviour-endorsed		race		-.03	-.39
		marital status		-.25	-2.83**
		education		-.04	-.56
		income		.03	.35
		IHLC		.17	2.27*
		CHLC		-.04	.46
		PHLC		-.01	.09
		HV-Rank		.02	.19
		HV-Index		-.18	2.28*
		status		.06	.86
		HV-Rank x IHLC		-.09	.99
		HV-Rank x CHLC		-.16	-1.88
F for model = 2.34 (p < .01)		HV-Rank x PHLC		-.02	-.91

hierarchical	HV-Index	IHLC	.00	.00	.03
	HV-Rank	CHLC	.00	-.06	-.54
PH Behaviour	PH Beliefs	PHLC	.01	.09	.87
high health	age	sex	.03	.14	1.49
value	race				
	marital status				
	income				
	education				
	status				
F for model = 0.87 (p is not < .05)					
hierarchical	HV-Index	IHLC	.05*	.24	3.11*
	HV-Rank	CHLC	.05	-.04	-.39
PH Behaviour-	PH Beliefs	PHLC	.06	.10	.94
endorsed	age	sex	.08	.12	1.22
high health	race				
value	marital status				
	income				
	education				
	status				
F for model = 2.19 (p is not < .05)					
stepwise	HV-Index	no variables entered			
PH Behaviour	HV-Rank				
high health	PH Beliefs				
value					
stepwise	HV-Index	IHLC	.05*	.22	2.25*
PH Behaviour-	HV-Rank				
endorsed	PH Beliefs				
high health value					
F for model = 5.04 (p < .05)					
hierarchical	HV-Index	IHLC	.10**	.31	2.69**
	HV-Rank	CHLC	.10	-.08	-.67
PH Behaviour	PH Beliefs	PHLC	.10	.09	.74
low health	age	sex	.11	.11	1.01
value	race				
	income				
	marital status				
	status				
F for model = 2.41 (p is not < .05)					

* p < .05 ** p < .01 *** p < .001

hierarchical	HV-Index	IHLC	.02	.13	1.16
	HV-Rank	CHLC	.03	-.12	-1.08
PH Behaviour-	PH Beliefs	PHLC	.03	.06	.51
endorsed	age	sex	.08*	.23	2.03*
low health value	race				
	income				
	marital status				
	status				
F for model = 1.71 (p is not < .05)					
stepwise	HV-Index	PH Beliefs	.18***	.41	4.11***
PH Behaviour	HV-Rank	IHLC	.26**	.28	2.86**
low health value					
F for model = 13.22 (p < .0001)					
stepwise	HV-Index	age	.12**	.33	3.15**
PH Behaviour	HV-Rank	IHLC	.20**	.30	2.86**
low health value	PH Beliefs	race	.26*	-.23	-2.22*
F for model = 7.74 (p < .001)					
stepwise	HV-Index	age	.07**	.27	2.41**
PH Behaviour-	HV-Rank				
endorsed	PH Beliefs				
low health value					
F for model = 5.99 (p <.05)					
hierarchical	PH Behaviour	sex	.04**	.21	3.06**
	status	age	.06*	.14	2.00*
PH Beliefs	race	HV-Index	.09**	-.18	-2.44*
	income	HV-Rank	.09	.04	.51
	education	IHLC	.11	.09	1.19
	marital status	CHLC	.11	-.09	-1.15
		PHLC	.11	-.02	.24
F for model = 3.47 (p < .01)					

hierarchical	income	sex	.01	-.14	-1.96
	race	age	.06**	-.23	-3.12**
health status	marital status	HV-Index	.07	.12	1.57
	education	HV-Rank	.10*	-.17	-2.27*
		IHLC	.12	-.06	-.80
		CHLC		.01	.15
		PHLC		-.12	-1.61
		PH Beliefs	.13	.06	.73
F for model = 2.80 (p < .01)		PH Behaviour		.07	.81

* p < .05 ** p < .01 *** p < .001

NB: Asterisks in the adjusted R square column refer to the significance of F change. Asterisks in the T column refer to the significance of F for the equation.

APPENDIX F

Alpha Reliability Coefficients for all Variables

VARIABLE	ALPHA
IHLC subscale	.66
PHLC subscale	.66
CHLC subscale	.62
PH Beliefs	.81
PH Behaviour	.78
HV-Index	.71
HV-Rank	.64
Health status	.57

APPENDIX G

Descriptive Statistics of high and Low Health Value Subjects for PHB, PHB-endorsed and IHLC

Health	IHLC			PH Behaviour			PH Behaviour-endorsed		
Value	Mean	S.D.	Variance	Mean	S.D.	Variance	Mean	S.D.	Variance
high	27.44	3.79	14.33	99.87	12.11	146.66	42.42	17.62	310.37
low	26.34	4.04	16.29	93.02	15.22	231.61	39.31	19.35	374.46
all	26.94	3.90	15.29	96.98	13.89	192.85	41.19	18.51	342.65