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WOMEN'S RECOVERY FROM MYOCARDIAL INFARCTION: THE BENEFITS AND BURDENS OF COGNITIVE BIASES IN THE PROCESSING OF SELF-RELEVANT INFORMATION

BY

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OVERVIEW AND STATEMENT OF THE PROBLEM

Coronary heart disease (CHD) is the leading cause of death in North American women over the age of 50 and is second only to breast cancer as the major cause of death in white women between the ages of 35 and 39 (Wingate, 1991). In Canada acute myocardial infarction (AMI) accounts for approximately 25,000 CHD deaths each year with an average male to female ratio of approximately 3:0 to 1:0 between ages 30 and 64 (Nair, Colburn, McLean, & Petrasovits, 1991). Presently epidemiologists are predicting an increase in the morbidity associated with CHD in both men and women largely because the survival chances of individuals who have suffered a heart attack continue to improve with more widespread use of advanced technology and pharmacotherapy (Joffres, 1992).

Although the prevalence of this disease remains higher in males, since 1950 the incidence of CHD has risen among women while it has declined among men (Ayanian & Epstein, 1991). Data clearly show that the prognosis for women hospitalized for CHD is more severe than that of hospitalized men. Also, once CHD is clinically manifest the case fatality rate in women significantly exceeds the rate in men. Despite this comparative clinical and prognostic severity, CHD has traditionally been considered a disease that afflicts middle-aged men and as a result women have been seriously under-represented in clinical research investigating primary and secondary prevention (Conn, Taylor, & Abele, 1991; Murdaugh & O'Rourke, 1988).

While scientific advances in the care of the coronary patient have made a significant contribution to increased life expectancy, the attainment of optimal heart health requires a concerted effort on the part of the individual over the long haul (O'Connor & Petrasovits, 1992). For many people, social and environmental inequities and lack of resources prevent them from reaching optimal levels of health, but among those who do have both the resources and the opportunity to take the necessary action to prevent heart disease, risk-reduction behaviour has been found to be quite inconsistent (e.g., Burgess, Lerner, D'Agostino, Vokonas, Hartman, & Gaccione, 1987; Miller, Wikoff, Garrett, McMahon, & Smith, 1990). Once the acute phase is over a treatment regimen designed to minimize the effects of the disease and prevent its recurrence is prescribed. This standard regimen includes dietary instruction for weight control and blood lipid reduction, a gradual increase in physical activity, taking prescribed medicines, stopping smoking, and managing stress (Heart and Stroke Foundation of Manitoba, 1988). Research conducted with post AMI males has found that high levels of adherence to prescribed regimens exhibited in the early stages of convalescence do not endure (e.g., Carmody, Senner, Malinow, & Matarazzo, 1980; Hentinen, 1986; Sivarajan, Newton, Semes, Kempf, Mansfield, & Gruce, 1983). Having had a potentially fatal illness episode and survived, it might be expected that individuals would be motivated to promote their heart health. It is therefore striking to discover that many survivors do not continue any attempt to modify their risk factors once out of immediate danger (e.g., Burgess et al., 1987; Hentinen, 1986; Miller, Wikoff, McMahon, Garrett, & Ringel, 1985). This latter group has been defined as non-adherent or non-compliant in that they do not follow the recommendations of health care providers that are designed to reduce the risk of further complications and to promote well-being (Meichenbaum & Turk, 1987).

In an attempt to explain risk-reduction behaviours in post-infarction women, this study examined participants self-enhancing beliefs, their perceptions of the threat posed by the heart attack, their ways of coping in response to the stress imposed by the illness, their beliefs regarding the efficacy of the prescribed treatment, and their reported risk-reduction behaviour. In accordance with this social cognitive framework, the research was guided philosophically by the concept of self-regulation as an alternative to the medical model of compliance. Self-regulation is person-centred and takes an internal or actor frame of reference. This perspective suggests that individuals' risk-reduction and health promotion behaviour will depend primarily upon their own representation of the health threat, in the case in question, the representation of the heart attack. From this representation, the patient determines how he/she will (or will not) attempt to integrate the illness into self-identity, a factor which is believed to affect beliefs in personal control related to the illness (Charmaz, 1983; Gadow, 1980). In the often chaotic and uncertain world of chronic illness, this sense of control can be vitally important (Miller, 1992).

In an effort to explore illness beliefs and behaviours from the perspective of the patient, the study proposed a pivotal role for the perception of threat invoked by the illness representation. It was hypothesized that three self-serving biases in the cognitive processing of self-relevant data, all of which have been found to facilitate adjustment to threat, may result in an interpretation of the heart attack that is less threatening. They were overly positive views of oneself, exaggerated perceptions of control, and unrealistic optimism (Taylor & Brown, 1988). In addition, it was expected that perceived threat would affect the degree of both anxiety and depression that are often experienced following heart attack (e.g., Froese, Hackett, Cassem, & Silverberg, 1974; Sykes, Evans, McBoyle, McIlmoyle, & Salathia, 1989). It was further hypothesized that the perception of threat and associated affective responses would influence the integration of behaviour designed to promote heart health.

A central hypothesis of this study suggested that significant bias in the processing of self-relevant information in either the positive or negative direction may interfere with risk-reduction behaviour. People recovering from heart attack who cast themselves in a very positive light, who exaggerate the degree of control that they may reasonably be expected to have over their wellbeing, and who have an overly optimistic sense of the future may consider themselves invincible thus obviating the need to behave in such a way as to off-set future risk. On the other hand heart attack survivors who have negative views of themselves, who expect that they will suffer further illness in the future, and who believe that they have no personal control over the onset of such illness, may feel that effortful risk-reduction behaviour designed to promote heart health, makes little sense. In other words, they believe that there is nothing they can do to alter the inevitably bleak outcome that confronts them. For this group also, effortful risk-reduction behaviour to promote heart health would make little sense. Consequently it was proposed that there was an optimal margin of

self-relevant bias in information processing that influences perceived threat and subsequently motivates AMI survivors to take action to promote their well-being.

Results of the study found no support for a self-serving bias, either in women's psychological response to coronary artery disease or in their health promotion behaviour during recovery. It is argued that this failure to replicate findings from previous studies, in which self-serving biases facilitated adaptation to threat, may be illness-specific. Qualitative and quantitative methods resulted in contrasting findings in terms of perceived threat, that have been attributed to the differences in data gathering techniques. In the former instance, women reported considerable fear surrounding contemplation of future health status, while in the latter they did not. Despite these differences, an important thread was found that linked perceived threat to ways of coping and risk-reduction behaviours during the recovery period. Findings from this study may be helpful in the development of rehabilitation strategies that have as their goal women's own involvement with as opposed to avoidance of the formidable effort required to optimize heart health.

REVIEW OF THE LITERATURE

The Health Promotion Approach to Heart Health

Chronic or long-term illness and disability have replaced communicable diseases as the predominant health issue among Canadians of all age groups (Epp, 1986). Of all long-term illnesses cardiovascular disease (CVD) is the most prominent in Canada. Since the first national mortality statistics were published in 1921 CVD has been the leading cause of death in Canada accounting for almost half of all deaths each year. Approximately 70,000 Canadians die annually from CVD, almost 60% more than from cancer, the second leading cause of death (Nair, et al. 1991).

Cardiovascular disease (CVD) is a classification that covers a number of diseases of the circulatory system. One of the most common forms of CVD is ischaemic or coronary heart disease (CHD). The most common manifestation of CHD is acute myocardial infarction (AMI), commonly referred to as "heart attack". In Canada, under the CVD mortality classification, approximately 25,000 deaths per year are due to AMI's. Although these data seem alarmingly high, the overall rate of CVD deaths has been steadily declining since the early 1950's. Between 1951 and 1987 CVD mortality rates declined by 42% for men and by 58% for women (Nair et al., 1991). However despite the encouraging drop in deaths from CVD, particularly ischaemic or coronary heart disease, the number of Canadians suffering from these diseases has not declined. Presently epidemiologists are predicting an increase in the morbidity associated with coronary heart disease (Joffres, 1992). To a large extent this is due to the fact that the survival chances of individuals who have suffered a heart attack continue to improve with more widespread use of advanced technology and treatment (Joffres, 1992).

Although the prevalence of this disease remains higher in males, since 1950 the incidence of CHD has risen among women while it has declined among men (Ayanian & Epstein, 1991). Data clearly show that the prognosis for women hospitalized for CHD is more severe than that of hospitalized men. Once CHD is clinically manifest, the case fatality rate in women significantly exceeds the rate in men. In particular, after a first AMI women are more likely to suffer subsequent heart attacks and to die, than are their male counterparts (Kannel & Abbott, 1987). Some of this difference can be explained by the increased age in women of approximately five years at the time of first infarction, by severity of the disease at initial presentation (Viscoli & Horwitz, 1990), and by the fact that women's coronary arteries are shorter and narrower than men's (Ayanian & Epstein, 1991). Despite the comparative clinical and prognostic severity for women, CHD has traditionally been considered a disease that afflicts middle-aged men and, as a result, women have been seriously under-represented in clinical research investigating primary and secondary prevention (Conn, Taylor, & Abele, 1991; Murdaugh & O'Rourke, 1988). Very few studies have used only women participants and the findings from those that have included both women and men are limited by sample sizes of women that are too small for meaningful comparison (e.g Bennett, 1992). Other studies have included women but do not report gender differences (e.g. Frenn, Borgeson,Lee, & Simandl, 1989). As a result very little is currently known about women's experience of and behavioural response to CHD and the factors that may either impede or facilitate their attainment of optimal heart health over the long haul.

Even though medical advances have improved the short-term survival of heart attack victims who reach hospital, mortality among this group remains high. Long-term disability is common in the presence of CVD and the effect of this upon both victims and families is profound. In economic terms, CVD exacts a heavy toll. It accounts for 21% of total patient hospital days in this country and for 25% of all disability pensions paid by the Canada Pension Plan in the under 65 age group (Heart & Stroke Foundation of Canada, 1993). Hospital costs incurred by CVD exceed 15 billion dollars annually partly due to the fact that treatment advances increasingly call for the use of expensive medicines and highly sophisticated technology (Health and Welfare Canada, 1992).

Despite the scientific advances in the care of cardiac patients, optimizing heart health requires a concerted effort in life-style change on the part of the individual over the long haul (O'Connor & Petrasovits, 1992). The major modifiable risk factors contributing to heart disease - smoking, high blood pressure, and elevated blood cholesterol - have long been recognized as important in both primary and secondary prevention (Bengtsson, 1983; Rosenberg, 1971). In other words modifying these risk factors will significantly reduce the likelihood of heart attack occurring. For people who have suffered heart attacks, modification of these factors can significantly reduce their risk of further heart attack and related complications. These risk factors are influenced by diet, physical activity, obesity, and alcohol consumption which are in turn associated with life-style and socio-economic status (Nair et al. 1992).

One response of the Canadian government to this rising trend in CHD morbidity that exacts such a heavy toll in human suffering as well as imposing an enormous economic burden on the health-care system, has been to adopt an illness prevention or health promotion approach. The World Health Organization defines health promotion as the process of enabling people to increase control over, and to improve their health. Using this definition as a point of departure, Health and Welfare Canada in its white paper entitled "Achieving Health for All" (Epp, 1986), described one of the principal challenges in health promotion as "enhancing people's ability to manage and cope with their chronic conditions....." (p. 5). In attaining the goal of "health for all Canadians" (p. 10), individual participation is considered essential; encouraging men and women to assert control over modifiable risk factors that affect their health is a primary strategy outlined in this national health effort.

Clearly, this white paper proposes that the responsibility for health rests significantly with the individual, however many researchers in the health field reject such a view because it places too little emphasis upon the role of social and environmental inequities that prevent people from reaching optimal levels of health (e.g., Gott & O'Brien, 1990; Illich, 1994; Stainton, 1988). Not all risk factors associated with CHD are controllable, heredity being the major one. So-called "controllable" factors include high blood pressure, smoking, obesity, lack of physical activity, high levels of dietary fat, and elevated cholesterol levels (Health and Welfare Canada, 1992). It is well known that both the incidence of CHD and the prevalence of controllable factors that do increase risk, vary according to socio-economic status (Joffres, 1992).

Although social inequity is significant in depriving people of the capacity to modify their risk factors and to attain higher levels of health, a large body of literature, although conducted almost exclusively with males, attests to the fact that individuals who have the resources to engage in health promotion and illness prevention behaviours, frequently do not (Meichenbaum & Turk, 1987). These people have been variously described as non-compliant or non-adherent in that they do not follow the directives of health care providers in executing the sort of life-style changes that are likely to promote their well-being. As a result, they may become limited in their capacity to work, to take care of themselves, or to perform the basic activities of daily living. In the last 15 years, non-adherence to prescribed treatment regimens has been a topic of central interest for both medical and social science research (e.g., Conrad, 1985; Leventhal, Zimmerman, & Guttman, 1984; McSweeney, 1993, Trostle, 1988).

Non-Adherence to Prescribed Regimens

Since the middle 1980s epidemiologists and health economists have known that improvements in biomedical knowledge have barely translated into further reductions in morbidity and mortality (Leventhal et al. 1984). Various explanations have been offered for this disappointing observation and its costly implications. For example, a ceiling effect has been suggested in which the high standard of general health in North America precludes measurable improvement. Also, the disappearance of the infectious diseases of the 19th century with their extremely high mortality rates, was mistakenly attributed to biomedicine as opposed to improvements in nutrition and sanitation. As a result the expectation prevails that each new medical advance will significantly reduce morbidity and mortality (Leventhal et al., 1984).

Less obvious obstacles to both illness prevention and health promotion are the barriers that exist to the application of existing knowledge. One such barrier is failure to follow prescribed treatment regimens. The terms non-compliant or non-adherent describe the discrepancy between what patients are advised to do by health care providers to improve their health status and what they actually do. Since Hippocrates noted the tendency for patients to lie about the regularity with which they took their prescribed medicines, non-adherence has been widely observed as a major cause of therapeutic failure (Meichenbaum & Turk, 1987).

Compliance studies are typically disease-specific, in other words the population under study is defined by the presence of a specific disease. High rates of non-compliance are reported throughout this literature. In their review, Sackett and Snow (1979) claimed that, on average, one third to one half of patients in study populations are in some way non-compliant with health care recommendations. Because of the variations in the compliance literature in conceptualization, methods, and measurement, general statements can be very misleading, however in specific instances alarming reports of the extent and consequences of treatment non-adherence may be found. For example, Vincent (1971) studied patients being treated for glaucoma, a disease of the eye characterized by increased intra-ocular pressure and hardening of the eye-ball that leads to a gradual impairment of vision and if untreated, eventually results in blindness. The thrice daily infusion of inexpensive, non-irritating eye drops provides a simple and effective treatment. Informed that they would go blind if they did not use their drops as directed, 58% of patients ignored the recommendation. When they were on the verge of becoming legally blind in one eye, adherence improved by only 16%.

In their review of compliance studies related to diabetes, Becker and Jantz (1985) described disconcerting levels of non-compliance. In both juvenile onset and adult onset diabetic adults, average dietary compliance was found to be 40% and adequate urine and blood glucose testing was reported by only 30% of persons. These data are particularly disturbing as diabetes is one of few chronic conditions that need not shorten the life-span, if careful self-management of blood-glucose levels is carried out.

Low levels of compliance are reported as the most significant therapy-limiting factors in the treatment of hypertension. High blood pressure is well recognized as a major risk factor in the development and progression of CVD. Approximately 10 to 15% of the general population and 20% of the out-patients seen in medical clinics show elevated levels of blood pressure (Luscher, Vetter, Siegenthaler, & Vetter, 1985). Anti-hypertensive medication has been found to be very effective in the control of severe, moderate, and mild hypertension. Furthermore recent developments in drug therapy have reduced many of the side-effects that were previously so discouraging to patients (Luscher et al., 1985). Despite these advances, management of hypertension remains far from optimal. From a large survey of British patients and general practitioners, Bannan, Beevers, & Jackson (1981) established the rule of halves, estimating that only half of all hypertensives are detected, only half of those are treated, and only half of those who are treated ever achieve normal blood pressure values.

Reports in the medical literature suggest that non-compliance with epilepsy medication regimens is a serious, potentially life-threatening problem (e.g., Reynolds, 1978; Pryse-Phillips, Jardine, & Bursey, 1982). Qualitative methodology provided a markedly different approach to understanding this phenomenon. Conrad (1985) investigated epilepsy medication practices in 80 men and women whom he described as "largely lower middle-class in terms of education and income" (p. 31). From 80 in-depth interviews with adult epilepsy sufferers he was essentially unable to make any overarching statement as to rates of compliance or non-compliance. What he did find however, was that people regulated the taking of medicine according to the social meaning that they ascribed to both the illness and its treatment. Conrad (1985) identified three main reasons why patients adjust medication practice. First, testing or experimenting enabled people to learn about the severity of the disease and its threshold. Through this strategy individuals could answer questions like, "How bad is this epilepsy?" and "How can I know if I'm getting better if I'm still taking the medication?" (p. 34). Second, controlling dependence was important for epilepsy sufferers as they continually struggled against becoming over-dependent upon family, friends, physicians, and medications. He also witnessed a paradox wherein medications could increase self-reliance by reducing seizures but the prospect of life-long medication was experienced as a threat to self-reliance. Medications thus symbolized the dependence created by having epilepsy. Third, stopping medications or missing doses served as a form of de-stigmatization. Taking medication is an acknowledgment that one is different from people who do not suffer from epilepsy and thus serves as a constant reminder of having the disease. Some of Conrad's (1985) participants believed that if they could stop taking medication, they would no longer have epilepsy. His study was landmark in contributing to the understanding of so-called "non-compliance". He concluded that not taking medicines as prescribed, represented an attempt to assert some degree of control over a condition that was frequently perceived by sufferers as completely beyond their control. From the client's perspective, not taking prescribed medicines or not taking them as prescribed, was more an issue of self-regulation than of compliance with an externally imposed regimen. People suffering from epilepsy created a "practical practice" (p. 29) of self-regulation in which the medical regimen, which in any instance is only a part of the illness whole, was integrated into the patient's life in a way that was meaningful and manageable for that particular patient. The power of these social ascriptions should not be under-estimated. The decision to refrain from taking adequate medication may have very serious consequences for epilepsy sufferers. The perceived benefit of non-adherence has to be considerable in order that a potentially fatal option will be chosen.

In summary, a great deal of research has been conducted into the determinants of non-adherence. In their extensive review Haynes, Taylor, and Sackett (1979), identified over 200 associated variables which they grouped as follows: a) characteristics of the client, b) characteristics of the treatment regimen, c) features of the illness, d) the relationship between recipient and provider of health care, and e) the clinical setting. Substantial overlap was found among these classes of variables. For example, lack of overt symptoms (illness variable) may co-exist with, and foster misconceptions about the disorder (client belief variable) so that one might expect that lack of symptoms coupled with the belief that lack of symptoms is indicative of health, would result in non-adherence to treatment.

A more concise classification of this extensive literature and the variables associated with adherence and non-adherence has been provided by Conrad (1985) who conducted the landmark study of epilepsy patients, referred to earlier. He suggested that there are essentially two dominant social science perspectives explaining variations in compliance. In the first, the problem of non-compliance resides within the confines of the client-provider relationship and in the second, in the illness beliefs held by the client.

Client-Provider Relationship

Satisfaction with the affective component of medical care has repeatedly been shown to be associated with adherence to treatment regimens (e.g., Becker & Maiman, 1975; DiMatteo & DiNicola, 1982; DiMatteo, Taranta, Friedman, & Prince, 1980; Hall, Roter, & Katz, 1988; Korsch, Gozzi, & Francis, 1968; Leventhal et al., 1984). Patients who find the provider to be uncaring, non-empathic, and critical are less likely to follow through on recommended behaviours (Squier, 1990). As Ben-Sira (1976;1980) noted findings such as these should not be interpreted as patients devaluing medical competence, but rather as an indicant of what they feel qualified to evaluate. Patients may not be in possession of sufficient medical knowledge to assess technical competence, however they are well qualified to assess the interpersonal nature of an encounter with a practitioner. Others have suggested, particularly in the case of long term illness, that what matters most to patients as they attempt to negotiate the medical environment, is the preservation of their personhood as opposed to the treatment of their disease processes (e.g., Brody, 1987; Gadow, 1980; Kleinman, 1988; Murphy, 1987).

Patients who are dissatisfied with the impersonal treatment they receive and with physicians' seeming lack of interest in them are also likely to engage in the practice of doctor-shopping, another factor associated with non-adherence. This can be emotionally devastating for an individual who is already physically and psychologically debilitated by the presence of illness and is seeking comfort in the relationship with the physician (Kasteler, Kane, Olsen, & Thetford, 1976). It is also economically undesirable because it entails needless duplication of examinations and tests. Krupkat (1983) has found that clients tend to change physicians not because they doubt the practitioner's competence, but because they are dissatisfied with the interpersonal component of the relationship. In particular they feel that they are not given adequate opportunity to either talk or be heard, and they do not receive sufficient information of a sort that they can comprehend.

In summary, studies in this line of enquiry locate the source of non-adherence or non-compliance in the interpersonal domain of the client-provider relationship and suggest that regimens may be more closely followed if changes can be made within that relationship to satisfy patients' emotional needs.

Illness Beliefs

The second major perspective on compliance proposes that the health beliefs of the client are critical in the decision to follow the medically prescribed regimens that are designed to prevent further illness and to promote health. The role of cognition in the form of health beliefs has attracted much attention from researchers interested in the topic of compliance (e.g., Rosenstock, Stecher, & Becker, 1988; Croog, Shapiro & Levine, 1971; Leventhal, Zimmerman & Guttman, 1984; Turk, Meichenbaum & Genest, 1983). The Health Belief Model (Rosenstock, 1974) in its original form was a social psychological model of preventative health behaviour that emanated from the study of motivation. It was later adapted by Becker (1974) in an attempt to explain compliance. The model suggests that behaviour is controlled by rational decisions that are made in light of a set of subjective probabilities. It proposes that people are not likely to take illness prevention action unless they a) believe they are susceptible to the disease in question, b) believe that the disease would have deleterious effects on their lives should they contract it, c) are aware of preventative actions that can be taken and believe that these actions will be effective in reducing their likelihood of contracting the disease or in reducing the severity of it, and d) believe that risks associated with the preventative action are outweighed by the risks associated with the disease.

Health beliefs may, in some cases, be based on misconceptions, faulty information, negative distortions, and cultural myths. Examples provided by Becker and Rosenstock (1984) include, "It couldn’t be happening to me. I don’t need to do anything special", "When I take medicine I feel like a pill-popper. I will become dependent on the medication", "What’s the use of trying. I won’t be able to stay in control", and "God will take care of my illness" (p. 47). Beliefs such as these will influence what Helman (1985) has called the explanatory model of illness. This model takes into account the patients’ perceptions of the cause of the illness, the nature of onset, the course that the illness is expected to take, its severity, the prognosis, and how it should be treated. It is the individual’s own beliefs, perceptions, and intimate contact with illness that shape the explanatory model. On the basis of this model patients who, despite the clinical severity of their illnesses, do not perceive themselves as vulnerable are less likely to engage in behaviour to enhance their well-being in the present and to reduce the likelihood of further risk in the future. In addition, those individuals who do consider themselves at risk for certain disorders are unlikely to countenance illness prevention behaviour unless they believe that the benefits will outweigh the costs (Meichenbaum & Turk, 1987; Turk, Rudy, & Salovey, 1986). For example Turk, Salovey, and Litt (1985) reported that the failure of women to regularly perform breast self-examination is a function of the lack of an explicit criterion of what so-called 'normal' breast tissue feels like, coupled with the high false-positive rate and accompanying anxiety. Hence, the emotional cost of carrying out this illness prevention behaviour is perceived as greater than any benefit that may accrue.

Research on the Health Belief Model (Rosenstock, 1974) has yielded at best only weak correlations among beliefs and behaviour (Meichenbaum & Turk, 1987). More recent refinements (Becker & Rosenstock, 1984; Rosenstock, 1985) have implicated the role of additional cognitive variables in adherence, such as perceived susceptibility to recurrence of the illness, cues reinforcing the threat of the illness, and a belief in one's personal efficacy in relation to carrying out the health recommendation.

Although both perspectives on compliance, namely the client's relationship with the health care provider and clients' beliefs, have gathered some supporting evidence, both make problematic assumptions about the nature and source of compliant behaviour. Stunkard (1979) complained that the term non-compliance had mistakenly focused investigators on the client and produced a body of generally insignificant findings in which no factor was consistently associated with following or not following medical prescriptions. Conrad (1985) suggested that the biomedical philosophy underlying much of the research on compliance presents a distorted view of how clients may manage their illnesses. He argued that the compliance concept as it is presented in the literature fosters a medically-centred orientation that has developed from providers' perspectives and has been conceived to solve the provider-defined problem of so-called 'non-compliance'. From this position consumers of health care services are depicted as passive rather than active, as obedient rather than assertive. Their task is to follow expert medical advice and should they fail to do so than they must hold themselves responsible for their suffering. Thus non-compliance may be viewed as a form of immorality. It is interesting to note that in Parsons's (1951) analysis which is still clearly influential, non-compliance is described as a form of deviance. As Conrad (1985) observed, when this perspective is adopted by social scientists , as has often been the case, the medically-centred view is unfortunately reinforced.

Perception of Threat

The medical model of treatment adherence clearly adopts an external or observer frame of reference. There is, however, an alternative client-centred perspective that takes an internal or actor frame of reference. The self-regulation model of treatment adherence views persons as active participants in their treatment rather than passive recipients of provider-based instruction. Emanating from control theory (e.g., Arbib, 1972; Carver & Scheier, 1982;) the concept of self-regulation as it is applied to health and illness behaviour emphasizes that individuals generate their own representations of health threats. These representations are built up from symptoms and sensations from the body, from family patterns and myths, from folk lore, friends, media, and health practitioners (Leventhal, Meyer, & Nerenz, 1980). Information from all these sources is integrated into a representation of a current illness episode or a future illness threat. According to Leventhal et al., (1984) this representation underpins planning and coping. Health related action based upon the representation depends upon at least two other factors that Leventhal et al., (1984) refer to as "coping factors" (p. 373). These are a) the individual's self-esteem or sense of effectance (Bandura, 1977) and b) the individual's repertoire of coping responses and his/her beliefs about their relative effectiveness (Folkman & Lazarus, 1980). These coping factors appear to be important in the individual's assessment of a threat as manageable. Coupled with the individual's unique representation of the threat, they will lead to coping reactions that will be appraised and re-appraised for their effectiveness as the illness unfolds. If the behavioural response results in the attainment of desired goals then it is likely to be repeated. If it does not, the behaviour will be modified or abandoned and a new behaviour will be tried (Folkman & Lazarus, 1980; Lazarus & Launier, 1978). Much like an experimenter then, the person threatened by illness plays an active role in shaping its course through the testing and accepting or rejecting of different strategies and through the refinement of responses that he or she - as opposed to the health care provider - finds manageable.

There is little doubt that an important component of the self-regulating mechanism is its capacity to help restore a sense of control, a factor which can be highly desirable in threatening circumstances (Taylor, Lichtman, & Wood, 1984). But when self-regulation is enacted through the general disregard of any directive which may preserve well-being, it carries with it a substantial risk of morbidity and mortality. In this way the restoration of control may be extremely costly.

As previously described, the self-regulation model views clients as active agents choosing their own goals, goals that are in part, determined by representations of the health threat. Individuals engage in behaviours that they believe will meet the chosen goals and they evaluate their progress in goal attainment in an ongoing fashion. Self-regulation is thus conceived as an ever-changing process in which people do what they can to modify their behaviour according to the changing demands of the illness, as it unfolds. This model further suggests that when people attempt to integrate health-related information they do so within a framework of pre-existing personal and cultural meaning and from the vantage point of an established behavioural repertoire.

From the review of the literature thus far, the degree to which a negative or aversive event, such as a serious illness, is perceived as threatening has emerged as an important variable in self-management. Evidence suggests that the perception of an event as threatening will vary in accordance with certain fundamental assumptions that people hold about their world and themselves. Corresponding to Bowlby's (1967), world models, Parkes's (1975) assumptive world, or Lerner's (1980) just world hypothesis, Janoff-Bulman (1989) has described the importance of the fundamental self-schemata that are deeply embedded within people's conceptual systems. Events are filtered and perceived through these self-schemata. From research with victimized populations (e.g., Bulman & Wortman, 1977; Janoff-Bulman & Frieze, 1983; Timko & Janoff-Bulman, 1985) Janoff-Bulman (1989) has suggested that these fundamental assumptions, shared by so many in Western culture, relate to perceptions of invulnerability. Until people are confronted by negative or aversive events they have a tendency to over-estimate the likelihood of experiencing positive events and under-estimate the likelihood of experiencing negative ones. She has found, for example, that although people may be intellectually aware of the fact that one in four North Americans develops cancer, people tend to truly doubt that they personally will be affected. Janoff-Bulman (1989) has described three fundamental assumptions that are integral to the self-schema. First, the world is benevolent; in general much of what happens is good and the basic intentions of most people are good. Second, the world is meaningful and makes sense; adversity is not random but distributed according to controllable and justifiable factors. Finally, self is worthy. This involves seeing oneself in a positive light, and as decent, competent, and praiseworthy. Traumatic negative events such as serious disease may threaten these positive assumptions about a benevolent, meaningful world and a belief in self-worth, and result in psychological disequilibrium. Janoff-Bulman (1989) reports considerable variation in what happens to these basic assumptions following the experience of traumatic events. Some people develop extremely negative core assumptions. Others re-establish a positive view of the world and themselves, while simultaneously recognizing a limitation to their previous notion of invulnerability. To date, research has not investigated these different patterns of responses. What does seem evident however is that people do have a basic orientation towards themselves and their world which is generally positive. Specific adverse events may disrupt this world view, but in the best of circumstances this disequilibrium will give way to the restoration of at least some sense of optimism and well-being.

To summarize then, the illness representation, which is so fundamental to planning and coping in the experience of illness, develops through the filter of the individual's self-schema. The degree to which the illness event is perceived as threatening will, in part, depend upon the fundamental assumptions integral to the individual's view of self and the world. Despite these individual differences, if the process of self-regulation is to involve effective risk-reduction behaviour and the anticipated promotion of well-being, then the individual needs to acknowledge that the illness event is a significant threat worthy of investment, commitment, and challenge and that the recommended health behaviours can reduce the likelihood of further complications. For example a heart attack is clearly life-threatening. The standard prescribed regimen to both off-set future risk and to promote regression of the atherosclerotic process will include reducing saturated fat and animal products in the diet, increasing dietary fibre, managing stress effectively, stopping smoking, increasing exercise, and taking a variety of medications such as beta blockers, calcium channel blockers, vasodilators, and anti-hypertensives (Miller et al. 1989). For many people this regimen amounts to a massive alteration in their entire way of life. If people are going to attempt to effect a change of such magnitude then it is reasonable to propose the existence of two essential pre-conditions. First, they must perceive the event as a threat and be willing to invest the considerable effort required to take on the challenge of implementing and maintaining the prescribed life-style changes. Second, they must believe that the prescribed regimen will, if followed, significantly increase their safety and well-being. As previously described, even the existence of a life-threatening disorder will not ensure adherence to a prescribed treatment regimen if the individual does not share the perception of severity and does not believe that the benefits of adherence behaviour will outweigh the costs (Turk, Rudy, & Salovey, 1986). In a pilot interview, an excerpt of which follows, conducted with a man ten weeks after his second infarction, the importance of his illness representation and the perception of threat in decisions regarding acting to reduce risk, were exemplified.

First of all, the man described the physical sensations he had experienced when his heart attacks occurred.

> J.W. Well, there's chest pains in here. (spreading hand across chest). Right from, well, ...I guess from the... start at the rib cage right up to the top of the neck here and then both sides down, both sides of ribs. Seem to be all over, just wasn't in one place, but seemed to be all over, and that, in that one square area.

He then reported how the cardiologist had presented the results of his angiogram.

> J.W. He says there's a 50% blockage. You're a normal person, he says. He says everybody's got at least 50% blockage. He says I don't see no problems. So I just moved back to doing the same things I was doing

before without any trouble. I, I still say it's in the lungs here, is what it is.

K.T. In your lungs?

J.W. Well, yeah. I look fine all the time. You know they wouldn't put me in intensive care you know. They come and look at me and they figure what the hell is this guy doing here. You know. He don't look like there's anything wrong with him. Could have been a muscle spasm or as I say, maybe angina. A little bit of angina pain or something like that, but I really don't think that's the heart itself, I really don't think that. After Dr. J. gave me another stress test and an ultrasound on my heart and lungs, I was supposed to go back to see him, I guess about two weeks ago. I never went near the place.

K.T. Why not?

J.W. [whispering so the tape-recorder wouldn't pick up his statement] Bloody waste of time.

This man appeared to gain confidence from his belief that his health problem was not related to his heart. The narrative shows how his own illness representation locates the source of the problem in his lungs. His perception of threat was diminished as a result of his encounter with the physician in which, according to J.W., he was informed that 50% occlusion of coronary arteries is normal. (The reader is asked to note that occlusion of the coronary arteries is not normal and potentially harmful). Additional evidence mitigating his perception of threat, was derived from not having been admitted to intensive care and his perception of himself as looking well.

When this sort of cognitive structuring of events is operative, then the suggested regimen for off-setting further risk to the heart has neither meaning nor relevance and adherence to the prescribed regimen should not be expected.

Perceptions such as these, no matter how "distorted" or "inaccurate" they may appear to the biologically enlightened, are worthy of closer examination because of the role they may play in people's seemingly reckless health behaviour.

The Perception of Reality and Psychological Health

In psychology's history the importance of "accurately" perceiving reality is an idea that appears to have emerged with Freud's (1976) interactive system of personality. In this system a key role was given to the ego in pursuit of reality and in attending to reality in accordance with one's "accurate" perception of it. Increasingly, in the post-Freudian years, accurate perception of reality was considered the hallmark of mental health (Snyder, 1989). In her widely cited book, Current Concepts of Mental Health, Jahoda (1958) wrote, " The perception of reality is called mentally healthy when what the individual sees corresponds to what is actually there" (p. 6). Many prominent theorists in psychology echoed this view (e.g., Allport, 1943; Erikson, 1950; Fromm, 1955; Maslow, 1950; Rogers, 1959) and it is still incorporated into writings in healthy personality. For example Jourard and Landsman (1980) noted "The ability to perceive reality as it really is, is fundamental to effective functioning. It is considered one of the two pre-conditions to the development of healthy personality" (p. 75). It should be remembered however, that for many of these writers, their views on the importance of accurate reality perception stemmed from their study of individuals who were suffering from severe psychological disturbances.

Beyond this theoretical work, limited empirical evidence attests to the fact that, among laypersons, there appears to be unquestioning acceptance of the desirability of being realistic. In the one reported empirical study that specifically addressed this issue, Wright (1968) surveyed grade five boys and college students about their views on the concept of reality. An overwhelming endorsement of the value of being realistic was found when 100% of the grade five subjects (N = 54) and 96% (N = 70) of the college students rated "being realistic" positively. Positive ratings revealed significant correlations between "being realistic" and "loving" while negative ratings showed positive correlations between "being unrealistic" and "stealing". Wright (1968) followed this initial quantitative assessment with a qualitative enquiry of the college students only. These participants were asked to discuss what was so good about being realistic and so bad about being unrealistic. The major theme that emerged was that realistic appraisal was essential if a person was to cope adequately with problems and to succeed in life. When asked to estimate the extent to which unrealistic behaviour represented aspirations that were too high or too low, 83% associated being unrealistic with aspirations that were too high. In other words being unrealistic meant that individuals would tend to over-estimate their ability and would thus be more likely to fall short of the goals towards which their efforts were directed. Her data also suggested that the weight given to being realistic grew out of an achievement-orientated society in which there was an inherent fear of failure and a need for success.

Wright's (1968) study was unique and her discussion of results particularly stimulating and relevant to the present research. She appears to be the first contemporary psychologist to have suggested both the benefits and burdens of being unrealistic under certain conditions. For example, she pointed to the endorsement that children receive when they aspire to high status occupations, even when there appears little chance of them reaching their goal, and how American society views it as indolent when children aspire to occupations of so-called lower status. Although such ideals may fall short of reality, Wright (1968) argued that they could strengthen the will to move forward in successive approximations of the desired outcome. So ideals can serve not only as motivating forces, but also as criteria against which progress is evaluated. But despite the motivating component of ideals, in Wright's (1968) view a significant problem can occur when unrealistic expectations of the future interfere with needed action in the present. This potential problem was examined in the current study where it was hypothesized that an overly pessimistic or overly optimistic perception of the future would deter heart attack victims from acting in the present to preserve their future well-being.

Cognitive Biases in the Processing of Self-Relevant Information

In the last decade or so a major interest in social psychology has been centred upon whether or not accurate reality perception is indeed a pre-requisite for psychological health. A burgeoning literature now suggests that the capacity to develop and maintain a positive view of reality, albeit somewhat unrealistic, is a valuable human resource to be nurtured and promoted rather than the manifestation of an error-prone information-processing system in need of correction (e.g., Cialdini, Borden, Thorne, Freeman, Walker, & Sloan, 1976; Janoff-Bulman, 1989; Rogers, Kuiper & Kirker, 1977; Ross & Sicoly, 1979; Snyder, Lassegard, & Ford, 1986; Taylor & Brown, 1988; Taylor, Collins, Skokan, & Aspinwall, 1989). Healthy psychological functioning, it is argued, is characterized by self-enhancing positive biases that are inherent in the processing of self-relevant data.

In his portrait of a totalitarian ego, Greenwald (1980) suggested that maintenance of the self-concept was dependent upon the existence of cognitive biases - or ego biases to use his term - that result in the fabrication and revision of personal history. He proposed that ego is a personal historian, an organization of knowledge characterized by cognitive biases that are strikingly similar to totalitarian information control strategies. Noting the pervasiveness of ego's biases, Greenwald (1980) argued that they develop within the individual's nervous system during the period of personality formation, and that they function to maintain order in cognitive structures. In this intra-psychic evolutionary process, cognitions endure because they are re-experienced or 're-cognized' (p.613). His analysis focused on data recalled from past experiences wherein the positive re-structuring of events could occur as people compared their past versus present selves on evaluative dimensions. He labelled the biases that can operate on recall as egocentricity, beneffectance, and cognitive conservatism. In this model, ego-as-historian is construed respectively as self-focused, self-aggrandizing, and self-justifying.

Conway and Ross (1984) provided a notable experimental example of biographical revisionism in their examination of students' self-evaluation of their study skills, before and after completing an improvement programme. The deception in the study was that the programme was never intended to be as effective as advertised, so improvement in study skills would not be anticipated. Students initially evaluated their skills and were then randomly assigned to either the experimental or waiting list control group. Three weeks later all students were asked to recall their initial self-evaluations. As hypothesized, subjects in the experimental group recalled their evaluations as being at a lower level than they initially reported them; waiting list controls exhibited no such bias. In comparison to their control group counterparts, programme participants reported greater improvement in their study skills after the three week treatment period and they demonstrated a further bias six months later by over-estimating their academic performance during the term in which the programme was carried out. Conway and Ross (1984) asked what psychological processes allowed participants to convince themselves that they had changed for the better on the basis of an ineffective programme. If participants believed the programme to be as beneficial as advertised, they may need to manufacture evidence supporting their belief in its efficacy. Two strategies could achieve this end. Students could either exaggerate their post-programme ability (difficult to do in the absence of demonstrable improvement) or they could derogate their pre-programme performance by describing themselves as less able than their initial self-evaluations suggested. Such downward revision of pre-programme standing could be reflected by a statement like, "I may not be perfect now but I was far worse at the beginning". Conway and Ross (1984) offered a number of alternative explanations for this positive reconstruction of past events, however the account that is most relevant for the present study is the one that is consistent with dissonance theory. When effort is expended in the attainment of a self-chosen goal, those labours can be justified by perceiving improvement even when it has not occurred. One way to perceive a better present, is to remember a worse past.

For people who find themselves confronting severe adversity, recall biases have been found to be particularly adaptive in that they may provide the individual with some room to soften an otherwise grim or fearful reality (e.g., Bulman & Wortman, 1977; Taylor, Lichtman, & Wood, 1984). Research suggests that the capacity to shape events into a less threatening form, even if some departure from the most accurate perception of reality is involved, may enhance emotional well-being. "The individual who responds to negative, ambiguous or unsupportive feedback with a positive sense of self, a belief in personal efficacy, and an optimistic sense of the future will, we maintain, be happier, more caring, and more productive than the individual who perceives this same information accurately" (Taylor & Brown, 1988, p.205). In other words, belief in our superiority can motivate us to achieve and sustain a sense of hope in difficult times (Myers, 1990)

Adaptive or not, research into cognitive bias tends to portray people as fabricators with respect to their processing of personal data, as revisionists who portray themselves and their histories in a more favourable light than circumstances generally warrant. In their review of this literature Fiske and Taylor (1984) noted , "Instead of a naive scientist entering the environment in search of truth we find the rather unflattering picture of a charlatan trying to make the data come out in a manner most advantageous to his/her already held theories" (p.88). Although these qualities may not be admired in historians there is evidence to suggest that they serve an important function in the organization of knowledge and in the development of adaptive behaviour.

Interpretive Biases in Naturalistic Settings

Beyond the laboratory setting the adaptive nature of cognitive biases in interpreting events is perhaps most strikingly evident in studies of individuals coping with traumatic life experiences. For example Bulman and Wortman (1977) found that among the psychological reactions to spinal cord injury was a perception by victims that they were better off as a result of their misfortune. These researchers found that those who were coping best tended to evaluate the experience positively. In this study participants recalled, almost as if it were a privilege, that devastating event in their lives that had permanently robbed them of the capacity to walk. Examples included, "The accident was the best thing that ever happened to me; it's forced me to decide my faith", "It's a learning experience. God has put me in this position to help me learn about him, myself, and others", and "I think this was the best thing - maybe I'll live a little longer 'cos its forced me to slow down" (p. 359).

This finding was later confirmed by Taylor, Lichtman, and Wood (1984) in their study of women with breast cancer. Taylor's (1983) theory of cognitive adaptation to threat was based upon this empirical study and there she describes how women reported perceived improvement in their lives following diagnosis of breast cancer. Examples of statements made by participants included, "I feel as if I were for the first time really conscious", "My life is framed in a certain amount of time .... and it's made better by the knowledge", and "You find out that things like relationships are really the most important things you have......it's very strange that it takes something so serious to make you realize that" (p. 1163). Women who were able to construe this kind of positive meaning from the experience of cancer demonstrated significantly better psychological adjustment.

With regard to the re-writing of history, Taylor (1983) argued convincingly for the benefits of illusory processes. In her theory of cognitive adaptation to threat she proposed that information processing is full of incomplete data gathering, shortcuts, errors, and biases. In describing these biases in the processing of self-relevant information, she coined the term "cognitive illusion" (p. 1161). Cognitive illusion, she maintains, is an integral component of adaptation to threat. She used the definition of illusion provided by Stein (1982), "An illusion is a perception that represents what is perceived in a way different from the way it is in reality. An illusion is a false mental image or conception which may be a misinterpretation of a real appearance or may be something imagined" (p. 662). From this definition the pejorative connotation traditionally ascribed to the term, 'illusion' is evident. On the basis of Taylor et al's., (1984) empirical study with breast cancer patients, Taylor (1983) reported how women manufacture causes when none are known, fabricate images of persons less fortunate than themselves, and claim to be better off as a result of personal tragedy, by reporting themselves as having been worse off before tragedy struck. In particular, women who evidenced an exaggerated perception of personal control over their illnesses showed better adjustment to the highly aversive experience of breast cancer. Measures of adjustment included the Locke-Wallace (1959) Scale of Marital Adjustment, Profile of Mood States Questionnaire (McNair & Lorr, 1964), Rosenberg's (1965) Self-Esteem Scale, and Campbell, Converse, & Rodgers's (1976) Index of Wellbeing. Taylor (1983) concluded that the stress imposed by a life-threatening illness was less likely to result in psychological disturbance if some sense of personal control over the illness could be generated.

Both Greenwald (1980) and Taylor (1983) subscribe to the functional role of illusions in the process of self-enhancement that can lead to the promotion of well-being. They argue that illusions contribute to a sense of self as a highly organized and efficient information-processing system, a view which may be especially important in the face of adversity. Taylor (1983) writes that, "The effective individual in the face of threat seems to be one who permits the development of illusions, nurtures those illusions, and is ultimately restored by those illusions" (p. 1168). Such a statement is supported by the repeated finding that, when comparing themselves to similar others, people describe themselves as more successful, more influential, more capable, and more in control of present and future life events than is generally warranted. Taylor and Brown (1988) further argue, "Because it is logically impossible for most persons to be better than the average person, these highly skewed evaluations may be regarded as evidence of their unrealistic or illusory nature" (p. 195).

Although the robustness of cognitive biases in the processing of self-relevant data is beyond question (e.g., Fiske & Taylor, 1984; Nisbett & Ross, 1980; Taylor, Lichtman, & Wood, 1984; Taylor, 1983; Taylor & Brown, 1988) that these biases are truly illusory, in other words that they "represent a false mental image which is different from reality" (Stein, 1982, p. 662), has not been established. For some people these so-called 'illusions' may indeed represent reality, for others not. But in view of the fact that what is believed by research participants in this body of literature is not evaluated in relation to reality, the use of the term, 'illusion' seems unwarranted. As no attempt will be made in the present study to compare participants' beliefs with so-called reality, the term "belief" will be used in favour of the term 'illusion'.

With regard to self-serving present and future beliefs Taylor and Brown (1988) emphasize three which consistently emerge, and among which there appears to be considerable overlap. They are overly positive views of the self, exaggerated perceptions of personal control, and unrealistic optimism. The suggestion is that psychological health is characterized by a self-serving tendency in information processing, that involves the simultaneous existence of all three beliefs in the person's self-schemata.

Overly Positive Views of the Self

Evidence suggests that many people tend to possess an overly positive view of themselves. Research conducted by Alicke (1985) and Brown (1986) showed that non-depressed people judged positive adjectives to be significantly more self-descriptive than negative adjectives. Positive personality information is more easily recalled than negative information and when negative information about the self is processed and effectively recalled it tends to be dismissed as inconsequential (Kuiper & Derry, 1982; Kuiper, Olinger, McDonald, & Shaw, 1985).

One's socially undesirable traits or attitudes tend to be perceived as common. This phenomenon, known as false consensus (Goethals, 1986), allows individuals to perceive their less desirable thoughts and actions as highly consensual, thus they may consider themselves as mainstream and socially appropriate. In contrast, one's desirable traits and attitudes tend to be viewed as uncommon and precious, an effect known as false uniqueness (Campbell, 1986; Goethals, 1986). In this case people see themselves as thinking and behaving in uniquely admirable ways, believing that others are not as blessed. In sum, false consensus and false uniqueness effects suggest that we view our failings as normal and our virtues as rare.

Further evidence for this pervasive tendency to see oneself as better than others comes from investigations in which self-ratings have been compared with judgements made by observers. For example Lewinsohn, Mischel, Chaplin, and Barton (1980) had subjects observe a group of students engaged in an interaction task. The observers then rated the students on a variety of attributes. Results showed that students' self-ratings were significantly more positive than the observers' ratings. In other words students' self-descriptions of themselves were more flattering than others' descriptions of them.

Overall it would appear that the view of self that people hold is not well balanced with regard to the favourable and unfavourable aspects of self. Well-adjusted persons are overly cognizant of, and involved with, their strengths and assets. By the same token they also tend to downplay and disregard their weaknesses and deficits. In contrast research shows that people who are more balanced with regard to acknowledging their unfavourable qualities tend to have low self-esteem and be moderately depressed (Coyne & Gotlieb, 1983). These individuals tend to be more even-handed in their attributions of responsibility for negative outcomes (Campbell & Fairey, 1985), there is greater congruence between their own and others' perceptions of themselves (Brown, 1986), and they recall both negative and positive self-relevant information with equal frequency (Kuiper & Derry, 1982).

In summary, these data suggest that far from being conducive to well-being as was traditionally thought, stark accuracy in self-perception may not be as adaptive.

Exaggerated Perceptions of Personal Control

A further bias in information processing emerges with regard to people's beliefs concerning the degree of control they have over life events. It has long been recognized that a sturdy sense of personal control is integral to the development of a healthy self-concept and strong self-esteem (Bandura, 1977; DeCharms, 1968; Heider, 1958). However evidence attests to the fact that people's beliefs in personal control over events in their lives may be far greater than is justified. Langer and Roth (1975) demonstrated that people often believe that they can control events that are, in fact, random. Using gambling paradigms these researchers manipulated variables such as skill, choice, and involvement to determine whether subjects believed they could control the throw of a dice. When subjects threw for themselves they believed that they could control the outcome; they did not have this belief when someone else threw for them. They believed that their skills in dice throwing could bring a chance situation under personal control. Similarly, when people expect and desire a certain outcome and the outcome occurs, they over-estimate the degree to which they were instrumental in bringing it about (Miller & Ross, 1975).

Evidence suggests that those who are more realistic concerning their beliefs in personal control may experience emotional disturbance. Abramson and Alloy (1981) for example, have found both mild and severe depression to be associated with accurate estimates of control over life events. When outcomes occurred as predicted, depressed individuals provided significantly more accurate estimates of their degree of control than did non-depressed subjects. Similarly, when negative mood is induced in subjects, they tend to be more accurate in attributing control to themselves (Alloy, Abramson, & Viscusi, 1981). Although compelling, these findings should be interpreted with some caution. As Benassi and Mahler (1985) noted, depressed people are not always more accurate in their evaluations of personal control and non-depressed people more inaccurate, but the preponderance of evidence seems to be in this direction; positive affect is more characteristic of individuals who have an inflated belief in personal control. In the face of threat it also appears evident that when people believe they can exert some degree of control over aversive events, they may adjust more successfully to those events (Averill, 1973; Taylor, Lichtman, &

Wood, 1984; Thompson, 1981). In hopelessly uncontrollable situations however, limitations to the benefit of perceived control are readily apparent. In their study of patients undergoing long-term haemodialysis, Witenberg, Blanchard, Suls, Tennen, McCoy, and McGoldrick (1983), found that patients who tried to prevent the inevitable deterioration of renal failure and who had, of course, been beaten by the disease, were found to be coping less effectively than those who believed they were powerless to alter the course of illness. Witenberg et al., (1983) explained this finding in the language of learned helplessness research (e.g., Seligman, 1975). Patients who perceived themselves as having control over their illnesses, and thus attempted to prevent deterioration experienced response-outcome independence. Conversely, those patients found to be managing relatively well did not invest effort in preventing further deterioration, so they were spared the harrowing experience of non-contingency between past actions and present status. It appears then, that beliefs in personal control in uncontrollable situations can be detrimental, if those beliefs lead to efforts to modify the unmodifiable.

Unrealistic Optimism

In general research indicates that many people consider that the present is better than the past and that the future will be better still (Brickman, Coates, & Janoff-Bulman, 1978). This optimism which tends to pervade people's thinking about the future is most prominent with regard to the self (Perloff & Fetzer, 1986; Weinstein, 1980).

Evidence for an unrealistically positive view of one's future comes from studies which compare how individuals rate the likelihood of future events affecting themselves, with those affecting others. Once again self, when compared to others, is perceived to be on the brink of a much rosier future. Students estimated the probability that they would like their first job, receive a good salary, and have a gifted child, as significantly more likely than these events happening to their peers (Weinstein, 1980). In contrast when asked to rate the probability of negative events occurring such as becoming ill or being robbed (Perloff & Fetzer, 1986), suffering depression (Kuiper, McDonald, & Derry, 1983), or being unemployed (Weinstein, 1980) respondents believed that they were significantly less likely than their peers to experience such adversity.

The bias of unrealistic optimism provides yet another example of how self-relevant data may be more accurately processed by persons who are mildly depressed and suffer from low self-esteem. Such people have been found to countenance more balanced estimates of future life circumstances (Ruehlman, West, & Pasahow, 1985). Similarly they fail to show the self-enhancing tendency of seeing more positive events as likely to happen to them and more negative events as only happening to others. Unrealistic optimism may be protective in that it can reduce the tensions associated with the prospects of a difficult or uncertain future, however it may also prevent persons from actively engaging in behaviours which will help preserve their well-being. For example, when peering into the future people who have had heart attacks may build a representation of the event and its sequela as non-threatening if they are wedded to the unrealistic belief, like Mr. Macawber was, that something will turn up and all will be well in the end (Dickens, 1890).

To summarize, a great deal of research in both social and clinical psychology attests to the fact that well adjusted persons harbour overly positive views of themselves, exaggerate the degree to which they can exert control over events affecting their lives, and have a vision of their future that is more optimistic than the future they would describe for others. Furthermore, individuals who have low self-esteem and who are mildly or moderately depressed tend not to display such self-enhancing beliefs. Taken together these findings suggest that self-enhancement, for which justification can not reasonably be found, may be one of the hallmarks of psychological health and not of psychological impairment as was previously believed.

An Optimal Margin of Illusion

Conceptualizing illusions as " exaggerations in the positivity of self-perception", Baumeister (1989, p. 176) proposed that there is an optimal margin of illusion in which psychological functioning is likely to be highest. In other words if reality perception is viewed as a continuum, distorted perceptions which err too close to either the positive or negative end of the continuum may result in adverse consequences for the individual.

History is replete with examples of the perils of over-confidence and how overly positive views of the self can lead to self-defeating behaviours. Baumeister (1989) recalls Maalouf's (1987) story of how the first mustering of Christians that set out to conquer the Holy Land was ill-prepared and impatient. Unable to wait for the organized expedition, these adventure-seekers first encountered the Moslem ruler, Kilij Arslan. He mounted a strategic military response and was able to annihilate the enemy, however this initial impressive defeat led Arslan and his troops to believe that they were so superior to the Christians that they need not worry about further attack. When the highly organized, orthodox Christian armies finally came along, Kilij Arslan's army was so ill-prepared that it was completely overwhelmed. This story illustrates the self-defeating course of events that might unfold when people are over-confident with respect to their ability and their capacity to bring events under their personal control. This mechanism was vividly described during a preliminary pilot interview for the present study, with a man who had experienced two heart attacks after which he underwent coronary by-pass surgery; one year later he suffered his third. At 57 years of age he described himself tearfully as a , "coronary invalid".

> "After the first two heart attacks and the triple by-pass I'd get better and go back to doing all the things I did before...I had this idea that I was invincible.....always did have. Now after the third (heart attack) I finally got the message...now I do things differently (F.M. pilot interview, February 1992).

This example illustrates Baumeister's (1989) proposition that when perceptions err beyond an "optimal margin of illusion" (p. 176) such over-confidence may result in self-defeating behaviour. Both too much or too little self-enhancement might obstruct people's engagement with the risk-reduction process. At either end of the self-enhancing belief continuum, individuals may be in jeopardy. At the negative end, the belief would be that the worst possible outcome would occur regardless of effort, whereas at the positive end people may believe that things will turn out for the best, again regardless of their efforts. In either case the motivation to engage in behaviour designed to promote well-being and reduce the likelihood of further risk would be absent.

In summary, the studies describing factors associated with cognitive biases in the processing of self-relevant data evidence both benefits and burdens; accurate perception of reality is associated with depression whereas inaccurate perception of reality, too far in the positive direction, is associated with self-defeating behaviour. As Baumeister (1989) suggested, these disparate findings may be best integrated through the concept of an optimal margin of illusion in which the individual can reap the benefits of illusion while avoiding some of the more deleterious consequences. This optimal margin hypothesis, "still awaits careful and rigorous empirical study" (Baumeister, 1989, p. 187). Of particular interest in the present study was the degree to which self-enhancing beliefs are adaptive. The speculation was that a small distortion in the positive direction would be most beneficial. If support could be found for an optimal margin hypothesis, future research would attempt to determine whether the consequences of moving out of the optimal margin would be different depending upon whether the individual moved in a positive or negative direction.

Given these theoretical considerations, a central hypothesis of this research was that a curvilinear relation existed between self-serving biases and risk-reduction behaviour. In other words people who had either very negative or very positive self-views would be less likely to behave in ways to off-set further risk than those whose views were more moderate. For example, it was hypothesized that people who viewed themselves negatively, perceived themselves as having no control over outcomes, and were pessimistic about the future, may subscribe to the view that they were going to die anyway so why invest the effort involved in health promotion. At the opposite extreme it was hypothesized that people with overly positive perceptions of themselves and the future may believe that they will be fine, regardless of what they actually do. Neither individual would be expected to expend effort in the following of advice designed to promote health. It was also proposed that a mediating variable in this relationship would be the individual's own representation of the health threat. In other words post-coronary women whose beliefs were highly self-enhancing may be less likely to consider themselves as being in highly threatening circumstances and thus less likely to engage in risk-reduction behaviour. It was proposed that an optimal level of self-enhancement exists in which the individual is unencumbered by terror, but at the same time is able to acknowledge that some degree of threat exists and is therefore motivated to reduce the risk of further harm. Essentially, this study suggested that to be unwaveringly certain of one's safety may be as self-defeating as believing that death will occur in the next minute.

A critical assumption here in regard to risk-reduction behaviour, is that most human beings are firmly invested in survival. As psychoanalyst Gregory Zilboorg (1943) pointed out in his penetrating essay, "Such constant expenditure of the psychological energy on the business of preserving life would be impossible, if the fear of death were not as constant. The very term self-preservation implies an effort against some form of disintegration; the affective aspect of this is fear; fear of death" (p. 467). Becker (1973) similarly noted that the instinct of self-preservation functions as a constant drive to maintain life and to master the dangers that threaten life. Interestingly, he also argued that because the world is such an uncertain and frightening place, people have a tendency to create positive, self-affirming, and reassuring illusions that enable them to cope with their existential terror. Because the terror of death is ubiquitous and of such great magnitude (Yalom, 1980) it seems safe to assume that individuals would wish that their behaviours would result in self-preservation. Consequently it is felt that the most adaptive behaviour is that which balances self-enhancement with a reasonable perception of threat, resulting in behavioural efforts aimed at the reduction of further risk.

The Affective Correlates of Myocardial Infarction

Anxiety

Surviving myocardial infarction is psychologically traumatizing in that the event is clearly life-threatening. Typically, the affective reaction to this stressful event has been conceptualized in terms of anxiety. In general, in studies of post-coronary patients, anxiety is conceptualized as an emotional reaction to the trauma which, in an extreme form, may have a disorganizing effect on behaviour, thus inhibiting recovery and the adjustment process (Sykes, Evans, McBoyle, McIlmoyle, & Salathia, 1989; Thompson, Cordle, & Sutton, 1982; Waltz, Badura, Pfaff, & Schott, 1988). Most post-infarction patients face immediate and often difficult adjustments to loss of status (although this is may be temporary), threat of worsening health and dependency, changes in family and career relationships, and fear of death. In Type A males, who have a greater propensity for the experience of AMI (e.g., Gentry, Balder, Oude-Weme, Musch, & Gary, 1983), anxiety may also result from the threat of loss of control with regard to self, others, and the environment (Rosenman, 1988).

Evaluation of the evidence concerning the level of anxiety experienced by post-coronary clients, and its effect upon recovery and rehabilitation, is made difficult by the fact that there is considerable variation in the instruments chosen to assess anxiety and the point of time, post-infarction, selected for the assessment (e.g., Cay, Duggard, & Philip, 1982; Dellipiani, Cay, Philip, Vetter, Colling, Donaldson, & McCormack, 1976; Cassem & Hackett, 1973; Thompson et al. 1982). Some studies have attempted to measure anxiety in samples of post-coronary patients by classifying them into minimal, moderate, and severe groups (e.g., Billig, Lindell, Sederholm, & Theorell, 1980; Froese, Hackett, Cassem & Silverberg, 1974). The emphasis in these studies was not on control group comparisons but on the absolute degree of anxiety experienced by post-coronary clients in each category. Hackett and Cassem (1976) investigated whether or not there was a difference between middle and low socio-economic status clients in terms of the severity of anxiety experienced post-infarction. They began interviewing 87 post-coronary clients 24 hours after admission to the Coronary Care Unit (CCU). Participants were interviewed between three and ten times during their hospital stay. These physician ratings of anxiety were made on the basis of observable behaviour, but these estimates are very subjective and so the results have to be treated cautiously. They defined severe anxiety as, "Appears on the verge of panic/ requested sedative", moderate anxiety as, "Impressed physician as restless and fearful", and mild anxiety as, "Physician noted tension in the face although client might deny it". On the basis of this classification 5% of the respondents were found to be severely anxious, 45% moderately anxious, and 39% mildly anxious. Anxiety was not evident in 11% of subjects. There were no differences between middle and low socio-economic groups in terms of anxiety ratings.

Using a multi-method approach, Cay, Vetter, Philip, and Dugard (1973) investigated 203 males admitted to the CCU. At four months post-infarction 166 of the 180 people who were still alive agreed to undergo a semi-structured clinical interview. In addition, the Personal Disturbance Scale of the Symptom-Sign Inventory (Foulds & Hope, 1968) was administered to measure anxious and depressive symptomatology. At four months post-infarction 30% of the participants were found to be extremely anxious and were having great difficulty returning to work. High levels of anxiety were also associated with difficulties in interpersonal relationships.

Philip, Cay, Vetter, & Stuckey (1979) tested the hypotheses that there would be discernible fluctuations in anxiety during the hospital stay and that this anxiety would be associated with difficulties in adjustment. They assessed anxiety in 55 males after their discharge from the CCU on the first, fourth, seventh, and tenth days on the medical ward. It might be expected that leaving the anxiety-provoking CCU would be accompanied by a reduction in anxiety. This awesome, highly technical environment is anathema to the reduction of stress. It is noisy, active, and often terrifying for clients as they endure being monitored, possibly witnessing cardiac arrest, or experiencing cardiac arrest themselves. However, using the Cattell 8 - Parallel Form Anxiety Battery (Cattell & Scheier, 1961) Philip et al. (1979) were surprised to find the highest levels of anxiety in post-coronary clients as they were leaving the CCU and the lowest levels at the time of discharge. Although the CCU is an anxiety-provoking environment there is obviously some comfort to be derived in the close monitoring that clients receive. These data suggest that the prospect of leaving and graduating to a less intensive environment creates some tension. The availability of normative British data for anxiety revealed that, in general, men in this sample did not differ from the population as a whole. In conclusion Philip et al., (1979) suggested that no reference to a general level of anxiety is justified when post-infarction clients are treated as a group. What was apparent however, was that some post-coronary clients experienced sufficiently troublesome levels of anxiety to adversely affect recovery and rehabilitation and that these people were in need of early intervention and counselling.

A more recent study points to the negative effect of high levels of anxiety upon recovery from AMI. Wiklund, Sanne, Vedin, & Wilhelmsson (1984) assessed psychosocial outcome in 177 male clients two months and then one year following their first AMI. Questionnaire and interview data indicated that approximately 60% of participants were found to be anxious, irritable, and depressed two months after the AMI. At one year post-infarction these participants showed no significant improvement in either anxiety or irritability; there was however a significant reduction in depression. These affective disturbances were also associated with reported symptomatology such as feelings of stress, gastritis, insomnia, impaired concentration, and headaches, and with avoidance behaviour, pessimism, and diminished sexual activity. Psychological factors were more significant predictors of maladjustment (pre-occupation with health status, negative attitudes towards life and the future, avoidance behaviour, diminished sexual activity) than socio-economic status, severity of the infarction, or angina. The close correlation between affective disturbances and scores on the Neuroticism Scale of the Eysenck Personality Inventory (Eysenck & Eysenck, 1964), suggested that the nature of the affective disturbance was neurotic. On the basis of these findings Wiklund et al., (1984) urged that psychological assessment and intervention begin early in the post-infarction period.

Insisting that it was inappropriate to assume that the middle-aged male experience of AMI applies to women, in one of very few studies comparing gender differences, Conn, Taylor, and Abele (1991), compared anxiety in women (n=80) and men (n=117) one to two years after the heart attack. Anxiety, as measured by the Profile of Mood States (McNair, Lorr, & Droppleman, 1971), referred to heightened musculo-skeletal tension, including somatic tension which may not be overtly observable, as well as observable psychomotor manifestations. Wilcoxon's Z test revealed no statistically significant gender differences in therapeutic regimen adherence, or in anxiety. The analysis did not address whether anxiety was associated with degree of physical incapacity in either the women or men in the sample, however it was established that, in comparison to men, women report significantly greater numbers of days of reduced activity and co-existing chronic illnesses. There was no significant difference found between men's and women's subjective health rating. In other words, despite women's greater experience of incapacitation, both men and women rated themselves similarly in regard to perceived well-being.

Much of the literature investigating the role of anxiety in recovery from AMI addresses the negative effects of either too much anxiety in the form, for example, of avoidance or pessimism (Wiklund et al., 1984) or too little anxiety, in the form of denial (Billig et al., 1980; Gentry et al., 1983). An alternative conceptualization does not view anxiety solely as a disorder but rather as "normal" with the anxiety process seen as contributing to adaptation following the experience of a threatening event. According to May (1950) the concept of normal anxiety became acceptable in the early nineteen-fifties and was promoted through art and literature. Kafka, Camus, Auden, and Bernstein advanced an image of an age of anxiety which encouraged both professionals and non-professionals to consider anxiety an important construct pervading the lives of all people. Endler, Edwards, and Vitelli (1985) and Endler (1988) have proposed a multidimensional interaction model of anxiety which acknowledges the adaptive role of anxiety in relation to stress and coping. According to this model, adaptation to threat includes cognitive and behavioural components as well as the more traditional affective and physiological considerations. Specifically, the cognitive component is a multi-stage process whereby the individual appraises, a) the situation in regard to its importance for their well-being, in other words, is it perceived as threatening or not, b) the coping resources available to them, which then may lead to c) a re-appraisal of the situation or the individual's coping resources. The consequence of this, provided there is a perception of threat, is an increase in state anxiety, and arousal of physiological systems which may then lead to an adaptive response.

Three conceptual distinctions are essential to this model, a) a distinction must be made between state and trait anxiety, b) both state and trait anxiety are multidimensional, and c) changes in state anxiety result from the interaction between trait anxiety and situational stress. This model postulates that people differ in anxiety proneness with respect to various types of threat, such as physical threat or social evaluation threat. Both the specific facet of trait anxiety and the type of situational stress must be taken into account in predicting state anxiety responses and adaptation. A change in state anxiety can only be predicted when the type of trait anxiety and the type of situational stress are congruent. For example a person high on social evaluation trait anxiety will be expected to manifest an increase in state anxiety when giving a public address. In contrast, a person low on physical threat trait anxiety would be less likely to perceive an event as threatening and therefore less likely to demonstrate a marked state anxiety response in what might be perceived by others as a physically threatening situation. Thus the individual who is low on physical threat trait anxiety and who does not perceive an AMI as life-threatening, may experience minimal state anxiety and be less likely to make adjustments to a life-style that might itself have been a contributory factor (Sykes et al. 1989). In effect, too little anxiety following a serious illness such as AMI may be maladaptive, if not more so than too much.

In the present study the degree to which participants perceived the AMI as threatening was operationally defined, in part, by reported state anxiety. Accordingly, the orientation statement of the state scale of the State-Trait Anxiety Inventory (Spielberger, 1983) was modified to ask the respondent to indicate her feelings when she thought specifically of the heart attack (see Appendix A). It was hypothesized that anxiety and optimism would be inversely related, in other words women who reported low levels of anxiety in relation to AMI would be more optimistic about their future health status. From the perspective of Endler's (1988) interaction model of anxiety, it was expected that there would be an optimal level of anxiety, neither too much nor too little, that would be associated with behavioural efforts to modify risk.

Depression

It has been suggested that a predictable progression of the psychological response to myocardial infarction involves initial anxiety followed by depression (e.g., Hackett & Cassem, 1979; Gentry et al., 1983). Similar to the literature on anxiety in post-infarction clients, investigations of depression are difficult to compare due to differences in instrumentation and the timing of measurement in relation to the infarction. Some studies report the existence of severe depression in post infarction clients and its deleterious effects upon adjustment. For example Kavanagh, Shepherd and Tuck (1975) assessed depression in 101 men 12 to 15 months after a first infarction. All participants were attending a post-infarction rehabilitation programme at the Toronto Rehabilitation Centre. Depression was measured on the depression sub-scale of the Minnesota Multiphasic Personality Inventory (MMPI). Thirty eight men had depression scores of less than 60 and were designated non-depressed, 24 had scores of 60 to 70 indicating moderate depression and 34 with scores above 70 were described as severely depressed. In terms of their MMPI profile, the severely depressed group had associated hysteria, hypochondriasis, and psychasthenia. They were significantly older than the non-depressed group, angina and hypertension were more frequently observed, and they made smaller gains in aerobic power as a result of the rehabilitation programme. In other words men who were older and in poorer health were likely to be more depressed. It is therefore not surprising that these people made smaller physical gains in rehabilitation.

In an important longitudinal study, Waltz, Badura, Pfaff, and Schott (1988) assessed depression at two weeks, six months, twelve months, three years, and five years post infarction. From their original sample of approximately 1000 "middle-aged" (p. 151) male patients with a medically verified first AMI, complete data are available for 372. Background variables included medically defined health status, pre-illness mental health, measured on a single item subjective rating, coronary-prone behaviour measured by the Jenkins Activity Survey, and social class and social support. The 12 item measure of social support focused on chronic marital problems and social stress originating in the marriage. Referred to as the "Marital Conflict Scale" (p.151) this measure had a Cronbach alpha of .86 and is reported as correlating moderately with the UCLA Loneliness Scale. A 19-item intimate attachment scale with a reported Cronbach reliability co-efficient of .92 measured clients' and spouses' perceptions of the emotional quality of the marital relationship including affection, sexual compatibility, socializing, confiding, concern, and commitment.

As with the anxiety studies, results demonstrate that it really is not possible to draw a meaningful general conclusion with regard to the existence of depression in post-AMI clients and its effects upon their recovery. Total sample means on the Hopkins Depression Scale (Pearlin, Lieberman, Menhagen, & Mullen, 1981) showed a significant increase from two weeks to five years post-infarction. However, these average scores conceal, for example, that those in better health appeared to quickly overcome feelings of depressed mood after their return home. Mean scale scores in the healthy group dropped significantly from 6.4 in hospital to 5.6 at six months and remained stable thereafter. Those in poorer health showed an increase in depression during the first twelve months post-infarction with a slight and gradual decrease over the next four years. At the end of the study men in poorer health had a mean depression score of 10.7, almost double those of men in better health.

Because lack of social support has been repeatedly implicated as playing a major role in processes leading to depression following an adverse life-event, the relationship between good and poor health and depression was further examined in relation to marital intimacy. As hypothesized, men in both poor and good health groups who enjoyed high levels of marital intimacy had significantly lower depression scores than men in the low intimacy group. Interestingly at time three (12 months post-infarction) group differences were particularly marked with mean depression scores of 4.2 in the good health/high intimacy group and 9.8 in the good health/low intimacy group. In the poor health/low intimacy group depression scores at 12 months post-AMI were 12.8. Finally of interest, was the finding that neither social support nor marital intimacy were associated with differences in anxiety scores. Significant differences in anxiety were not found between good and poor health groups.

It has been rather forcefully stated that the quantitative analysis of human suffering, such as is reported above, results in a whittled-down, distorted image that betrays the essential nature of this universal human experience (e.g. Kleinman, 1988). There is no doubt that qualitative methods applied to the examination of the psychological sequela of either acute or long-term illness provide a more in-depth and intense account of suffering from the individual's perspective. In the examination of depression and long-term illness however, it is apparent that these methods are complementary, not rival, as the following descriptions from qualitative studies reveal.

Unlike anxiety, depression usually develops when the patient's condition has stabilized and the implications of the infarction are recognized (Cassem, Nelson, & Rich, 1979). Although some people recover completely from heart attacks and attain levels of health higher than experienced pre-infarction, many do not. Depending upon the severity of the infarction and resultant damage to the myocardium, some people are forced to lead very restricted lives in which they are unable to resume former roles. In the extreme they will not be able to carry out any physical activity without discomfort and they will experience fatigue, shortness of breath, and chest pain as a result of minimal or no exertion. Those who are so disabled often experience social isolation, loss of self-worth, and extreme dependency (Charmaz, 1983). They may also feel discredited (Goffman 1963) because of negative feedback from others and from the inability to meet expectations imposed either by themselves or by others. These findings, as well as those from quantitative studies, indicate that degree of incapacity and depression are positively related. This relationship was hypothesized in the present study.

In qualitative research utilizing semi-structured interview techniques, the feelings of sadness and despair that so often characterize chronic illnesses of all kinds are attributed to a fundamental loss of the former self (e.g., Cassell, 1991; Charmaz, 1983; Corbin & Strauss, 1988). It is this loss of self that is believed to constitute the nature of suffering in which chronically ill people observe their former self-images crumbling away without the simultaneous development of equally valued new ones. According to Cassell (1991) the suffering of the chronically ill starts with their inability to accomplish previously important purposes. When individuals are unable to complete actions that they associate with their self-identity (be it the inability to perform as a teacher, cab driver, parent, spouse, home-maker, or to carry out the activities of daily living) these important aspects of self become lost (Corbin & Strauss, 1988). As loss of self is perpetuated by the consequences of unremitting illness, people report feelings of loss of control over their lives and their futures, loss of identity, a sense of hopelessness and despair, and severe diminution of self-esteem. This was exemplified by one discussant in the pilot study who, after describing himself as a cardiac invalid, stated tearfully,

> "There are so many things I can't do now. I can't work, I can't fish or hunt...I can't even make love to my wife. Makes a guy feel kinda useless". (F.M., 1992).

During some parts of the discussion the extent of this man's sadness was vividly apparent and areas for potential intervention emerged. Of interest however, was the fact that his score on the Centre for Epidemiological Studies Depression Scale (Radloff, 1977) was 1 (the lowest possible score is zero) indicating that he was not depressed at all. This illustrates the importance of a pluralistic methodology in the study of behaviour. Qualitative and quantitative paradigms reflect approaches to research that are philosophically distinct, however the objective measurement of that which is amenable to valid quantification will, if used alone, deprive the researcher of the opportunity to enter into the very context that helps to clarify the nature of beliefs, thoughts, and intentions underlying the behaviour of interest (Bernheimer, 1986). In the case above, the standardized instrument suggested freedom from depressive symptoms; from this measurement perspective the respondent was not found to be depressed. However, closer examination of his feelings revealed that he was struggling with some very painful issues and that some interventions may have been helpful for him. The suggestion is not that these findings are contradictory, but that when taken together, they present a sharpened and more sensitive image of the phenomenon in question. This informant did not appear clinically depressed to the researcher and no doubt the CES-D yielded valid data. However during the course of the interview, problems surfaced of a potentially disabling nature, that would be worthy of psychological intervention if the respondent so chose. The point is that standardized instruments when used alone might obscure the identification of suffering that could be amenable to treatment. Triangulation (Campbell & Fiske, 1959) combines quantitative and qualitative methodologies in complementary fashion demonstrating, as the depression example shows, that each has an equally important contribution to make in the examination and understanding of human experience.

Self-Esteem

According to Rosenberg (1965), self-esteem is the evaluative component of the self-concept. Self-concept, he wrote, is the constellation of things that people use to describe themselves such as physical attributes, personality style, strengths, and weaknesses. Self-esteem describes the judgement people then make about those elements that make up the self-concept. It is a judgement about one's worth that results in a sense of approval or disapproval of the self. The judgement about one's worth comes from evaluations of the self by oneself and evaluations of the self by others. Rosenberg (1965) makes a further distinction between the perceived and the ideal self. The perceived self is similar to the self-concept. In other words it is the objective and subjective view of one's characteristics and abilities. The ideal self, on the other hand, is the image of an individual that one might aspire to. When perceived and ideal selves are fairly well matched self-esteem is likely to be high; when they are disparate, according to Rosenberg (1965) self-esteem will be low. In contrast to persons with low self-esteem, those with high self-esteem perceive themselves as worthwhile and significant, and they feel confident, powerful, and virtuous (Coopersmith, 1967). Those with high self-esteem have also been found to be happy, confident, and free from undue anxiety (Gilberts, 1983), they tend to take more and greater risks (Hirst & Metcalf, 1984), and are less likely to perceive pain as aversive (Feldman, 1986). In contrast studies have found that people low on measures of self-esteem use more negative terms when describing themselves and expect that they will fail on cognitive tasks (Crouch & Straub, 1983). Rosenberg (1965) also found low self-esteem people to be shy and indecisive.

In their review of self-defeating behaviours, Baumeister and Scher (1988) found no consistent role for self-esteem; both high and low self-esteem were associated with self-defeating behaviour. Viewing oneself either too favourably or too unfavourably with the associated affective consequences, may therefore be maladaptive.

Poor health has frequently been associated with low self-esteem. In a large national survey of 2264 adults, Antonucci and Jackson (1983) found not only that self-esteem was lower in people with health problems, but that there was a linear relationship between severity of illness and low self-esteem. In comparison to women's self-esteem, men's self-esteem was more adversely affected by the presence of illness. Similar findings are reported by Hunter, Linn, and Harris (1982) in their study of persons over the age of 65, in whom low self-esteem was associated with more daily pain and greater disability. The problem with evaluating these data however, is that the measurement of esteem occurred following illness onset so that it is not possible to determine which variable - illness or low self-esteem - was antecedent.

Limited evidence suggests that higher levels of self-esteem are associated with better adjustment to illness over the long term. In their study of 55 physically disabled college students, Linkowski and Dunn (1974) found that students with higher levels of self-esteem were more accepting of their disability and more able to integrate it into their self-concept. Litt, Cuskey, and Rosenberg (1982) observed that among adolescents suffering from rheumatoid arthritis, those with high self-esteem were more likely to take medications as prescribed.

In describing the psychological aftermath of AMI, Cassem and Hackett (1979) used the term "ego infarction" to describe the severe blow to self-esteem that a damaged heart appeared to present. In their qualitative study of post-infarction clients they found that low self-esteem was characterized by feelings of inadequacy, dependency, fragility, and hopelessness and that these feelings were potentiated by the severity of the illness.

In general research suggests that long-term illness can severely erode self-esteem (e.g., Cassem & Hackett, 1979; Corbin & Strauss, 1988). Charmaz's (1983) deeply detailed work with 57 people suffering from cardiovascular disease, cancer, diabetes, or multiple sclerosis, illustrated the impact of long-term illness on the perceived self. From in-depth interviews with participants it was apparent that much of what was once known about the self was altered, sometimes very suddenly and without any warning, and valued aspects of self were irrevocably lost. As with depression, Charmaz (1983) found that low self-esteem was positively related to incapacity. When illness imposed severe restrictions in people's lives by limiting work and recreation patterns, reducing the social network, and increasing dependence, participants were most likely to feel unworthy, burdensome, and useless. She also noted heightening of self-esteem when the physical condition improved, even if the improvement was minimal.

In his most vivid and moving description, Robert Murphy (1988), dying slowly from a benign tumour of his spinal cord, acknowledged the extent of the battle that can rage between self-esteem and illness. He wrote, "Of all the psychological syndromes associated with disability, the most pervasive and the most destructive is a radical loss of self-esteem. Illness is a centripetal force, pulling to lower self-esteem. It facilitates withdrawal from old associations and pushes one towards social isolation" (p. 73). Robert Murphy died in 1991. His book is testament to his courage and forbearance.

In summary, it might be expected that a positive relation would be found between self-views and self-esteem. In the present study however it was expected that this relation may be weakened by the severity of the infarction and resultant disability. Based on the previous discussions of anxiety and depression and their association with health impairment following AMI, these affective states were also hypothesised as intervening in the relation between self-enhancing beliefs and risk-reduction behaviour.

Coping

The ways in which people cope with life-threatening events, such as myocardial infarction, have been of considerable interest to researchers and clinicians, theoretically because of what may be learned about how people manage life crises, and practically because of the role coping processes play in recovery and rehabilitation (Sykes et al., 1989). In recent years conviction has grown that it is how individuals cope with stress, not stress per se, that influences their psychological well-being and somatic health (e.g., Antonovsky, 1988; Folkman & Lazarus, 1988; McRae, 1984). Antonovsky (1988), for example, proposed the beneficial effects of stress, in his salutogenic or health-generating model. Central to this concept is the philosophic view of the human organism as being in a dynamic state of "heterostatic disequilibrium" (p. 15). Plainly stated, the demands imposed by the environment are ever-present and constantly changing. When tension announces that a demand has to be met, then something has to be done.

Individuals differ in their coping and adjustment, to the stress of both acute and chronic illness (Felton & Revenson, 1984). In this sense, coping refers to how people deal with a situation and adjustment describes the process of becoming suited to both the situation and the efforts expended in its management. Results of many studies attest to the importance of individual coping efforts in helping ill adults maintain reasonable levels of emotional well-being (e.g., Cohen & Lazarus, 1973; Menaghan, 1982; Silver, Auerbach, Vishniavsky, & Kaplowitz, 1986). These studies have revealed that people use a wide variety of coping strategies in response to illness including denial, selective ignoring, information-seeking, avoidance, learning specific illness-related behaviours, wishful thinking, blaming others, and seeking social support. One of the criticisms of this research is that definitions of 'good' versus 'bad' copers have been made on an a priori basis, usually by health care providers, a strategy which can seriously confound outcome measures (Felton & Revenson, 1984; Folkman & Lazarus, 1988).

Urging that coping be conceptualized and investigated as process, Folkman and Lazarus (1984) define coping as the cognitive and behavioural efforts to manage specific external and/or internal demands appraised as taxing or exceeding the resources of the individual. This definition fits admirably with the idea of self-regulation described earlier, for the following reasons, a) it is process-orientated, b) it speaks of management rather than mastery and, c) it makes no a priori, provider-centred judgement about the quality of the coping process. Central to their interactional stress model Folkman and Lazarus (1984) propose a three part cognitive appraisal sequence that underpins the coping process and adaptive behaviour. In primary cognitive appraisal an event such as AMI is evaluated on the basis of its importance for the person's safety. The perceived degree of harm or damage to well-being, would be an important consideration at this stage, and one might expect that such a perception with vary in accordance with the extent of myocardial damage and resultant physical limitations experienced by the patient. In order for people to successfully manage the harm that has befallen them, Folkman and Lazarus (1984) contend that past behaviours will weigh heavily. Values and commitments may require re-definition, past events may need to be interpreted differently, and efforts to control or undo the damage may necessitate a change in approach to stress.

In secondary appraisal, the person is threatened by the prospect of harm to come. In the case in question, this could amount to cardiac symptoms, further morbidity with the endangering of life goals, loss of autonomy and social or occupational functioning, and death. In short, an evaluation of what might happen, when it might happen and how bad it might be, is undertaken. The recognition of such threat causes the individual to consider possibilities for its prevention, and in order to cope effectively, he or she must evaluate resources, options, and limitations. Often the information needed for these evaluations is missing or incomplete and so the victim has to struggle with the ubiquitous uncertainty that characterizes, for example, cardiovascular disease. As Janis (1974) noted, vigilance - the attentive search for information - is particularly important under conditions of threat. Also, the way in which a person handles potential danger will, in part, depend upon past experiences that can provide assistance in knowing what might happen and what to do about it.

Finally, in cognitive re-appraisal changes in judgement are made and alternative options for coping are considered in light of previous outcomes. Individuals review the situation from the perspective of what could be gained as opposed to what has been lost or what could be lost. So this sense of challenge, like threat, is future-orientated. Victims are more likely to cope effectively with the stress of challenge if they have a positive outlook, have enthusiasm and interest with which to meet the challenge, and believe that they are in possession of at least some of the resources to manage (Folkman & Lazarus, 1984). It becomes apparent from this analysis that, due to the nature of cardiovascular disease, patients have the potential to simultaneously experience harm, threat, and challenge and to describe and exhibit discernible cognitive and behavioural responses to each of the three types of stress.

Folkman and Lazarus's (1984) process-orientated approach to coping is directed toward what an individual actually thinks and does within the context of a specific stressful experience and how these thoughts and behaviours change as the experience unfolds. Their model allows researchers to evaluate the informant's perception of the effectiveness of a given coping strategy, acknowledging the possibility that the strategy may be adaptive in one context and maladaptive in another. When considered as process, coping is characterized by changes that are a function of the continuous appraisals and re-appraisals of a shifting person-environment relationship (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). Any change in the person-environment relationship leads to an appraisal of the event, its significance, and consideration of what action might be needed. This appraisal will then influence subsequent coping efforts (Folkman & Lazarus, 1988). Such a process-focused model is particularly appropriate in the context of illness, as illness is so often characterized by marked fluctuation and uncertainty. Adaptation in this context may exact constant review and revision of beliefs and behaviours as individuals attempt to come to terms with illness and maintain some modicum of order and predictability in their lives.

Theoretically, the Folkman and Lazarus (1988) model differs from traditional trait approaches to coping that attempt to identify what people generally do in response to stress. The attempt to measure stable coping dispositions that operate across diverse life situations has been of limited predictive value (e.g., Cohen & Lazarus, 1973; Kaloupek, White, & Wong, 1984). According to Folkman and Lazarus (1988) the major weakness with trait measures of coping is that they tend to underestimate the complexity and variability inherent in the coping process. This view is supported by the findings from qualitative studies in naturalistic settings showing that individuals alter their ways of coping according to the specific nature of the stressful event (e.g., Moos & Tsu, 1977; Menaghan, 1983; Pearlin & Schooler, 1978; Stone & Neale, 1984).

In an interesting parallel, recent developments in quantum theory suggest that continuous fluctuation in biological and chemical systems is inherent. These systems, existing in disequilibrium, are known as dissipative structures and they exhibit the capacity to be spontaneously transformed into new states (Prigogine & Stengers, 1984). Gergen (1985) has suggested that human behaviour is also characterized by substantial instability, such that traditional scientific methods which rely upon the stability of behaviours over time, are not appropriate. From this perspective the analysis of any behaviour solely as trait-driven, would be misguided.

Acute myocardial infarction is a serious illness of sudden onset that can result in a spectrum of limitations ranging from minimal to severe. Major adaptive challenges may arise as a result of incapacitation and hospitalization; examples include changes in roles and status, alterations in significant relationships, loss of a former healthy identity, and fear of further morbidity and death (Corbin & Strauss, 1988). The choices people make in the ways in which they will attempt to manage these stressors, cognitively and behaviourally, may be expected to have a significant impact upon their physical and psychological well-being in both the short and long term.

Folkman and Lazarus (1988) have identified eight dimensions of adaptation to stress that they describe as "ways of coping". These dimensions form the sub-scales of the Ways of Coping Questionnaire (1988) that was used in the present study. They are, 1) confrontive coping that describes aggressive efforts to alter the situation and suggests some degree of hostility and risk-taking, 2) distancing, describing the cognitive efforts people use to detach themselves from the stressor and to minimize its importance, 3) self-control, describing efforts to regulate feelings and actions, 4) seeking social support, with an emphasis on informational support, 5) accepting responsibility for the stressor with a concomitant theme of trying to rectify the situation, 6) escape-avoidance describing wishful thinking and behavioural efforts to escape or avoid the problem, 7) planful problem-solving that describes deliberate problem-focused efforts to alter or modify the situation, and 8) positive re-appraisal in which individuals attempt to create some positive meaning in the aversive episode. For some people, this latter strategy may have a religious dimension.

In keeping with the self-regulation philosophy underlying the present research, it was hypothesized that the extent to which women adhere to the risk-reduction regimen following heart attack, will vary in accordance with the ways in which they cope. Looking at the dimensions of coping that Folkman and Lazarus (1988) propose, some, such as accepting responsibility and problem solving, are likely to lead to behaviour that would off-set risk, while others, such as distancing and confrontation may lead to behaviour that might increase risk of further complications.

In summary, the processing of self-relevant information was proposed as explaining differences in risk-reduction behaviour, specifically the risk-reducing strategy of attempting, at least to some degree, to integrate the standard post-infarction medical regimen into life-style. It was also proposed that these beliefs would result in variations in the ways in which people cope with the stress that heart disease imposes, and that these ways of coping would further result in variations in following the medical prescriptions that are designed to optimize heart health.

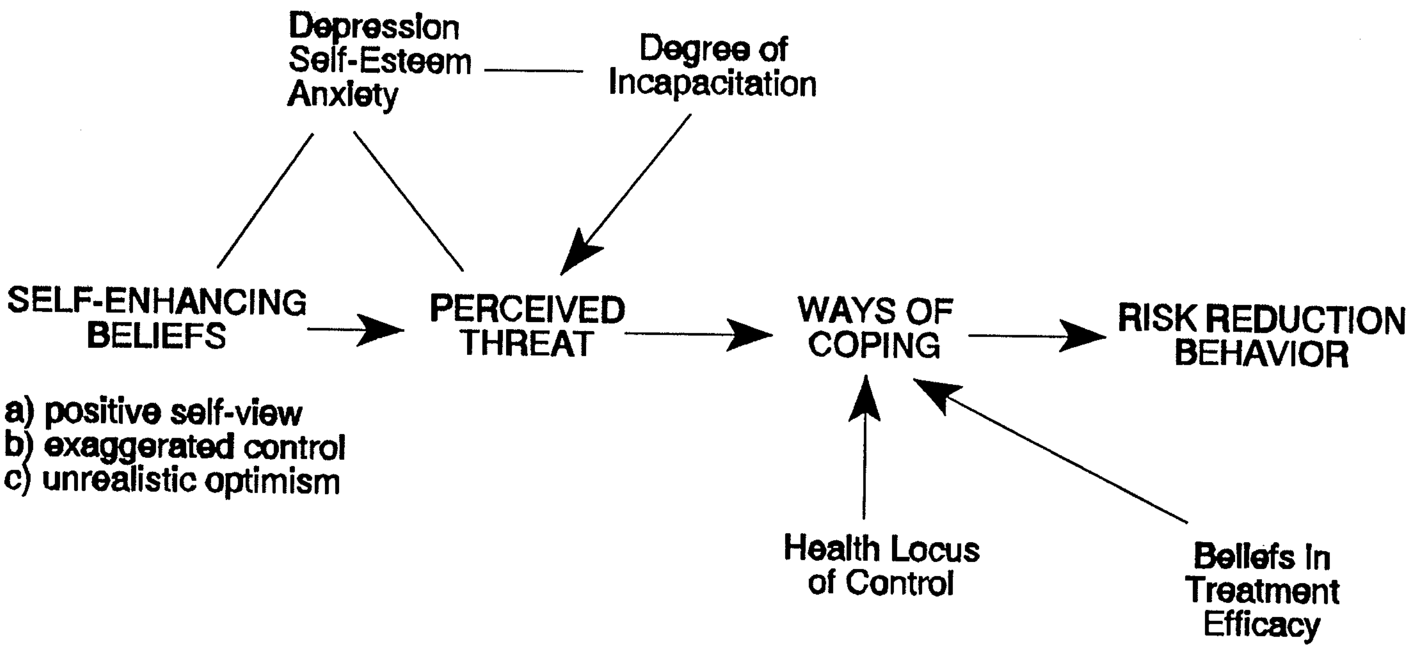

Figure 1 Hypothesized Relations Between Variables

Research Design and Hypotheses

The purpose of this descriptive and explanatory study was to answer two major questions emanating from the social psychological literature.

1) Can the variables that have been combined under the rubric of "self-enhancing beliefs" - overly positive self-evaluation, exaggerated beliefs in personal control, and unrealistic optimism - be considered unidimensional or not. If not, what are their relative contributions to ways of coping and risk-reduction behaviour in post-AMI females?

2) Is there a quadratic relation between self-enhancing beliefs and risk-reduction behaviour and can this be explained by the degree to which AMI is perceived as threatening?

The following hypotheses were derived:

Hypothesis 1: It was expected that self-enhancing beliefs and perceived threat would be inversely related. In other words, people who cast themselves in a positive light with regard to self-evaluation, personal control, and future health outcomes would view the experience of AMI as less threatening than those whose views were less self-enhancing. This hypothesis implies the possibility that, contrary to the common representation (e.g., Taylor & Brown, 1989) self-enhancing beliefs may not be a unitary construct. Depending upon the answer to this question, it was expected that perceived threat would be correlated either with the three separate measures of self-enhancing beliefs or with self-enhancing beliefs as an aggregate measure.

Hypothesis 2: The greater the degree to which a participant is incapacitated as a result of the AMI, the greater the likelihood that the event would be perceived as threatening.

Hypothesis 3: The hypothesized relations among self-enhancing beliefs, degree of incapacitation, affective measures, and perceived threat were as follows: a) high levels of self-enhancing beliefs would be associated with low levels of anxiety and depression, and high self-esteem, b) as degree of incapacitation increased respondents would have higher scores on measures of anxiety and depression and lower scores on self-esteem, c) respondents who felt highly threatened by the AMI would be more anxious and more depressed than those who felt less threatened.

Hypothesis 4: Self-enhancing beliefs, perceived threat, and degree of incapacitation, would each be associated with risk-reduction behaviour in the form of a quadratic relation. Specifically, 4a) women whose self-enhancing beliefs were either very high or very low would be less likely to engage in risk-reduction behaviour than those whose self-enhancing beliefs were more moderate, 4b) similarly, women who felt either not threatened at all or who felt considerably threatened by their physiological status would be equally unlikely to act in such a way as to promote their own well-being, and 4c) people who were either barely incapacitated or more severely incapacitated would not consider the risk-reduction process worthy of their effort. In the former instance the person may have believed that the physical problems were not sufficiently threatening to warrant the effort that risk-reduction behaviour calls for, while in the latter case the belief may have been that the physical problems were severe enough such that even the strictest adherence to the treatment regimen would have no beneficial result.

Hypothesis 5: Perceived threat, health locus of control, and beliefs in the efficacy of the medical regimen would be associated with different dimensions of ways of coping. Specifically, 5a) it was expected that women who felt seriously threatened by the event may exhibit coping efforts that included avoidance, confrontation, and self-control, 5b) women who had an internal locus of control regarding health outcomes would evidence ways of coping that included accepting responsibility, planful problem-solving, and positive re-appraisal, and 5c) women believed in the efficacy of the treatment regimen would be likely to evidence planful problem-solving and accepting responsibility.

Hypothesis 6: Dimensions of ways of coping would be associated with risk-reduction behaviour. Specifically, people whose coping efforts included seeking social support, accepting responsibility, planful problem-solving, and positive re-appraisal would be more likely to engage in risk-reduction behaviour than those whose coping efforts included avoidance, confrontation, distancing, and self-control.

METHOD

Respondents

In collaboration with the director of the Cardiology Department at St. Boniface Hospital, six patients who had experienced heart attacks agreed to be interviewed by the researcher during the pilot phase of the study (January - April, 1992). These patients, five men and one woman, provided rich descriptions of their experiences of AMI, its influence upon their lives, and their beliefs and behaviours regarding rehabilitation. Each person underwent a semi-structured qualitative interview that allowed testing of the interview protocol. Interviews lasted an average of two hours. Pilot participants also completed the set of questionnaires; no person took longer than one hour to answer the questions. The interviews were invaluable in gaining a better understanding of the experience of AMI, which in turn, was influential in the design of the study. Most especially, they enabled the researcher to appreciate how important the individuals' illness representation and perception of threat were in relation to the sort of self-care that is believed to optimize heart health. The interviews also helped to establish the relevance and meaningfulness of the major hypotheses.

Between April 1993 and August 1994, 65 women who had experienced their first AMI were contacted through the intensive care units of six Winnipeg hospitals, including St. Boniface General Hospital, Health Sciences Centre, Victoria Hospital, Concordia Hospital, Misericordia Hospital and Grace Hospital. This study was the first in a series designed to develop an understanding of the relation between perception of threat, self-enhancing beliefs, and risk-reduction behaviour in post-coronary patients. Questions that had not been previously asked by social scientists were posed for the first time. It was therefore considered important that, at the outset of this research programme, independent variables be kept to a minimum so as not to obscure the identification of hypothesized relations. Consequently the research examined one gender only. The decision to study women arose from three important observations. First, although the prevalence of CHD remains higher in males, since 1950 the incidence of this disease has risen among women while it has declined among men (Ayanian & Epstein, 1991). Second, and of particular concern, is the finding that after myocardial infarction, women are at increased risk for re-infarction and death. Once CHD is clinically manifest, the case fatality rate in women significantly exceeds the rate in men (Kannel & Abbott, 1987; Lerner & Kannel, 1986). Some of this difference may be explained by the increased age in women at the time of first infarction and by severity of the disease (Fiebach, Viscoli, & Horwitz, 1990). In addition, women's coronary arteries are shorter and narrower than men's and as a result they are in greater jeopardy from myocardial insufficiency following infarction. Consequently the prognosis for women hospitalized for coronary heart disease tends to be more severe than that of hospitalized men. Finally, CHD has traditionally been regarded as a disease that affects middle-aged men. Despite the disconcerting epidemiological and prognostic data describing women's experience, women remain seriously under-represented in clinical research investigating primary and secondary prevention (Conn, Taylor, & Abele, 1991; Murdaugh & O'Rourke, 1988). Virtually nothing is known about how women adapt to coronary artery disease after the initial cardiac ischaemic event (Aquino & Meagher, 1984; Sharpe, Clark, & Janz, 1991). Very few studies have included women only and the findings from those that have compared women and men are limited by sample sizes of women that are too small for meaningful comparison (e.g., Bennett, 1992). Other studies include women but do not report gender differences (e.g., Frenn, Borgeson, Lee, & Simandl,1989). As a result, very little is known about women's experience of and behavioural responses to CHD and the factors that may either impede or facilitate their attainment of optimum heart health over the long haul.

Power analysis for this study was conducted using the Number Cruncher Statistical System (1991). In view of the fact that many of the hypothesized relations had not undergone previous testing, it was considered important that theoretically significant relations not be obscured by an overly-stringent alpha. Alpha was therefore set at .05 with desired power to detect significance of .80. In the present study, the investigator believed that effect sizes of less than .3 would have very little theoretical or practical significance. Such an effect size is described by Cohen and Cohen (1975) as conservative and in the absence of conventional definitions in a given body of research, such as in the present case, is considered an appropriate beginning. A sound theoretical basis informed the development of directional hypotheses that indicated one-tailed tests of significance. These more powerful tests require smaller numbers of respondents than non-directional, two-tailed hypotheses.

In consideration of all these factors, it was determined that a total of 65 respondents were required.

Criteria for entry into the study were as follows:

a) Female only, fluent in English.

b) 75 years of age and under.

c) First diagnosis of AMI.

d) With regard to health status subsequent to the infarction, women were ineligible to participate in the study if they were classified by the researcher as being in Class 4 of the Canadian Cardiovascular Society Classification which would describe them as follows:

> "Cardiac disease present which results in client being unable to carry out any physical activity without discomfort. Symptoms of cardiac insufficiency or of anginal syndrome may be present even at rest. If any physical activity is undertaken, discomfort is increased.

Such women were ineligible for inclusion for two reasons. First, and most importantly, the slightest exertion could have been detrimental to these women's safety. The second reason was methodological; women suffering from this degree of incapacitation would not have been able to incorporate some of the risk-reduction strategies into their lives.

Measures

Self-Enhancing Beliefs Scale

A self-enhancing belief scale was specifically developed for the purposes of the present study. The scale is comprised of three sub-scales that were designed to measure overly positive self-evaluation, exaggerated perceptions of control, and unrealistic optimism in comparison to others of the same age and gender. A total of 1415 undergraduate students from the Introduction to Psychology Subject Pool at the University of Manitoba participated in the pilot-testing of these scales. All responses were recorded on a nine-point Likert-type format with options ranging from very much below average to very much above average.

Scale development

For the self-view sub-scale, items were selected from a list of 555 personality-trait words that had been previously rated for favourableness by 100 college-age students (Anderson, 1968). Respondents in the pilot study were asked to compare themselves to other students of the same age and sex on a 16 item list of personality-trait adjectives. Words chosen from Anderson's (1968) list were those that had been rated as slightly above the mid-point in terms of favourableness. In other words they were rated more towards the favourable as opposed to the unfavourable end of the word list. They were also selected for their moderately favourable connotation rather than extreme favourability in self-description. It was felt that less potent items would provide a more persuasive test of the bias. Examples include cautious, philosophical, and imaginative. In contrast, words such as honest, sincere, loyal, and trustworthy would place too hefty a social desirability burden on the respondent and were thus excluded. Other items in the list, for example determined, creative, and attentive, were personal characteristics that had been found to be related to coping (Folkman & Lazarus (1988). These were considered particularly important for the assessment of women's self-views, post-infarction, given the nature of the illness and the demands that would be made on them during rehabilitation.

The optimism and control sub-scales were adapted from Weinstein's (1982) model. On the optimism scale respondents were asked to compare themselves to others of the same age and gender and indicate what they thought the chances were of being troubled by a number of health problems in the future. The same health problem list was selected for the control scale. In this instance students were asked to compare themselves to others of the same age and gender and indicate the extent to which they felt they could control whether or not the health problems would trouble them at some point in the future. The critical difference between these scales is that for optimism the respondent rates the likelihood of contracting a given disorder, while for control he/she rates the degree of control that they perceive themselves as having in preventing the onset. The illnesses on these scales were selected with the post-AMI sample in mind. Some are clearly related to heart disease (e.g., high cholesterol, high blood pressure, and stroke), some are of unknown or questionable aetiology and therefore less susceptible to personal control (e.g., Alzheimer's disease, arthritis), and some are more readily associated with stress (e.g., depression, migraine, ulcers).

The approach to factor analysis was to submit all items from the three sub-scales to analysis using a principle factor solution and Varimax rotation. This resulted in a six factor solution accounting for 45.4% of the variance. All ten items on the unrealistic optimism sub-scale had significant loadings on factor one ranging from .4 to .7.

Two positive self-view factors were derived. Items in the first self-view factor included organized, responsible, cautious, self-disciplined, motivated, attentive, determined, and sophisticated. This factor was labelled "problem-focused" . Loadings ranged from a high of .72 for responsible to a low of .36 for sophisticated. Interestingly this factor consisted mostly of items identified by Folkman and Lazarus (1988) as being important in the coping process. The only exceptions were cautious and sophisticated, both of which had the lowest loadings. As a result these items were deleted. The second self-view factor included adaptable, philosophical, resourceful, objective, imaginative, and creative. This factor was labelled "imaginative-creative". Loadings ranged from a high of .8 for imaginative to a low of .4 for adaptable. As a result of these clusterings one item, "sensitive" , was identified as irrelevant and was therefore were omitted from the questionnaire.

Two factors were derived from the exaggerated control scale. In the first factor labelled "psychogenic" items included depression, high blood pressure, migraine, and ulcers. Loadings ranged from .5 for migraine to .8 for depression. Of interest in this clustering was that the depression item from the unrealistic optimism scale loaded at -.5. To remind the reader, the exaggerated control scale asks respondents to rate the extent to which they feel that <u>they have control</u> over whether or not health problems such as depression will trouble them at some time in the future. The unrealistic optimism scale asks respondents to rate the chances of those same health problem troubling them in the future. So what this fourth factor appears to reveal is that respondents believe that they will not suffer from depression because of the control that they can exert over its onset. The second control factor shows something quite similar. Items in this factor labelled "atherosclerotic" include heart attack, high cholesterol, and stroke with loadings ranging from .5 for stroke to .8 for heart attack. The two unrealistic optimism items loading on this factor were heart attack and high cholesterol, both loading at -.4. Once again in consideration of the relationship between exaggerated personal control and unrealistic optimism, respondents appear to believe that these events will not happen to them because of the control that they have over their onset. These data might indicate that the Heart Health Initiative (Health & Welfare Canada, 1992) which vigorously promotes the notion, both in the media and in education, that heart disease is preventable through life-style management, may be having some effect, at least in the 18 - 25 years age group.

On the sixth and final factor (the third exaggerated control factor) items included Alzheimers Disease, arthritis, and diabetes. This factor was labelled "degenerative" and loadings ranged from .6 (arthritis) to .7 (Alzheimers). From these analyses all items on the exaggerated control and unrealistic optimism scales were retained.

Multidimensional Health Locus of Control Scale

Developed as a refinement of the Health Locus of Control Scale (Wallston, Wallston, Kaplan & Maides, 1976), the Multidimensional Health Locus of Control Scale (Wallston, Wallston, & DeVellis, 1978) is a three dimensional scale which conceptualizes sources of reinforcement of health related behaviours as either internal, a matter of chance, or under the control of powerful others. The MHLCS is an 18 item instrument utilizing a five point Likert-type scale ranging from strongly agree to strongly disagree.

The multidimensional approach to the measure of locus of control was suggested by Levenson (1974). She had found that not only were internal beliefs orthogonal to external beliefs, but that causes attributable to 'fate' and 'chance' could be separated from 'powerful others' with regard to externality. Her three eight-item Likert-type scales, internal, powerful others, and chance showed discriminant validity in the measurement of locus of control beliefs. Although Levenson's (1974) scales did not include health related items, her demonstration of the utility of measuring three distinct dimensions of locus of control was persuasive; as its name implies the MHLCS parallels this conceptualization. In the examination of health-related behaviour it seemed especially important to assess the degree to which powerful others, such as nurses and physicians, are seen by patients as influencing health outcomes. Hence the structure of the MHLCS was considered especially appropriate for the present research.

Scale Description and Development

In the scale development study subjects over the age of 16 who were waiting at departure gates at Nashville airport were approached by a research assistant and asked to complete a series of questionnaires. Those who agreed to participate were instructed to complete all 93 items and return them to the researcher in the stamped envelope provided. In this initial study, health locus of control was represented by 25 internal items, 30 powerful other items, and 26 chance items. Respondents also completed a shortened 10-item version of the Marlowe Crown Social Desirability Scale (Strahan & Gerbasi, 1972) and two items related to current and general health status. Demographic information was obtained for gender, age, educational level, and place of residence. Of the 354 persons approached, 282 agreed to participate, and 125 completed and returned their questionnaires. Of this 125, 10 had to be discarded due to the extent of missing data. In the final sample of 115, 49% were males, 76% had some college education, and the mean age was 42 years.

Separate item analyses were carried out on the powerful other, chance, and internal health locus of control items. The criteria for selecting items from each dimension for the final scale included an item mean of 3.5, wide variability of response alternatives on the item, significant item-scale correlation, and low correlation with social desirability. As a result, six pairs of items were chosen for each of the three dimensions. Items in each pair were worded differently but had the same meaning. The pairing was carried out in order that equivalent forms, A and B, could be derived for use in studies utilizing repeated measures designs.

Reliability and Validity

For forms A and B combined (item N = 12 for each dimension) the co-efficient alpha reliabilities were .86 for internality (IHLC), .83 for powerful others, and .84 for chance. Inter-correlations were computed between separate forms (A, B,) and combined form (A+B) MHLC sub-scales and Levenson's (1974) internality, powerful others, and chance scales, and Social Desirability. Forms A, B, and A + B combined of the IHLC and PHLC subscales were found to be statistically independent, r = .154, r = .058, and r = .124 respectively (p <.05). The IHLC and CHLC subscales for the three forms were negatively correlated, r = -.343, -.189, and -.293. PHLC and CHLC subscales demonstrated a low positive correlation, r (A) = .055, r (B) = .259, r (A+B) = .204. Social Desirability did not correlate significantly with the IHLC (r = .097), the PHLC (r= .091) or the CHLC (-.236).

Correlations of the MHLC scales with the demographic information showed no significant correlations for gender, and only Form A of the PHLC correlated significantly with age (r = .198, p<.05) and educational level (r = .222, p<.05).

Given the independence of these subscales the MHLC shows much greater sensitivity and thus potential usefulness than unidimensional health locus of control scales (e.g Lefcourt, 1982; Wallston, Wallston, Kaplan, & Maides, 1976). Besides having the facility to obtain scores on three theoretically and empirically differentiated dimensions of health locus of control, researchers also have at their disposal equivalent forms of the scale for use in repeated measures designs.

Ways of Coping Questionnaire

The Ways of Coping Questionnaire (Folkman & Lazarus, 1988) has been developed primarily for use in studies of the coping process. It is not intended to measure either coping dispositions or styles. In order to assess coping styles an investigator would need to measure process across a wide variety of stressful encounters and then evaluate consistencies in the process across events (Folkman &

Lazarus, 1988). The Ways of Coping Questionnaire (WCQ) is based on the following definition of coping, "The cognitive and behavioural efforts to manage specific external and/or internal demands appraised as taxing or exceeding the resources of the individual" (Folkman & Lazarus, 1988, p. 2). The important considerations in this definition are a) it is process orientated, b) there is no a priori judgement about the quality of the coping process, c) it implies a distinction between coping as an active process and coping as an automatic adaptive behaviour, and d) it addresses the issue of management as opposed to mastery, the difference being that management refers to an individual's attempt to respond to a demand whereas mastery implies that the demand has been successfully overcome. In the best of circumstances coping will lead to mastery, but to conceptualize coping as mastery results in an inevitable confound between process and outcome.

Scale Description and Development

The WCQ was derived from the Ways of Coping Checklist, an instrument used in the 1976/7 Berkeley Stress and Coping Project. The original Checklist was comprised of 67 coping strategy items derived from Lazarus and Launier's (1978) conceptual framework and from published literature related to coping (e.g. Sidle, Moos, Adams, & Cady, 1969; Weisman & Worden, 1976/7). The coping strategies represented by the Checklist included defensive coping such as avoidance, magical or wishful thinking, isolation and suppression, and problem-solving strategies such as information-seeking, direct action, and inhibition of action (Folkman & Lazarus, 1988). Subjects responded to items relative to a specific stressful event, indicating "yes" or "no" as to whether they had used that strategy to deal with the event.

The WCQ is a revised 66 item version of the Checklist having retained the original cognitive and behavioural strategy items. At the suggestion of respondents, some items were deleted because they were unclear or redundant and items related to prayer were added. The response format was also changed from "yes" or "no" to a four point Likert-type scale, (0 = does not apply to 3 = used a great deal) allowing measurement of the frequency with which respondents used a particular strategy.

The sample from which the WCQ was developed consisted of 75 white middle-class married couples who had at least one child living at home. Husbands and wives were interviewed separately in their homes once a month over a five month period. Different interviewers interviewed them each time. Subjects were asked to consider the most stressful event they had encountered in the previous week and then to complete the WCQ with that event in mind (Folkman & Lazarus, 1988).

Reliability and Validity

Observations from the five interviews were pooled. Three separate factor analyses were carried out using different strategies for combining person-occasions, or observations (Folkman & Lazarus, 1988). The initial analysis was carried out on the entire set of observations, five observations from each of the 150 subjects, each focusing on a different stressful event. Second, 150 stressful events, one per subject, were randomly selected from the 750. And third, 150 stressful events were randomly selected from the total of 750, without replacement of the 150 utilized in the second factor analysis. These three approaches yielded factor patterns that were not significantly different from each other. Principal components analysis indicated eight factors, confrontive coping, distancing, self-controlling, seeking social support, accepting responsibility, escape-avoidance, planful problem-solving, and positive reappraisal.

The WCQ measures process which, by definition, will vary over time. Consequently, traditional test-retest estimates of the reliability of the construct would be inappropriate (Folkman & Lazarus, 1988; Gergen, 1985). Reliability of the WCQ was established by evaluating the internal consistency of the sub-scales. The alpha coefficients were as follows: confrontive coping = .70, distancing = .61, self-controlling = .70, seeking social support = .76, accepting responsibility = .66, escape-avoidance = .72, planful problem-solving = .68, and positive re-appraisal = .79.

Repondents in the initial field studies confirmed the face validity of the WCQ by describing their utilization of the listed strategies in stressful situations (e.g. Folkman & Lazarus, 1980; 1985; 1988). Support for construct validity of the instrument is to be found in the fact that results of the field studies are consistent with the authors' theoretical predictions, namely that coping consists of both emotion-focused and problem-focused strategies, and that coping is a process. In other words, as predicted, the way in which people cope will vary in relation to contextual demands and in relation to changes in the demands as the stressful event unfolds. From studies with very diverse populations, there now exists substantial evidence attesting to the fact that both problem-focused and emotion-focused types of coping are utilized in virtually every stressful situation (Folkman & Lazarus, 1980; Heppner, Reeder & Larson, 1983; Kirmeyer & Diamond, 1985; Manne & Sandler, 1984). Problem-focused types of coping are more often used in situations appraised as unstable, whereas emotion-focused strategies will be used in response to events unlikely to change. Consequently any formulation describing the coping process solely in terms of one or the other may be considered inadequate.

Folkman and Lazarus (1988) have also observed that people will vary their coping efforts according to the perceived magnitude of the stressor. For example, in response to events viewed as highly threatening to self-esteem, persons are more apt to use more self-control, accept more responsibility, use more escape avoidance, and seek less social support. In contrast when the well-being of a loved one is threatened, people tend to draw more on confrontive coping, distancing, and planful problem-solving. These variations in coping are consistent with the theoretical premise that coping is determined more by the relationship between the person and the environment than it is by independent person or situation factors (Folkman & Lazarus, 1988).

A further study by Folkman and Lazarus (1985) supports the theoretical prediction that coping varies as events unfold. With a mid-term exam chosen as the stressful event students' coping was assessed two days before and two days after the exam, and finally two days after grades were announced. Variation in coping process was significant. The problem focused type was used before the exam, distancing was used after the exam while awaiting the results, and wishful thinking and self-blame were used after the grades were posted. The poorer the grade, the more the coping strategy was utilized.

Finally, Folkman, Lazarus, Gruen and DeLongis (1986) showed that the various forms of coping tend to differ in the extent to which they are stable or unstable across situations. Mean auto-correlations were used as estimates of stability across five stressful encounters of 100 men and women, that is 50 married couples. The correlations were measured between the sub-scale scores on each measure for each individual. The correlations were found to be low ranging from r = .17 to r = .47. The three subscales with the lowest mean autocorrelations were seeking social support (r = .17), confrontive coping (r = .21), and planful problem-solving (r = .23). Positive reappraisal had the highest average autocorrelation, suggesting that it is more stable and thus more likely to be under the influence of personality.

In summary, these data provide support for the fact that the WCQ is a measure which captures both problem-focused and emotion-focused types of coping and that it is sensitive to changes in coping across different situations and within a particular situation as it unfolds. As such it is invaluable in the measurement of coping as process.

Health Attitude Scale

The Miller Health Attitude Scale (Miller, Wikoff, McMahon, Garrett, & Johnson, 1981) is an 11 item semantic differential scale that was developed to assess heart client's beliefs regarding the efficacy of the medical recommendations. It specifically measures beliefs regarding the five components of the standard therapeutic regimen for promoting heart health, namely diet, exercise, smoking habits, medications, and stress management.

Scale Description and Development

In the first stage, an open-ended questionnaire was given to 27 people suffering from cardiovascular disease who were enrolled in a cardiac rehabilitation programme. Respondents were asked to describe the advantages and disadvantages of performing the activities outlined in the standard medical regimen. In the second stage, clients' responses were transformed into a bipolar adjective format. For example some clients responded that following the diet was "hard for me". The bipolar representation chosen for these responses was, "difficult-easy". The response, "It's good for me" was represented by "good-bad". Common sets of adjectives were selected for all five aspects of the medical regimen. The final selection of adjectives had been found to be reliable when used with medical (Jenkins, 1966) and sociological (Anderson & Fishbein, 1965) concepts in prior studies. Content validity of the instrument at this stage was established by representatives from nursing, medicine, and social psychology. These 'experts' assessed the congruence between the adjective pairs and respondents' perceptions of the advantages and disadvantages of the medical regimen. The ten bi-polar adjectives finally identified as relevant to all aspects of the medical regimen were, successful-unsuccessful, valuable-worthless, harmful-helpful, difficult-easy, good-bad, healthy-sick, unnecessary-essential, flexible-rigid, aggravating-soothing, fair-unfair. Two additional pairs - alert-passive and sharp-blunt were included because of their irrelevance to the regimen. According to Kerlinger (1967) irrelevant items are important. The tendency for respondents to rate them at the mid-point (neutral) serves as a validity check for other responses. Following Osgood, Suci, & Tannenbaum's (1967) recommendations, the polarity of six of the twelve pairs was reversed to decrease response set and a seven point continuum was used to elicit the most informative responses. Osgood, et al., (1967) identified three factors with semantic differential scales, namely potency, activity, and evaluation, however adjectives used in the construction of the Miller Health Attitude Scale were from the evaluation dimension only.

Reliability and Validity

Reliability and validity was established through testing with two clinical samples. The first consisted of 480 individuals from six geographic regions of the United States, whose heart disease had been diagnosed approximately eight years previously. These persons were all members of the Mended Hearts Organization which runs support groups across the country. The second group consisted of 35 clients who were recovering from their first AMI and were about to be discharged home. Responses from both groups showed generally neutral responses for the adjective pair flexible-rigid which resulted in low correlations with the total score. This indicated that flexible-rigid had little relevance to the concepts under study therefore this pair was dropped from the final scale.

In the Mended Hearts group alpha co-efficients were found to be .69 diet, .73 medication, .71 exercise, .70 smoking, and .70 stress management. In the recovering AMI group reliabilities were .78 diet, .90 medication, .85 exercise, .85 smoking, and .90 stress management. The predictive validity of the instrument was tested by comparing attitudes towards the regimen with actual reported adherence behaviours to the regimen. Attitude and adherence scores for the second group were correlated using Spearman rank correlations. Attitude and behaviour were found to be significantly correlated for diet ($r = .31, p < .05$), activity ($r = .46, p < .01$), and smoking ($r = .62, p < .001$), but not for stress management ($r = .15$) or medication ($r = .12$). Adherence behaviour reports were also obtained from a family member appointed by the client. Significant client-family member correlations were found for diet ($r = .85, p < .001$), medication ($r = .81, p < .001$), and smoking ($r = .62, p < .001$) but not for stress management or exercise.

Data for the attitude scale were factor analyzed using a principal factor solution and Varimax rotation. This resulted in eight factors accounting for 55.4% of the variance. They were labelled by Miller et al., (1981) as activity, smoking, medication, diet, stress, burden, fairness, and desirability. The burden factor was so identified because of significant loadings on the adjective pair, 'difficult-easy' on the medication sub-scale (.23) and on 'aggravating-soothing' on the activities sub-scale (.65).

The fairness factor had significant loadings on item 12 only, fair-unfair. These loadings ranged from .60 for stress to .74 for activity. The evaluation of the medical regimen as fair or unfair seems not to be related to specific behaviours, since patients responded similarly to this item on each of the five sub-scales. Adjective pairs harmful-helpful and unnecessary-essential provided the basis for the desirability factor. Loadings ranged from .14 for unnecessary-essential on the smoking subscale to .62 for the same pair on the medications sub-scale. The Health Attitude Scale has been helpful in providing clients with insights into their motivation for behaviour and it has assisted in identifying problem areas in rehabilitation in out-patient treatment (Miller, Wikoff, McMahon, Garrett, & Johnson, 1981).

Health Behaviour Scale

The Health Behaviour Scale (Miller, Johnson, Garrett, Wickoff, & McMahon, 1982), assesses the degree to which health-related behaviours of post-infarction patients are in accord with the medical regimen. Typically, two versions of the Health Behaviour Scale (HBS) are administered, one to the client and the other to a family member or significant other designated by the client. In the present study data were obtained from the patient only. The HBS assesses the same five aspects of the medical regimen as the Health Attitude Scale, namely diet, smoking, exercise, stress management, and medications. Different situations where adherence to the medical regimen may be evaluated include home, work, during sports and recreation, and in social situations. In the present research, behaviours were assessed for home and social situations only. The reason for this was that data were collected at approximately six weeks post-infarction when most patients had neither returned to work nor resumed recreational activities.

The structure of the HBS is very simple. For each of the measurable situations respondents were asked to indicate on a five point Likert-type scale the degree to which she performed the behaviours of the medical regimen. The internal consistency of the HBS has been found to be quite high ranging from .81 to .99 (Miller et al., 1982). These data were derived from a sample of 24 men who had had their first AMI six months previously. In this study Miller et al., 1982 attempted to determine the relationship between health attitudes and behaviour in work, recreation, home, and social situations. Although participants indicated positive attitudes towards all aspects of the medical regimen in all situations, their behaviour was consistent with their attitudes only for the action of diet in work and social situations.

Rosenberg Self-Esteem Scale

The Rosenberg Self-Esteem Scale (Rosenberg, 1965) is a ten- item Guttman scale (Guttman, 1944) which measures the construct of self-esteem as a single dimension. It utilizes a four point response option ranging from 'strongly agree' scored as one to 'strongly disagree' scored as four. With one third of the positive items reversed, the highest self-esteem score is 19 and the lowest, 31.

Guttman scaling is a procedure designed to order both items and respondents with respect to some underlying cumulative dimension (Carmines, 1978). Guttman's (1944) method results in scores which have unique meanings since response patterns for each subject are cumulative. In other words a respondent who strongly agrees with the attitude object, in this case self-esteem, should answer affirmatively to all items which were accepted by "agree" respondents. To one or more additional items, the "strongly agree" subject will have responded accordingly (Oskamp, 1977). Guttman (1944) suggested that if a scale displays this cumulative pattern then it is certainly unidimensional in nature. He asserted that if responses to all component items on a scale could be predicted on the basis of total scores, then each item must form part of a single underlying dimension which can be measured along a continuum (McIver & Carmines, 1981).

Reproducibility and Scalability

For Guttman (1941) scales the psychometric properties are represented by reproducibility and scalability. The co-efficient of reproducibility represents the consistency in responding between subjects. For the reproducibility index, respondents scores are examined separately so that inconsistent response patterns can be determined. An inconsistent pattern would occur where a respondent endorsed a favourable item and failed to endorse a less favourable item. Each such instance would be considered a response error; no more than 10% of inconsistent responses are acceptable if the scale is to be considered unidimensional. The reproducibility of the RSE is reported as .92. (Rosenberg, 1965).

> "From general considerations of scale theory it should be clear that if a set of items has high reproducibility, then the items should necessarily have high test-retest reliability" (Guttman, 1950, p. 305).

The co-efficient of scalability corrects for the sources of distortion or error in the co-efficient of reproducibility, namely extremeness of items and extremeness of individuals (Menzel, 1953). To measure scalability, a scalogram is devised in which categories, as well as individuals are ordered. The co-efficient in fact, is a measure of the relative improvement in reproducibility which results from a knowledge of both category frequencies and scores, rather than from either of these alone. According to both Guttman (1950) and Menzel (1953) the co-efficient of scalability in a unidimensional scale should not be below .60. The co-efficient of scalability reported by Rosenberg (1965) is .72.

Validity

The ten item self-esteem scale was embedded in a large test battery and administered to 50 volunteers who served as resident research subjects and were retained by the National Institute of Health (NIH). These "normal volunteers" (Rosenberg, 1965, p. 18) were housed on the wards of the National Institute of Health's Clinical Centre. They were not considered a clinical population. Nursing staff with no knowledge of the subjects' self-esteem scores, completed Leary's (1957) Personality Scales on all subjects. Associations between these variables were reported in percentages. Individuals with high self-esteem scores were desribed as "gloomy"

9% of the time, as not depressed 88% of the time, and as disappointed only 13% of the time.

Using NIH physiological measures of neurosis (insomnia, fine tremor, palpitations, headache, nail-biting, breathlessness, dizziness, and nausea) high self-esteem was associated with one symptom or less in 60% of subjects. Self-report measures of association between two other variables, "What others think of me" and "My ability to criticize myself" were assessed. Of the high self-esteem subjects 61% indicated that they believed others thought very well of them and 38% felt others thought fairly well of them. Only 8% of low self-esteem subjects believed that others thought well of them. In the high self-esteem group, 43% were able to criticize themselves as compared to only 25% in the low self-esteem group.

From these pilot studies Rosenberg (1965) concluded that the RSE was 'internally reliable, unidimensional, and had good face validity". The scale has been used extensively in psychological research and is strongly recommended for use in studies of chronically ill populations (Taylor, Lichtman, & Wood, 1984).

The Centre for Epidemiological Studies Depression Scale

The Centre for Epidemiological Studies Depression Scale (Radloff, 1977) is a 20 item self-report measure that has been developed to assess depressive symptomatology in the general population (Radloff, 1977). Thus it's purpose differs markedly from other depression scales which have been used diagnostically with suspected clinical populations (e.g., Beck, 1978; Berndt, 1986; Kovacs, 1985; Lubin, 1966).

Scale Description and Development

In the early developmental stages, the clinical literature and factor analytic studies of depression were reviewed to identify the major components of depressive symptomology. These were found to be depressed mood, feelings of guilt and worthlessness, feelings of helplessness and hopelessness, psychomotor retardation, loss of appetite and sleep disturbance (Radloff, 1977). From this initial bank of items a small number representing each of the major components was selected for the CES-D. Each of the finally chosen items had appeared on previously validated depression scales (e.g., Beck, Ward, Mendelson, Mock, & Erbaugh, 1961; Zung, 1965).

The attention of the subject responding to the scale is directed towards current functioning as evidenced by the stem, "How often during the past week did you........". Each response is scored from zero to three on a scale representing frequency of occurrence of each of the 20 items, thus the possible range of scores is zero to 60 with higher scores indicating more depressive symptoms (Radloff, 1977).

Each item represented in the CES-D describes one of 20 symptoms, any of which can be experienced by healthy people; seriously depressed people on the other hand would be expected to experience many though perhaps not all of the symptoms (Radlof, 1977). According to Klein (1974) in healthy populations positive and negative affect may co-exist with a low negative correlation while depressed patients can be characterized by absence of positive as well as presence of negative affect. Correlations between negative and positive affect in clinical populations would therefore be expected to be more highly negatively correlated. As Radloff (1977) points out a general population sample is likely to be largely heterogeneous in reporting depressive symptomatology, with many people experiencing a few symptoms and a few people experiencing many. Inter-item correlations may therefore be found to be low. By contrast in a more homogeneous clinical group higher item means, higher inter-item correlations, and higher measures of internal consistency would be anticipated.

Reliability and Validity

Four separate field tests were conducted in the United States over a two year period to establish the reliability and validity of the scale. One individual aged 18 years or over was randomly selected from a randomly selected sample of households in comparable communities in either Missouri or Maryland. To these individuals the CES-D was administered along with other scales measuring depression, depressed mood, well-being, social desirability, demographics, desirable/undesirable life events, physical illness, and use of medications and alcohol. The complete battery contained 300 items and took an average of one hour to complete.

The four field tests consisted of two survey interviews with samples from the general population (N = 3574), a re-interview survey conducted with willing and available respondents from each original sample three, six, or twelve months after the original interview (N = 1422), and a survey interview with a psychiatric in-patient population (N = 70). To demonstrate generalizability, the results of the surveys were compared across age, sex, race, and educational subgroups.

Unfortunately, the item analysis data as it is presented by Radloff (1977) does not include mean values, only low to high distribution of the item correlations. As expected some inter-item correlations were low in the non-clinical sample (range r = .03 - .63). A similar range however was obtained with the clinical sample (r = .01 - .73). The estimate of internal consistency, co-efficient alpha, is reported as .85 in the non-clinical population and .90 in the clinical population.

Although the CES-D was not designed for clinical diagnosis, all 20 items describe symptoms of depression as seen in clinical cases. In consideration of its validity, one might therefore expect that the scale would clearly discriminate between clinical and non-clinical groups and be sensitive to levels of depressive symptomatology (Radloff, 1977). It should also correlate comparatively well with other scales designed to measure depression and less well with scales measuring related but different variables. Finally it should be sensitive to depression of the reactive type occurring in response to difficult life events. As predicted the CES-D discriminated significantly at the $p < .01$ level between non-clinical and clinical samples, yielding mean scores of 9.25 and 24.42 respectively.

The correlation between the CES-D and the Hamilton Physician's Rating Scale (Hamilton, 1960) was .69, with the Raskin Rating Scale (Raskin, Schulterbrandt, Reatig, & McKeon, 1969) it was .75, with the Bradburn Negative Affect Scale (Bradburn 1969) it was .62, and with the Bradburn Positive Affect Scale (Bradburn, 1969) it was -.21. There was a low negative correlation with the Marlowe-Crown Social Desirability Scale (r = - .18) which as Radloff (1977) suggests may indicate some general response set with the CES-D. Given the size of the correlation however, one may conclude that the bias is small.

With regard to the influence of life events upon CES-D scores, it has long been established that significant life events may be associated with physical as well as psychological or psychiatric illness. In validating the CES-D, it is apparent that the more negative the event, the higher the depression score of those who experienced it. Marriage and vacations were associated with comparatively lower mean CES-D scores, 7.48 and 7.95 respectively, means for illness, separation, and divorce were higher, 11.20, 16.83, and 11.27 respectively. The highest depression score was associated with death of a spouse at 19.13.

In conclusion, the CES-D has high internal consistency and good concurrent validity by clinical and self-report criteria. It would appear to be a valuable tool in studying the relationship between depressive symptoms and many other variables.

The State-Trait Anxiety Inventory

While fear has been of concern to humanity since ancient times, anxiety was not recognized as a pervasive human condition until the end of the nineteenth century. It was Freud (1936) who initially proposed a critical role for anxiety in personality and in the aetiology of personality disorders. For Freud anxiety was "something felt" (Freud, 1936, p. 85), a specific, unpleasant emotional state of the human organism that included experiential, physiological, and behavioural components.

The concepts of state and trait anxiety were first discussed by Cattell (1966); they have since been elaborated by Spielberger (1972; 1979). Building on Thorne's (1966) conception of personality as " a temporal cross section in the stream of life of a person" (p. 127), Spielberger (1983) described emotional states as expressions of personality. These states may exist at any given moment in time and at varied levels of intensity. Anxiety states are characterized by subjective feelings of tension, apprehension, nervousness, and worry, and by activation of the autonomic nervous system.

In Spielberger's (1983) conceptualization personality is "relatively enduring differences among people in specifiable tendencies to perceive the world in a certain way and in dispositions to react or behave in a specified manner with predictable regularity" (p. 1). Personality traits are described as behavioural dispositions acquired in childhood which dispose an individual to view the world in a particular way and to manifest consistent response tendencies (Spielberger, 1983). Trait anxiety (T-Anxiety) refers to relatively stable individual differences in anxiety-proneness wherein people exhibit measurable differences in their tendency to perceive stressful situations as dangerous or threatening. In contrast emotional states are transitory in nature and may recur when evoked by appropriate stimuli. Individuals who perceive situations as threatening may respond with elevations in state anxiety (S-Anxiety). The stronger the T-Anxiety, the greater the likelihood that the individual will experience more intense elevations in S-Anxiety in a threatening situation (Spielberger, 1983). The degree to which an individual perceives a situation as psychologically dangerous or threatening will be greatly influenced by each individual's past experience.

According to Spielberger (1983) the high T-Anxiety individual will exhibit S-Anxiety elevations more frequently than the low T-Anxiety individual because he or she will tend to interpret a wider range of situations as threatening. It is the perception of threat that has the greater impact on the level of S-Anxiety than the real danger associated with the situation.

Scale Description and Development

The State-Trait Anxiety Inventory (STAI) has been used extensively in research and clinical practice. Separate self-report scales measure each concept of state and trait. The S-Anxiety scale consists of 20 statements that evaluate how respondents feel "right now". The 20 statements on the T-Anxiety scale evaluate how respondents "generally feel". The scales are administered in sequence, state then trait, on both sides of a single page test form. Consistent with the definition of anxiety provided by Spielberger (1983), both measures evaluate feelings of apprehension, tension, nervousness, and worry. With the trait measure the focus is general while with the state measure the orientation is to the here and now. In addition to assessing how respondents feel at the present time, the S-Anxiety scale can be used to evaluate how people felt at a particular time in the recent past or how they anticipate they will feel in a situation likely to be encountered in the near future. The procedures reported by Spielberger (1983) for item construction and refinement for the STAI are impressive. Over 5,000 working adults, college students, high school students and military recruits were tested in the development of forms Y1 (state anxiety) and Y2 (trait anxiety). In the initial step, a large pool of items was gathered which had demonstrated concurrent validity as measures of anxiety. Three widely used scales - Taylor's (1953) Manifest Anxiety Scale (TMAS), Welsh's (1956) Anxiety Scale, and the IPAT Anxiety Scale (Cattell & Scheier, 1963) - were administered to 288 introductory psychology students at Vanderbilt University. Items which resulted in item-total correlations of .25 and above (N = 177) were retained. They were re-written so that the content was preserved but the form was altered so that each item could be used with different instructions to assess S and T-Anxiety (Spielberger, 1983).

A second group of undergraduates reviewed the re-written items for detail and clarity of content. Items which they found redundant, vague, or ambiguous were eliminated, and the format and instructions were simplified. A total of 124 items judged to have the potential for measuring both S and T-Anxiety were retained for further evaluation.

In a third procedure 54 undergraduates were administered the 124 items and were asked to indicate how each described "how you generally feel". Response options included, "almost never", "sometimes", "often", or "almost always". They were then asked to review the items again assessing whether they described "how you feel at the present time". Options included, "yes", "no", or "doesn't apply". After this procedure, items with item-total correlations of .35 or greater were retained (N = 66).

These remaining items were given to a fourth sample of undergraduates (N = 265) along with brief descriptions of one stressful and one non-stressful situation.

Students were first asked to respond to the items on the basis of how they generally felt (T-Anxiety). They then contemplated each situation and responded according to how they believed they would feel in each of them (S-Anxiety). These students had also taken the TMAS and IPAT ten weeks previously. Their T-Anxiety responses were correlated with summed z scores for the TMAS and IPAT. Items with correlations of less than .20 were excluded. Each individual item's usefulness as a measure of S-Anxiety was evaluated with a point-biserial correlation procedure that determined the extent to which the item distinguished between stressful and non-stressful situations. Items which did not significantly discriminate were discarded resulting in a remainder of 44.

A further 810 undergraduates were administered the 44 item measure with T-Anxiety instructions and then with S-Anxiety instructions for the stressful and non-stressful situations. T-Anxiety item-total correlations, S-Anxiety by situation point-biserial correlations and correlations among the individual items were computed separately for males and females. A total of 32 items had T-Anxiety item-total correlations of .24 for both males and females and S-Anxiety point-biserial correlations which discriminated between stressful and non-stressful situations.

In the final stage of item validation the 32 item scale was administered to 400 introductory psychology students on two occasions. The first was during a regular class period; the second was two months later prior to the final examination in the course. The extent to which each individual's score on each item changed from non-stressful to stressful situations was determined by calculating point bi-serial correlations separately for males and females. The 20 items that best met these criteria were selected for the S-Anxiety (Y1) scale. Each of these items had previously met the stringent item-validation procedures described above for measuring T-Anxiety. Therefore the 20 items were satisfactory measures of both S and T-Anxiety (Y2). The final forms consist of similar items differently worded, with S-Anxiety items stressing the immediacy of feelings and T-Anxiety items stressing their generality (Spielberger, 1983).

Examination of the relationship between forms Y1 and Y2 and age revealed that working adults of both sexes above the age of 50 tended to be lower in both S and T-Anxiety than their younger counterparts. Means for the over 50 group are reported as 34 for both S-Anxiety and T-Anxiety; in the student samples the overall means are 39 and 40 respectively.

Reliability and Validity

Test-retest reliability correlations for Y1 and Y2 were obtained on 354 high school students and 197 college students. The T-Anxiety correlations for high school students ranged from .73 to .86 and for college students from .65 to .75. For the S-Anxiety scale test-retest correlations for both high school and college groups were relatively low ranging from .16 to .62. These lower stability indices were expected for the state measure because a valid measure of state anxiety should reflect the influence of unique situational factors that would exist at the time of testing (Spielberger, 1983). Given the transitory nature of anxiety states the alpha co-efficient of internal consistency was considered a more meaningful index of reliability. The

Kuder-Richardson 20 statistic was reported for the following samples upon which the STAI norms are based: a) working adults (N = 1838) Y1 r = .93, Y2 r = .91, b) college students (N = 855) Y1 r = .92, Y2 r = .91, c) high school students (N = 424) Y1 r = .90, Y2 r = .90, and d) military recruits (N = 1964) Y1 r = .94, Y2 r = .90. The working adult sample was categorized in such a way as to measure the state and trait variables in different age groups. Three groups were created, 19 to 39, 40 to 49, and 50 to 69. For both males and females the alpha co-efficients remained high over the entire age range, r = .89 to r = .96.

Further evidence of internal consistency of STAI scales is provided by item-total correlations computed for the normative samples. The mean S-Anxiety item-total correlation for working adults was r = .63, for college students r = .59, for high school students r = .55, and for military recruits r = .61. The mean T-Anxiety item-total correlations were .56, .56, .54, and .52 respectively.

As described items were required to meet stringent validity criteria at each stage of test development. Further evidence of construct, concurrent, and convergent validity is also provided for the STAI. Construct validity was established by comparing the mean scores of neuro-psychiatric patients (N = 461) with those of non-clinical subjects (N = 5283). The clinical group had substantially higher T-Anxiety scores (mean = 46.6, sd = 12.41) than the non-clinical group (mean = 38.0, sd = 11.00). For S-Anxiety, mean scores for military recruits were higher (mean = 46.0 sd = 13.0) than their own T-Anxiety scores (mean = 35.0 sd = 9.90) when they were tested shortly after beginning a highly stressful training programme. S-Anxiety scores of college students were also significantly higher under examination conditions (mean = 57.0) than they were when measured in the regular class period (mean = 39.0).

Concurrent validity was established by correlating the T-Anxiety scale with the IPAT Anxiety Scale (Cattell & Scheier, 1963) the Taylor Manifest Anxiety Scale (Taylor, 1953), and the Zuckerman Affect Adjective Checklist (1960) for both college students (N = 206) and neuro-psychiatric patients (N = 66). For college students the correlations between the T-Anxiety scale and the Manifest Scale and the IPAT were relatively high, r = .85. The Affect Adjective Checklist correlated only moderately, r = .52. Spielberger (1983) concludes from this that the Affect Adjective Checklist is "less adequate as a measure of anxiety" (p. 15). Among the clinical sample, the correlation was measured between T-Anxiety and the IPAT only, r = .83.

To assess convergent/divergent validity, the STAI was correlated with other measures of personality. It would be expected that larger correlations would be found with measures of psychopathology and smaller correlations with measures of unrelated constructs. Correlations were measured between the STAI and the Minnesota Multiphasic Personality Inventory (Hathaway & McKinley, 1982) in 208 neuro-psychiatric patients. The sub-scales of the MMPI which reflect high levels of acute anxiety are Depression, Psychasthaenia, and Schizophrenia. Their correlations with S-Anxiety were r = .57, r = .79, and r = .71 respectively. The Cornell Medical Index was correlated with the STAI in the psychiatric sample. For both S and T-Anxiety r = .70. According to Spielberger (1983) this indicates that a large number of medical symptoms are associated with high STAI scores. There was no relationship between the Beta Intelligence Test and S-Anxiety (r = -.08) and T-Anxiety (r = -.03).

In conclusion, the STAI has undergone rigorous and extensive refinement with both clinical and non-clinical samples of different ages. Since its initial development in 1964, more than 2,000 published studies have reported its use (Spielberger 1983). In the present study the distinction between state and trait anxiety was considered essential in order that anxiety in response to the stressful event of a myocardial infarction could be measured separately from anxiety experienced by persons in a general sense. Women with a higher predisposition to anxiety (trait) would be expected to demonstrate higher levels of anxiety in relation to the infarction (state).

Perceived Threat

Perception of threat was of central interest in the present study. While it was felt that modification of the state anxiety measure (i.e. infarction-specific orientation of respondents) would allow assessment of anxiety in relation to the AMI, this procedure alone would not measure the extent of perceived threat, harm, and loss in a more general sense. It was therefore decided to include the Primary Appraisal Scale used by Waltz, Badura, Pfaff, & Schott (1988) in their examination of the psychological consequences of AMI. Respondents were asked to indicate on a five point Likert-type scale, the degree to which they felt worried by various possible outcomes of the infarction. In Charmaz's (1983) description, outcomes of this sort that are represented on this scale, such as never attaining the pre-illness level of functioning, loss of independence, and having to give up previously held life goals, may result in a "fundamental loss of the former self" (p. 168).

Waltz et al., (1988) found that primary appraisal scores were uniformly high in the hospital at time one (two weeks post-infarction) and that there was a slow but consistent decrease over time until the fourth measure at four years post-AMI. Using a scoring system different from the one used in the present study, a mean for the total sample of 19.9 at time one decreased to 14.6 at time four. As would be expected, respondents who had suffered less severe infarctions and who enjoyed better health during recovery had significantly lower scores on the primary appraisal scale. Their scores dropped from 16.4 at time one to 9.0 at time four. These data suggest that as time elapses following the heart attack, in conjunction with good physical recovery, clients are likely to feel less threatened. The question of concern in the present study however, was whether this physical improvement and consequent reduction in perceived threat would foster the belief that health-promotion behaviour was no longer necessary.

Reliability data for the Primary Appraisal Scale are very limited as Waltz et al., (1988) developed the scale specifically for their study. They report a test-retest coefficient of .77 from time one to two (four weeks) and .76 from time four to five (one year). The present study will therefore provide an opportunity to subject this conceptually important measure to further testing.

Degree of Incapacitation

Respondents were asked to assign themselves to the category of the Canadian Cardiovascular Society Classification that best described their physical and functional status at the time of data collection, namely six to eight weeks post-infarction. The activities pertaining to functional status refer to the requirements of daily living and include personal self-care, maintenance and upkeep of the home and yard if applicable, laundry, shopping, cooking, driving, and recreation. Respondents are asked to assign themselves to one of three categories describing their own perception of their physical capabilities. This was important in the present study because it was argued that these perceptions, not those of care-givers, form the basis of the individual's representation of the health threat. The respondent is unquestionably more intimately associated with the illness than anyone else, and consequently with the limitations it imposes upon her.

Procedure

With approval from the Ethics Review Committees of the Department of Psychology and the Faculty of Medicine, University of Manitoba, and from the institutional ethics committee of each of the hospitals involved, eligible participants were contacted through the intensive care units of St. Boniface General Hospital, Health Sciences Centre, Victoria General Hospital, Concordia Hospital, Misericordia Hospital and Grace Hospital. All the hospitals were located within the Winnipeg city boundary. The researcher met with each patient after her medical condition had stabilized and she had been transferred from intensive care to the general medical ward. Patients were usually approached within 48 hours of the anticipated time of discharge. First of all their permission was sought to discuss the research. Following the description of the study, the women were then invited to participate in the study. The researcher was careful to emphasize first, that they were not obligated to participate, and second, that confidentiality would be carefully maintained. Patients who were interested in participating were given a letter to keep, describing the study and providing the name and telephone number of the investigator. If they so chose, prospective respondents then gave the investigator their telephone number with the understanding that they would be contacted approximately six weeks hence to re-establish their willingness to participate. Six weeks later when they were phoned at home, women indicated whether or not survey materials could be delivered to their homes, and stated a time that this would be convenient. In total, 12 women who had agreed to participate when they were in the hospital, declined when they were contacted by phone at home. This emphasizes the importance of not attempting to obtain formal consent in the hospital setting, where patients may not perceive themselves as being at liberty to refuse to take part in research. Once at home patients may feel more confident in asserting their real choice, thus the voluntariness of their consent is better assured.

All participants completed questionnaires measuring the following, a) health locus of control, b) ways of coping, c) self-enhancing beliefs i.e positive self-view, exaggerated control, and unrealistic optimism, d) self-esteem, e) depression, f) anxiety, g) health beliefs, h) health behaviours, i) perceived threat (primary appraisal), j) perceived degree of incapacitation, and k) demographics. There were two additional questions. The first asked whether the patient had undergone angioplasty, a procedure in which an inflatable balloon catheter is introduced into the occluded coronary artery and then inflated in order to flatten the atheromatous plaque against the artery wall. This procedure can instantaneously provide improved perfusion of the myocardium as well as relief of pain, but there is some documented evidence that it can encourage patients to believe that their own efforts to optimize heart health are unnecessary (e.g., Gaw, 1992). In other words, since patients may believe that their own health-promotion behaviours are superfluous following angioplasty, the procedure should be accounted for in research that attempts to explain such behaviours. They were also asked to state whether or not they had read Heart Talk (Heart and Stroke Foundation of Manitoba, 1988). Although limited in its information and perceived by many women as having been written exclusively for men and therefore of little relevance to their experience, this book represented the common denominator in terms of cardiac education across provincial hospitals. At the respondent's discretion, the completed materials were collected either later the same day or the following day. During completion of the questionnaires, respondents could contact the researcher on a mobile paging system at any time. During the 16 month period of data collection, only four respondents called into the system. Two women wanted to postpone the time of collection of materials and the remaining two needed clarification of survey items.

There were two reasons for the six week time lag between the date of infarction and data collection. First, from a biological standpoint the initial six weeks post-infarction is the most critical healing time for injured heart muscle. Up until this time, exertion tolerance may still be quite low. By six weeks, recoverers are beginning to enter exercise programmes and some are returning to their everyday routines. The second consideration is of a psychological nature. The central hypothesis of the proposed study was that a curvilinear relation exists between self-enhancing beliefs and risk-reduction behaviour. This relation could not reasonably be tested until at least six weeks post-infarction. Evaluating, testing, and modifying the medically prescribed regimen in order to integrate it into one's life to whatever degree, can only begin after the acute phase of illness is over. As the self-regulation model of treatment adherence would suggest, adjusting to the chronic phase or long haul involves moving towards a satisfying workable life within the boundaries of physical and psychological limitations. By six weeks post-infarction patients who were so inclined, had had sufficient time to begin to integrate the recommended life-style changes.

A semi-structured, open-ended interview was conducted with a randomly selected sample of 12 participants (see Appendix B). Qualitative data was not gathered for the purposes of theory development however, in keeping with a grounded theory methodology (Strauss, 1990) interviews continued to be conducted until no new data appeared to emerge in major categories and all of the elements in the conceptual model were accounted for. The purpose of this method was to obtain a much deeper understanding of the experience of myocardial infarction than self-report measures alone could provide. In keeping with the philosophy of a pluralistic methodology (Webb, Campbell, Schwartz, Sechrest, & Grove, 1981), the qualitative interview protocol reflected the variables represented in the questionnaires, which in turn, mirrored the conceptual elements of the theoretical model under examination.

RESULTS

Characteristics of the Sample

Sample characteristics are presented in Table 1. It is difficult to determine the representativeness of this sample in relation to the population of women recovering from a first heart attack. Neither the Manitoba Health Services Commission nor Statistics Canada, Ottawa, could provide a profile of characteristics of women recovering from a first heart attack. This is because hospital admissions data do not discern between a first or subsequent heart attack. Moreover, if the heart disease co-exists with other pathophysiology, such as diabetes or mental illness, it may or may not be recorded as the reason for admission. Despite the problem of defining population characteristics, the representativeness issue was partly off-set by the system of referral for the present study. During the 18 months of data collection, all women who were admitted with a first heart attack to tertiary care hospitals in the city of Winnipeg were referred by intensive care unit nursing staff or cardiology research nurses to the investigator for possible inclusion in the study. Of the 92 women invited to participate, 12 declined, two died, and 13 were ineligible, either as a result of serious co-existing illnesses such as cancer, schizophrenia, or Crohn's disease, or because complications developed in the recovery period such that the patients were symptomatic at rest.

Table 1
Sample Characteristics

Variable	Categories	N
Age	Range = 37 - 76	
	Mean = 61	65
Education	Grade 8 or less	7
	Some High School	16
	High School diploma	20
	Some College	12
	College Degree	7
	Graduate Degree	3
Annual Household Income	Range = 10,000 - 100,000	
	Mean = 24,210	38
	Not reported	27
Marital Status	Never married	2
	Common Law	3
	Married	29
	Widowed	16
	Separated/Divorced	15
Read "Heart Talk"	Yes	60
	No	5
Angioplasty	Yes	15
	No	50

Reliability of Measures

Cronbach's (1951) alpha measures of internal consistency were calculated for each scale and as Table 2 shows, these reliability coefficients were generally high.

Table 2
Reliability Coefficients

Variable	Cronbach's Alpha
Unrealistic Optimism	.84
Overly Positive Self-View	.89
Exaggerated Control	.80
Depression	.89
Self-Esteem	.80
State Anxiety	.96
Trait Anxiety	.94
Perceived Threat	.96
Ways of Coping	.95
Health Locus of Control	.80
Health Beliefs:	
Diet	.70
Exercise	.84
Smoking	.80
Medicines	.80
Stress	.80

Descriptive Statistics

For ease of reading, variable names have been shortened for use in tables. These abbreviations, used throughout the results section, may be found in Table 3. Table 4 lists all measured variables and provides the range, mean, and standard deviation for each, as well as the lowest and highest possible scores.

Table 3
Abbreviations for Variable Names

Self-Enhancing Beliefs
UNOPT: unrealistic optimism
PSELF: overly positive self-view
EXCNL: exaggerated perceptions of personal control

Affective Measures
STANX: state anxiety
TRANX: trait anxiety
SEST: self-esteem
CESD: depression

Threat and Incapacitation
PTHRT: perceived threat
INCAP: degree of incapacitation

Ways of Coping
CONFCOP: confrontive coping
DISTAN: distancing
SELFCONT: self-controlling
SOCSUPP: seeking social support
ACCRESP: accepting responsibility
ESCAVO: escape-avoidance
PROBSOL: problem-solving
POSREAP: positive re-appraisal

Health Locus of Control
INTERNLC: internal
EXTOTHLC: external, powerful others
EXTCHLC: external, chance

Health Beliefs
BDIET: diet
BEXER: exercise
BMEDS: medications
BSTRS: stress management
BSMKG: smoking

Health Behaviours
DIET: following diet
EXER: exercising regularly
MEDS: taking medicines
SMKG: non-smoking
STRS: managing stress

Table 4
Descriptive Statistics For All Variables

Variable	Mean	Median	SD	RANGE	POSS RANGE
UNOPT	47.5	45.0	14.1	19 - 82	10 - 90
PSELF	84.5	84.0	13.6	56 - 125	14 - 126
EXCNL	50.3	52.0	12.8	18 - 76	10 - 90
STANX	39.4	37.0	14.1	20 - 74	20 - 80
TRANX	38.0	37.0	11.3	20 - 63	20 - 80
SEST	39.0	38.0	5.6	25 - 50	10 - 50
CESD	16.0	13.0	11.2	0 - 46	0 - 60
PTHRT	50.4	48.0	19.7	18 - 90	0 - 90
INCAP	4.6	5.0	1.6	1 - 8	0 - 8
CONFCOP	3.6	3.0	3.3	0 - 13	0 - 18
DISTAN	10.3	9.0	5.5	1 - 27	0 - 27
SELFCONT	11.0	11.0	6.2	0 - 29	0 - 30
SOCSUPP	8.8	9.0	4.1	0 - 18	0 - 18
ACCRESP	4.6	4.0	3.1	0 - 11	0 - 15
ESCAVO	9.1	7.5	6.0	1 - 23	0 - 30
PROBSOL	7.1	7.0	4.0	1 - 18	0 - 18
POSREAP	13.0	13.0	5.7	0 - 27	0 - 27
INTERNLC	20.8	21.0	3.6	10 - 30	6 - 30
EXTOTHLC	18.0	18.0	4.5	7 - 28	6 - 30
EXTCHLC	14.4	15.0	4.1	6 - 24	6 - 30
BDIET	50.6	51.0	7.4	32 - 63	9 - 63
BEXER	50.8	52.0	8.5	24 - 63	9 - 63
BMEDS	55.0	57.0	7.5	33 - 63	9 - 63
BSTRS	50.8	52.0	8.2	31 - 63	9 - 63
BSMKG	47.6	51.0	11.2	7 - 63	9 - 63
DIETH	4.0	4.0	0.6	2 - 5	1 - 5
DIETS	3.7	4.0	0.8	1 - 5	1 - 5
EXERH	4.0	4.0	1.0	1 - 5	1 - 5
EXERS	3.6	4.0	1.0	1 - 5	1 - 5
SMKGH	4.5	5.0	1.0	1 - 5	1 - 5
SMKGS	4.5	5.0	1.0	1 - 5	1 - 5
MEDSH	4.9	5.0	0.3	3 - 5	1 - 5
MEDSS	4.8	5.0	0.4	3 - 5	1 - 5
STRSH	3.6	4.0	1.0	1 - 5	1 - 5
STRSS	3.7	4.0	1.0	1 - 5	1 - 5

Note: For health behavior suffix **H** and **S** refer to home and social contexts.

Data Screening

Data screening was carried out in accordance with the procedures described by Tabachnick and Fidell (1989). As they emphasize, this can be tedious and time consuming, but it is integral to an honest analysis. The first step was to examine univariate frequency distributions with their respective descriptive statistics for accuracy of data input. All values on all variables were within possible range and all computed means and standard deviations were plausible.

Second, was the assessment of missing values. There were very few spoiled or unanswered responses, no doubt a reflection of the importance women appeared to ascribe to both the study and their participation in it. The small number of omissions were scattered at random in the data set, and so were not suggestive of any consistent pattern that could adversely affect the analysis.

The assumption of multivariate normality underpinned the inferential statistical procedures used in analyses. Multivariate statistics are often robust to violations of their assumptions but Tabachnick and Fidell (1989) advise that, because the literature on robustness is far from conclusive, tests for normality can not simply be dispensed with. The third step in screening then, was to construct normal probability plots and examine them for this assumption. Although these plots provide a visual basis for the determination of normality, it is more reliably evaluated by computing, for example, the Lilliefors statistic that tests the null hypothesis that the data are drawn from a normal distribution. Variables that did not have a significant Lilliefors value were considered normally distributed. Non-normally distributed variables and the procedures undertaken to result in a better fit between data and assumptions, will be described as the relevant hypotheses are tested.

Prediction based on the General Linear Model (GLM), was a major goal of the analysis. For non-normally distributed variables, a straight line will not fit well to the data. Because linearity is so important to the GLM, the assessment of linearity between variables was undertaken by examination of bivariate scatterplots and residuals analysis. When there are numerous variables under investigation, as in the present case, screening for all possible pairs can be very burdensome. By using normality screening procedures, it was possible to select variables that exhibited non-normality and examine only those to assess the severity of departure (Tabachnick & Fidell, 1989). Non-linearity is also discussed in relation to the specific hypothesis-testing that it had the capacity to influence.

Hypothesis 1: **There will be an inverse relation between self-enhancing beliefs and perceived threat.**

Before reporting results for this hypothesis, a preliminary question to answer was whether or not overly positive self-view, exaggerated control, and unrealistic optimism could be conceptualized as a single construct of self-enhancement, or whether they were more accurately described as separate dimensions requiring separate analyses and interpretation. Literature on the benefits of self-enhancing beliefs in adaptation to threat suggest that they co-exist. Taylor and Brown (1988), for example, describe how a cluster of beliefs or "illusions" are characteristic of the mentally healthy person. They describe this person as,

> ".....one who has the enviable capacity to distort reality in a direction that enhances self-esteem, maintains beliefs in personal efficacy, and promotes an optimistic view of the future. These three illusions, as we have called them, appear to foster traditional criteria of mental health, including the ability to care about the self and others" (p. 204).

As Table 5 shows, Pearson Product-Moment correlation coefficients obtained for the three self-enhancing beliefs measures indicated that, for this sample of women, these cognitions could not be grouped together in the form of one measure of self-enhancement. In other words, although each may be a measure of self-enhancement, high scores on one measure do not necessarily imply high scores on one, or both of the others. The minor exception was between unrealistic optimism and exaggerated perceptions of personal control, where a low, inverse correlation of $r = -.31$, $p < .05$ was found. A higher score on the unrealistic optimism measure indicated that women believed they would not be troubled by health problems in the future. In conjunction with a low score on exaggerated personal control, this inverse relation implied that a belief in future good health was coupled with a belief that disease onset, should it happen, was not under personal control.

Table 5

Pearson Product-Moment Correlations for Self-Enhancing Belief Measures and Perceived Threat

	PSELF	UNOPT	EXCNL	PTHRT
PSELF	1.00	.01	.21	.12
UNOPT		1.00	-.31*	-.22
EXCNL			1.00	-.01
PTHRT				1.00

Note: * P = < .05 N = 65

In order to further examine the potential relatedness of the self-enhancing beliefs measures, exaggerated control and unrealistic optimism were re-defined according to the disease classifications that constituted them. Items on the measures consisted of three disease types, cardio-vascular, psycho-social, and those of unknown aetiology. It will be remembered that respondents were asked to estimate, in comparison to similar others, what they thought their chances were of suffering from the illnesses in the future, and the degree to which they personally had control over their onset. By grouping these diseases together, plausible correlations could have been obscured. They were therefore separated according to disease classification and examination of correlation was repeated. These control and optimism x disease-type self-enhancement measures are presented in Table 6. As the coefficients show, there was slight strengthening of the relation between unrealistic optimism and exaggerated control in the cardiovascular category only [$r = -.44$, $p < .01$]. In addition, separation of the exaggerated control measure by disease category resulted in a weak positive correlation between psychosocial exaggerated control and overly positive self-view [$r = .27$, $p < .05$]. This relation implied that women whose self-views were positive, tended to believe that they could exert more control over psychosocial illness onset in the future. Despite this slight strengthening of the relations between some self-enhancing belief measures, it was felt by the investigator that, overall, the strength of association among these measures did not warrant grouping them together as a single construct. Consequently, for the remainder of the analysis, the measures were not classified in accordance with disease specificity and they were treated as independent of one another.

TABLE 6

Pearson Product Moment Correlations for Self-Enhancing Belief Measures x Disease-Type and Perceived Threat

	UNOPTCV	UNOPTPS	UNOPTUA	EXCNLCV	EXCNLPS	EXCNLUA	PTHRT	PSELF
UNOPTCV	1.00	.60**	.60**	-.44**	.17	-.26*	-.14	.00
UNOPTPS		1.00	.52**	-.22	-.08	.03	-.22	.00
UNOPTUA			1.00	-.33**	.03	-.17	-.19	.00
EXCNLCV				1.00	.43**	.34**	-.14	.09
EXCNLPS					1.00	.33**	-.04	.27
EXCNLUA						1.00	-.20	.13
PTHRT							1.00	.02
PSELF								1.00

Suffix Key for Disease-Type

CV	Cardiovascular
PS	Psychosocial
UA	Unknown aetiology

Note: * p < .05, ** p < .01 N = 65

Hypothesis one had suggested that self-enhancing beliefs and perceived threat would be negatively related. In other words, women who cast themselves in an overly positive light with regard to self-evaluation, who exaggerated the extent to which they could exert personal control over health-related events, and who were overly optimistic about future health status, would view the experience of AMI as less threatening, than those whose views were less self-enhancing. As Tables 5 and 6 show, no support was found for this hypothesis; no relation could be found between perceived threat and any of the self-enhancing beliefs measures.

Hypothesis 2: **There will be a positive relation between degree of incapacitation and perceived threat.**

The perceived degree of incapacitation measure (see Appendix A) is best described as an ordinal scale in which the distance between levels is not amenable to precise measurement (Munro & Page, 1993). The Pearson Product-Moment correlation is not an appropriate statistic for computing a correlation between an ordinal measure, such as degree of incapacitation, and an interval measure, such as perceived threat. Ordinal data do not satisfy the normality assumption underpinning the Pearson r, therefore hypothesis 2 was tested using Spearman's rank correlation coefficient. The most conservative test of the relation between these two variables is carried out by treating them as if they were both ordinal (Andrews, Klem, Davidson, O'Malley, & Rogers, 1981). Like the Pearson coefficient, the rank correlation ranges between -1.00 and +1.00 where -1.00 and +1.00 indicate a perfect linear relation between the ranks of the two variables. As Table 7 shows, a moderate Spearman correlation [rho = .41, p <.001], was found between perceived threat and degree of incapacitation, meaning that the more physically incapacitated women were following the AMI, the more threatened they felt in terms of their future health status and their ability to function as before.

Table 7

Spearman Correlations for Perceived Threat, Degree of Incapacitation and Affect

	PTHRT	INCAP	SEST	STANX	TRANX	CESD
PTHRT	1.00	.41**	-.37**	.61**	.61**	.57**
INCAP		1.00	-.24*	.31**	.22*	.27*
SEST			1.00	-.28*	-.60**	-.56**
STANX				1.00	.76**	.64**
TRANX					1.00	.76**
CESD						1.00

Note: * p < .05, ** p < .01 N = 65

The proposed conceptual model (Fig. 1) had suggested that affective variables, specifically anxiety, depression, and self-esteem might intervene in the relation between degree of incapacitation and perceived threat. This created the possibility that the association found between degree of incapacitation and perceived threat was spurious, in other words the correlation between them resulted solely from the fact that they were both correlated with one or more affective measures. The moderate correlations between both degree of incapacitation and perceived threat and the affective measures, suggested that partial correlation analysis could offer greater precision in understanding the incapacity-threat relation. This analysis was undertaken by first computing a matrix of Pearson product-moment (zero-order) correlations that is presented in Table 8.

Table 8

Pearson Product-Moment Correlations for Perceived Threat Degree of Incapacitation and Affect

	PTHRT	INCAP	SEST	STANX	TRANX	CESD
PTHRT	1.00	.42**	-.33**	.60**	.61**	.53**
INCAP		1.00	-.23*	.35**	.24*	.22*
SEST			1.00	-.24*	-.55**	-.51**
STANX				1.00	.76**	.61**
TRANX					1.00	.68**
CESD						1.00

Note: * p < .05, ** p < .01 N = 65

It was interesting to note that, despite the assumption of normality that underpins the Pearson computation, these correlations were almost identical to the Spearman correlations computed under the assumption of non-normality (Table 7). The partial correlations are based on the Pearson zero-order matrix. From the zero-order matrix, perceived threat and incapacity were found to relate to each other in moderate, positive association and both also related with similar strength to anxiety and depression. These variables were all negatively associated with self-esteem. In other words, the more incapacitated women were as a result of coronary artery disease, the more threatened they felt about their future health status and the more likely they were to experience anxiety and depression.

First, second, and third-order partial correlation coefficients were computed in order to see what would happen to the relation between incapacity and threat when the linear effects of the affective measures were controlled for. The relation was affected most by partialling out state anxiety and self-esteem together, resulting in a weakening of the relation between threat and incapacitation from $r = .42$, $p < .01$ to $r = .25$, $p < .05$.

In summary, statements in support of hypothesis two need some refinement. As expected, when women were confronted by the inescapable evidence of their disrupted physical capacity, fears about their future health status were increased. However, part of the reason why physical limitations may potentiate threat in this way, is because increased anxiety and lowered self-esteem so often attend the body that has been slowed by coronary artery disease, even if only temporarily.

Hypothesis 3: **The relations among self-enhancing beliefs, degree of incapacitation, affective measures, and perceived threat, will be as follows.**

- **a) high levels of self-enhancing beliefs would be associated with low levels of anxiety and depression, and high self-esteem,**
- **b) as degree of incapacitation increased respondents would have higher scores on measures of anxiety and depression and lower scores on self-esteem,**
- **c) respondents who felt highly threatened by the AMI would be more anxious and more depressed than those who felt less threatened.**

The correlations among threat, self-enhancing beliefs, affect, and incapacitation measures are presented in Table 9. As expected, trait anxiety was negatively correlated with overly positive self-view [$r = -.28, p < .05$] and exaggerated control [$r = -.25, p < .05$]. There was no significant relation between these self-enhancing belief measures and state anxiety.

The moderate inverse relation between depression and exaggerated control [$r = -.32, p < .05$] suggested that people who were depressed were less likely to believe that they personally could control illness onset in the future. Unrealistic optimism and self-esteem were, as expected, positively correlated [$r = .30, p < .05$] meaning that women whose self-esteem was higher were more likely to be optimistic about their future health status.

Table 9

Pearson Product-Moment Correlations for Threat, Self-Enhancing Beliefs, Affect, and Incapacitation

	UNOPT	PSELF	EXCNL	STANX	TRANX	SEST	CESD	PTHRT	INCAP
UNOPT	1.00	.01	-.31*	-.16	-.16	.30*	.05	-.22	-.13
PSELF		1.00	.21	-.08	-.28*	.17	-.11	.02	.19
EXCNL			1.00	-.10	-.25*	.23	-.32*	-.01	-.07
STANX				1.00	.76**	-.24*	.61**	.61**	.35**
TRANX					1.00	-.55**	.68**	.61**	.24
SEST						1.00	-.51**	-.33**	-.24
CESD							1.00	.53**	.22
PTHRT								1.00	.42**
INCAP									1.00

Note: * $p < .05$, ** $p < .01$ N = 65

As expected, self-esteem was inversely related to both trait anxiety [r = -.55, p < .01] and state anxiety [r = -.24, p < .05] and also to depression [r = -.51, p < .01]. The relative strength of association between self-esteem and trait anxiety may be a function of both these scales measuring more enduring characteristics. State anxiety, on the other hand, was a measure of the respondent's level of anxiety when asked to think specifically about her heart attack at the time of completing the questionnaire. Given the typical experience of physical and emotional ups and downs during the recovery period after AMI, one would not expect the sort of evenness in state anxiety that might associate it with a more stable characteristic such as self-esteem.

Perceived threat was highly correlated with both state and trait anxiety to the same degree [r = .61, p < .01]. It was also positively correlated with depression [r = .53, p < .01]. Of interest was the finding that degree of incapacitation was not associated with depression; it was however, moderately correlated with state anxiety. These results suggest that degree of incapacity experienced in the present, is less likely to be associated with negative affect in the same way that a more enduring image of adverse future health status is.

The proposed conceptual model (Fig 1) and construction of the third hypothesis suggested that there may be some utility in using measures of self-enhancing beliefs, affect, and degree of incapacitation to predict threat. Correlation simply measured the degree of association between pairs of these variables, while regression would predict a value of threat for each respondent, from all the predictor variables in the equation.

The regression model for predicting perceived threat was as follows:

PTHRT = Bo + B1(UNOPT) + B2(EXCNL) + B3(PSELF) + B4(STANX) + B5(TRANX) + B6(SEST) + B7(CESD) + B8(INCAP)

There were a number of preliminary issues to consider before the regression procedure could be carried out. First, the number of respondents in this study limited the choice of a regression strategy. It eliminated, for example, the possibility of using a stepwise algorithm. While unique in its ability to find the best subset of independent variable predictors, stepwise procedures require a minimum respondent to independent variable ratio of 40:1 (Tabachnick & Fidell, 1989). Standard multiple regression with forced entry of independent variables was, therefore, the model adopted, where the overall inferential test was whether the sample of scores was drawn from a population in which the squared multiple correlation, or R square, was zero. In other words, the proportion of variation in the dependent variable (perceived threat in this case), predictable from the best linear combination of the independent variables, was zero.

Second, correlation analysis had revealed a moderate to strong degree of association between some of the predictors in the regression model. When predictor variables are correlated (collinear), parameter estimates may be unreliable measures of their associated predictors (Younger, 1985). Unreliable or unstable regression coefficients not only measure the effect of their associated predictor, but are confounded with the effects of other predictors related to them. Collinearity assessment was therefore carried out. The approach used was that of Belsley, Kuh, and Welsch (1980). In their recommended analysis, it is necessary to determine whether the correlation between predictor variables would negatively affect the least squares regression solution. The criterion used was that correlations above .85 are of a magnitude that can deleteriously affect the regression results. Because there were no variables in the model that exhibited this strength of relation, it was concluded that the obtained parameter estimates would not be adversely affected by collinearity.

In the regression procedure carried out for this hypothesis, the aim was to assign relative importance to each individual predictor variable. The correlation matrix for self-enhancing beliefs, threat, affect, and incapacitation, indicated moderately strong linear associations between, for example, threat and anxiety, and threat and depression, however how important these were as predictors of threat when considered in conjunction with the other independent variables in the regression equation, was a more difficult question to answer. Any statement about any of the independent variables was contingent upon all the other variables in the equation. To help answer these questions, the part correlation coefficients were obtained. These statistics indicated the correlation between the dependent variable and an independent variable, when the linear effects of the other independent variables have been removed from the independent variable under study. So, for example, in this regression problem, the correlation between perceived threat and depression can be computed while removing from depression the linear effects of self-enhancing beliefs, incapacity, and the remaining affective measures.

To further assist in the assessment of the relative contribution of each independent variable in predicting threat, the R square change was computed as each variable entered the model. This procedure tested the null hypothesis that the population value for the change in R square was zero, as each independent variable was added.

Analysis of standardized residuals was built into the regression procedure. This provided a test of the assumptions of normality and linearity between predicted threat scores and errors of predicted threat. On visual inspection, residuals scatterplots appeared unremarkable, with residuals tending to cluster in the centre of the plots. However the plot for the depression variable looked a little off-balance. It tended to trail to the upper right-hand corner of the plot, suggesting non-linearity. The problem, as is usually the case appeared attributable to some outlying cases. Despite this anomaly, the maximum standardized residual value [zresid = 1.7] was below the level that could exert too great an influence on the regression solution [zresid = 3.0]. In addition, the Mahalanobis distance criterion for deletion of multivariate outliers, evaluated as chi squared with degrees of freedom equal to the number of independent variables in the model, was also within acceptable limits. In this case the limit was Chi Square = < 26.12, p < .001. The maximum distance found in the regression model described, was chi square = 25.0, p < .001. From these screening procedures, it was concluded that the assumptions underlying the regression procedure had not been violated and so the solution could be reported. These data may be found in Table 10 where it is apparent that, contrary to hypothesis, self-enhancing beliefs make no contribution to the prediction of threat. There was no significant change in R square as each was entered into the equation.

Over and above the conclusions drawn from simple correlation, depression is the most important contributor to the prediction of threat. The largest change in R square [.31] occurs when depression is entered into the model. This coefficient provides unique information about threat that is not available from the other variables in the equation. Its part correlation coefficient of .55, evident at entry (step four), diminishes in the presence of anxiety, suggesting that anxiety and depression contribute similarly to the perception of threat. However, neither state nor trait anxiety result in significant R square change. In other words, they make no unique contribution to the prediction of threat, as depression does.

Table 10

Standard Multiple Regression Predicting Perceived Threat

```
           Variable(s) Entered on Step Number 1   UNOPT
     Multiple R               .21
     R Square                 .04          R Square Change          .04
     Adjusted R Square        .03          F Change                3.19
     Standard Error         19.44          Signif F Change          .07

     F = 3.19                   Signif F = .07

                                  Variables in the Equation
Variable           Correl      Part Cor      Partial        F          Sig F
UNOPT              -.21        -.21          -.21          3.19        .07
(Constant)                                                58.18        .00

           Variable(s) Entered on Step Number 2   EXCNTL
     Multiple R               .23
     R Square                 .05          R Square Change          .00
     Adjusted R Square        .02          F Change                 .50
     Standard Error         19.52          Signif F Change          .47

     F = 1.83                   Signif F = .16

                                  Variables in the Equation
Variable           Correl      Part Cor      Partial        F          Sig F
UNOPT              -.21        -.23          -.23          3.66        .06
EXCNTL             -.01        -.08          -.08           .50        .47
(Constant)                                                22.89        .00
```

Table 10 (cont'd)

Variable(s) Entered on Step Number 3 PSELF

Multiple R	.24		
R Square	.05	R Square Change	.00
Adjusted R Square	.01	F Change	.16
Standard Error	19.65	Signif F Change	.68

F = 1.26 Signif F = .29

Variables in the Equation

Variable	Correl	Part Cor	Partial	F	Sig F
UNOPT	-.21	-.23	-.23	3.71	.05
EXCNTL	-.01	-.09	-.09	.61	.43
PSELF	.02	.05	.05	.16	.68
(Constant)				11.93	.00

Variable(s) Entered on Step Number 4 CESD

Multiple R	.60		
R Square	.36	R Square Change	.30
Adjusted R Square	.32	F Change	28.80
Standard Error	16.28	Signif F Change	.00

F = 8.5 Signif F = .00

Variables in the Equation

Variable	Correl	Part Cor	Partial	F	Sig F
UNOPT	-.21	-.21	-.26	4.49	.03
EXCNTL	-.01	.07	.09	.51	.47
PSELF	.02	.07	.09	.58	.44
CESD	.53	.55	.56	28.80	.00
(Constant)				3.30	.07

Table 10 (cont'd)

Variable(s) Entered on Step Number 5 STANX

Multiple R	.67		
R Square	.45	R Square Change	.08
Adjusted R Square	.40	F Change	9.30
Standard Error	15.26	Signif F Change	.00

F = 9.67

Signif F = .00

Variables in the Equation

Variable	Correl	Part Cor	Partial	F	Sig F
UNOPT	-.21	-.14	-.19	2.27	.13
EXCNTL	-.01	.05	.07	.35	.55
PSELF	.02	.08	.11	.81	.37
CESD	.53	.24	.31	6.55	.01
STANX	.60	.29	.36	9.30	.00
(Constant)				.59	.44

Variable(s) Entered on Step Number 6 TRANX

Multiple R	.69		
R Square	.48	R Square Change	.03
Adjusted R Square	.43	F Change	3.93
Standard Error	14.90	Signif F Change	.05

F = 9.12

Signif F = .00

Variables in the Equation

Variable	Correl	Part Cor	Partial	F	Sig F
UNOPT	-.21	-.10	-.13	1.15	.28
EXCNTL	-.01	.08	.12	.84	.36
PSELF	.02	.13	.18	2.16	.14
CESD	.53	.15	.20	2.54	.11
STANX	.60	.12	.17	1.89	.17
TRANX	.61	.18	.25	3.93	.05
(Constant)				.19	.66

Table 10 (cont'd)

Variable(s) Entered on Step Number 7 SEST

Multiple R	.69		
R Square	.48	R Square Change	.00
Adjusted R Square	.42	F Change	.01
Standard Error	15.02	Signif F Change	.90

F = 7.68 Signif F = .00

Variables in the Equation

Variable	Correl	Part Cor	Partial	F	Sig F
UNOPT	-.21	-.09	-.13	1.05	.30
EXCNTL	-.01	.08	.11	.78	.37
PSELF	.02	.13	.19	2.13	.14
CESD	.53	.14	.19	2.27	.13
STANX	.60	.11	.15	1.40	.24
TRANX	.61	.17	.23	3.39	.07
SEST	-.33	.01	.01	.01	.90
(Constant)				.17	.67

Variable(s) Entered on Step Number 8 INCAP

Multiple R	.72		
R Square	.52	R Square Change	.04
Adjusted R Square	.46	F Change	5.18
Standard Error	14.50	Signif F Change	.02

F = 7.87 Signif F = .00

Variables in the Equation

Variable	Correl	Part Cor	Partial	F	Sig F
UNOPT	-.21	-.09	-.13	.99	.32
EXCNTL	-.01	.10	.14	1.22	.27
PSELF	.02	.08	.11	.81	.37
CESD	.53	.15	.22	2.96	.09
STANX	.60	.04	.06	.23	.62
TRANX	.61	.19	.27	4.52	.03
SEST	-.33	.05	.08	.38	.53
INCAP	.42	.20	.29	5.18	.02
(Constant)				.88	.35

In conclusion, there is mixed support for hypothesis three. At best, only moderate associations were found between measures of self-enhancing beliefs and affect. Of particular interest was the lack of association between self-enhancing beliefs and the threat and incapacity measures. Perceived threat, on the other hand, related to all affect measures, particularly trait and state anxiety. Physical incapacity related only to state anxiety, and not to depression and self-esteem as hypothesized. It also related significantly to perceived threat.

Self-enhancing beliefs accounted for none of the variance in the prediction of threat. Depression made the largest, unique contribution to the prediction of threat, accounting for approximately 40% of the variance.

Hypothesis 4: **Self-enhancing beliefs, perceived threat, and degree of incapacitation will each be associated with risk-reduction behaviour in the form of a quadratic relation.**

Risk-reduction behavior was measured in accordance with the five standard components of the prescribed, post-infarction behavioural regimen, namely reducing fats and salt in the diet, following an exercise programme, taking medicines as prescribed, refraining from smoking, and managing stress. The distributions of both health belief and health behaviour variables were significantly negatively skewed and kurtotic. In other words, scores piled up at the positive end of the distributions, and the spread of scores was limited. This indicated women generally followed the suggested therapeutic regimen both at home and in social contexts.

Table 11 presents the Spearman correlations for health behaviours in home and social contexts. As these data show, the same behaviours across contexts tended to be highly correlated, but the five behaviours in the same context were inconsistently associated. This indicated that women were engaging in some, but by no means all of the recommended behaviours that would hopefully optimize heart health.

The original intention in examining the hypothesized quadratic relations between self-enhancing beliefs, threat, incapacitation, and risk-reduction behaviour, was to compute a single index of behaviour for each context, to be used as criterion variables in regression analysis. The feasibility of creating these indices was examined by first comparing each of the five behaviours between contexts, and then looking at the relation among behaviours within each context. Even though many of the distributions for behaviours within and between contexts were of similar shape, it was possible that they did, in fact, differ significantly. These comparisons were undertaken before conducting any of the statistical tests for hypothesis four. As Table 11 shows, the correlation between diet behaviours in the two contexts [$r = .50$, $p < .01$] and exercise in the two contexts [$r = .60$, $p < .01$] suggested that on these two measures only, women's behaviour may have varied sufficiently to warrant separate analyses.

Table 11

Spearman Correlations for Health Behaviours in Home and Social Contexts

	EXERH	SMKH	MEDSH	STRSH	DIETH	EXERS	SMKS	MEDSS	STRSS	DIETS
EXERH	1.00	.22	-.07	.41	.47**	**.60****	.20	.00	.30	.70**
SMKH		1.00	-.02	.20	.40**	.23	**.80****	.10	.00	.40**
MEDSH			1.00	.00	.01	.02	.30	**.70****	-.05	-.04
STRSH				1.00	.33**	.41**	.14	-.02	**.80****	.24
DIETH					1.00	.40**	.30*	.13	.14	**.50****
EXERS						1.00	.22	.03	.32*	.50**
SMKS							1.00	.40**	.10	.40**
MEDSS								1.00	.00	.15
STRSS									1.00	.16
DIETS										1.00

Note: ** $p < .01$, * $p < .05$ N = 65

Paired t-tests were carried out to further investigate the possibility of real behavioural differences in the two contexts. The normality assumption underlies the Student's t distribution therefore, due to the significant negative skew on the behaviour measures, variable transformation was undertaken before the t statistics were computed. Transformation of variables was carried out in accordance with the shape of the skew that characterized their distribution. Taking medicines as prescribed and refraining from smoking were both severely negatively skewed and therefore subjected to reflect and inverse transformation. Distributions for exercise, stress, and diet were only moderately skewed in the negative direction and so were subjected to logarithmic transformation. The t-tests were carried out on these transformed variables. It was found that only dietary behaviour was significantly different (though not markedly) between home and social contexts ($t = 3.57$, $p < .001$). Diet, therefore, was the only behavioural variable to be separated in analysis for home and social contexts. As no mean differences could be found between home and social contexts for smoking, medication, exercise, and stress modification behaviour, these measures were combined and averaged, so a single numeric was obtained for each. These correlations are presented in Table 12.

Transformed variables can be very difficult to interpret. For example, although exercise behaviour scores were easily understood and could be interpreted meaningfully, the logarithm of exercise, in behavioural terms, is somewhat obscure. Out of interest, and in order to see whether transforming the variables made a great difference to the results, the t tests were computed on the behavioural variables before as well as after transformation. Despite the normality assumption underpinning this test, it was striking to see how closely the two sets of t values resembled each other. As an example, for the logarithm of exercise in home and social contexts, $t = 2.38$, $p < .001$; the difference before transforming was $t = 2.29$, $p < .001$. This is not to say that assumptions underlying statistical tests can be violated with impunity, however it does demonstrate how very robust these tests may be to substantial violations of the normality assumption.

Table 12

Spearman Correlations For Behavioural Variables Collapsed Over Context

	SMOKE	MEDS	STRESS	EXER	DIETH	DIETS
SMOKE	1.00	.24*	.08	.21*	.35**	.36**
MEDS		1.00	-.01	.10	.12	.11
STRESS			1.00	.46**	.24*	.21*
EXER				1.00	.44**	.61**
DIETH					1.00	.50**
DIETS						1.00

Note: ** $p < .01$ * $p < .05$ N = 65

As Table 12 shows, the Spearman correlations among the five different behaviours in each context was only low to moderate, suggesting that, following a heart attack, women engaged in some but not necessarily all of the five risk-reduction behaviours. To talk about "life-style" change then, as a collective term, may blur the explanation of risk-reduction behaviour following heart attack. In light of these findings, the derivation of a single index of behaviour was contra-indicated. Worthy of comment is that, from Table 12, it may be seen that taking medicines as prescribed does not correlate significantly with other behaviours. As Table 4 shows, the range for this variable is 3 - 5 with a mean of 4.85; the median is 5. Essentially, there is no variation for this behaviour; almost without exception, all women took their medicines as prescribed in both home and social contexts at six weeks post-infarction. As a result of this severely attenuated distribution, the correlation with other variables is low.

Taking each behaviour separately and, for reasons already discussed, distinguishing between dietary behaviour in home and social contexts only, the curvilinear relations implied by hypothesis four were first assessed by visual inspection of bivariate scatter plots. None of the plots suggested that the quadratic term would significantly improve explanation of relations between variables. To examine this suggestion further, first-order partial correlation analysis was undertaken, in which the quadratic relation was examined while controlling for the linear term for the same variable pair. Table 13 presents these comparisons.

Table 13

Partial Correlation Coefficients for Self-Enhancing Beliefs, Threat, and Incapacitation, and Behaviour (Quadratic Correlations Controlling for Linear Effects)

A. Perceived Threat (PTHRT)

	i) Linear Relation	ii) Quadratic Relation (QPTHRT)	iii) Quadratic Relation Controlling for Linear Term (PTHRT)
SMOKE	-.40**	-.42**	-.18
MEDS	.09	.08	-.10
STRESS	-.32*	-.33**	-.11
EXER	-.23	-.24*	-.05
DIETH	-.27*	-.30*	-.16
DIETS	-.18	-.16	.10

B. Degree of Incapacitation (INCAP)

	i) Linear Relation	ii) Quadratic Relation (QINCAP)	iii) Quadratic Relation Controlling for Linear Term (INCAP)
SMOKE	-.09	-.07	.11
MEDS	-.08	.09	.03
STRESS	-.15	-.16	-.02
EXER	-.26*	-.30*	-.08
DIETH	.06	.08	.10
DIETS	-.10	-.08	.14

C. Unrealistic Optimism (UNOPT)

	i) Linear Relation	ii) Quadratic Relation (QUNOPT)	iii) Quadratic Relation Controlling for Linear Term (UNOPT)
SMOKE	-.02	-.05	-.18
MEDS	-.05	-.03	.11
STRESS	.01	-.02	-.19
EXER	-.03	-.04	-.05
DIETH	.00	.00	-.02
DIETS	.09	.10	-.2

Table 13 (cont'd)

D. Overly Positive Self-View (PSELF)	i) Linear Relation	ii) Quadratic Relation (QPSELF)	iii) Quadratic Relation Controlling for Linear Term (PSELF)
SMOKE	.06	.06	-.04
MEDS	.18	.17	.11
STRESS	.00	.03	.22*
EXER	-.01	.00	.20
DIETH	.09	.09	-.03
DIETS	.13	.13	.04

E. Exaggerated Control (EXCNL)	i) Linear Relation	ii) Quadratic Relation (QEXCNL)	iii) Quadratic Relation Controlling for Linear Term (EXCNL)
SMOKE	.25	.21*	-.14
MEDS	.27*	.26*	.00
STRESS	.15	.13	-.09
EXER	.30*	.30*	-.07
DIETH	.22	.20*	-.06
DIETS	.14	.13	-.02

Note: $^{**}p < .01$ $^{*}p < .05$ N=65

The data presented in Table 13, virtually without exception, failed to support hypothesis four. In other words, the linear components were adequately descriptive of the relations between self-enhancing beliefs, threat, and incapacity and health behaviours. Virtually nothing could be added by trying to capture the curvilinear component. The minor exception was between avoiding stressful situations and overly positive self-view. This weak, positive correlation between the squared term of overly positive self-view and managing stress [$r = .22$, $p < .05$] describes a loose 'C' shaped curve with a forward tilt. In other words, there was a mix of a straight line and a curve that best described the relation between these variables. What this suggested is that, generally, as women's self-view increased they tended to be more likely to manage stress effectively, but only up to a certain point. This adaptive behaviour appeared to drop off where view of self was either very low or very high.

Examination of the correlation coefficients in Table 13 reveals strictly limited associations between the self-enhancing belief measures and behaviour. Neither unrealistic optimism nor overly positive self-view were related to any health behaviours. Exaggerated control was moderately positively correlated with medication practice [$r = .27$, $p < .05$] and exercise [$r = .30$, $p < .05$], meaning that women who believe that future illness onset was under their personal control were more likely to take their medicines as prescribed and follow an exercise programme. Worthy of note is that this belief in personal control over illness events and smoking and dietary behaviour at home, closely approached significance.

With the exception of medication practice, perceived threat and health behaviours were inversely related. These relations were significant between threat and smoking [r = -.40, p < .01], avoiding stress [r = -.32, p < .01], dietary behaviour at home [r = -.30, p < .05], and following an exercise programme [r = -.23, p < .05]. In other words, as perceived threat increased, women's concerns over their future health status and capacity to function as before, lead them to behave in ways that were counter-productive to wellbeing. Fearfulness promoted continued smoking, an inability to avoid stress almost by definition, non-adherence to diet in the home environment, and a reluctance to exercise.

The relation between degree of incapacitation and behaviour was surprisingly limited however, as would be expected, it related negatively to exercise [r = -.30, p < .05]. Obviously, women who were physically more depleted as a result of their heart attack would be less likely to follow their exercise schedules at six weeks post-infarction.

To conclude then, the quadratic relations proposed for hypothesis four between self-enhancing beliefs, threat, incapacitation, and risk-reduction behaviours were not supported. The only minor exception was for overly positive self-view and the avoidance of stress. With regard to women's long-term well-being, perhaps the most important finding was that perception of threat, rather than promoting risk-reduction behaviour, tended to attenuate it. Although theory might predict an optimal level of threat in promoting adaptive behaviour, results from this study have not supported such a proposition.

Hypothesis 5: **Relations between ways of coping and perceived threat, internal locus of control for health outcomes, and beliefs in treatment efficacy will be as follows:**

a) women who feel seriously threatened by the event may exhibit coping efforts that include avoidance, confrontation, and self-control,
b) women who have an internal locus of control regarding health outcomes will evidence ways of coping that include accepting responsibility, planful problem-solving, and positive re-appraisal,
c) women who believe in the efficacy of the treatment regimen will be likely to evidence planful problem-solving and accepting responsibility.

Of the eight dimensions of the Ways of Coping measure, (Folkman & Lazarus, 1988) confrontive coping and escape-avoidance were not normally distributed. The Lilliefors statistic for each was significant; in both cases, the skew was positive indicating that women tended not to engage in these coping strategies. For this reason, correlations between perceived threat and ways of coping were computed using the Spearman rho statistic. These data may be found in Table 14.

Table 14

Spearman Correlations for Perceived Threat, Health Locus of Control, Beliefs in Treatment Efficacy, and Ways of Coping

	SELFCONT	DISTAN	CONFCOP	SOCSUPP	ACCRESP	ESCAVO	PROBSOL	POSREAP
PTHRT	.20	-.00	.10	.12	.24*	.41**	-.04	-.06
EXOTHLC	.21*	.30**	.13	.20	.20*	.10	.09	.17
EXCHLC	.31**	.16	.12	.07	.12	.30**	.15	.03
INTERNLC	.01	.24*	.14	.23*	.12	.03	.21*	.30**
BDIET	-.09	.03	.10	.30**	.06	-.09	.13	.21*
BSMOKE	.05	.03	-.07	.07	-.04	-.18	.10	.12
BEXER	.00	.02	.08	.30**	-.03	-.09	.31**	.50**
BMEDS	.13	.23*	.30**	.50**	.20*	.06	.40**	.40**
BSTRESS	-.01	.10	.05	.30**	-.02	-.13	.24*	.21*

Note: * $p < .05$, ** $p < .01$ N = 65.

The moderate positive correlation between perceived threat and escape-avoidance [r = .41, p < .01] suggests that when people are afraid, they look for distractions from their fears. At the same time however, although to a lesser extent, they also shoulder some responsibility for the stressor and look for ways to rectify the situation. The relation between threat and this latter strategy - accepting responsibility - was r = .24, p < .05. This somewhat contradictory picture seems to imply that, when recovering from heart attack, women may resort to ways of coping that involve both approach and avoidance of the stressor. The strong positive correlation between escape-avoidance and accepting responsibility [r = .70, p, < .01] supports this contention and mirrors Folkman and Lazarus's (1984) conceptualization.

An internal locus of control for health outcomes, as expected, is associated with problem-solving [r = .21, p < .05] and positive reappraisal [r = .30, p < .01]. Surprisingly, it is also positively correlated with distancing as a way of coping [r = .24, p < .05]. In other words, shouldering the responsibility for this particularly serious illness event, may lead to cognitive efforts to downplay its importance.

The social support dimension of the Ways of Coping measure addresses informational support more than the implied notion of support from other people. Social support is moderately positively correlated with an internal locus [r = .23, p < .05]. Not surprisingly, women who have an internal locus for health outcomes are more likely to actively search for the kind of information that will enable them to bring about the wellbeing they seek.

Worthy of note, although not incorporated into the fifth hypothesis, are the associations between the two external loci of control - powerful others and chance - and ways of coping. The locus of control measure for this study was selected because of its incorporation of the powerful other external locus, believed particularly relevant for ill people who, besides their own resolve, rely upon competent health professionals to maintain and enhance their level of wellbeing. Not surprisingly, the external other locus of control (EXOTHLC) was moderately correlated with distancing [$r = .30$, $p < .01$], meaning that the more women placed responsibility for health outcomes with health professionals, the more they cognitively detached themselves from the stressor. Chance, as a locus of control for health outcomes, was significantly related to self-control [$r = .31$, $p < .01$] and escape-avoidance [$r = .30$, $p < .01$]. This suggested that coping strategies promoting lack of personal involvement with the stressor, appealed to women who believed their health status was determined by fate.

As Table 14 shows, the associations between health beliefs and ways of coping are, by and large, as hypothesized. Women who believed in the efficacy of the treatment regimen, particularly following an exercise programme, taking medicines, and avoiding stressful situations, tended to evidence ways of coping that included obtaining information(SOCSUPP), focusing their efforts on looking for ways to manage the stressor (PROBSOL), and attempting to derive some positive meaning from the experience (POSREAP). Belief in the efficacy of a diet low in fat and salt was not as strongly correlated as expected with the more adaptive dimensions of coping. It related most strongly to social support [$r = .30$, $p < .01$] and then to positive reappraisal or deriving positive meaning from the experience [$r = .21$, $p < .05$]. Once again, the apparent contradiction appeared in that distancing was associated with a belief variable that would be expected to promote involvement with, rather than detachment from the process of recovery. Distancing was significantly associated with the belief in taking medicines as prescribed [$r = .23$, $p < .05$]. Possibly, this finding is supportive of the perception that medicines play an independent role in recovery that has nothing to do with the woman herself and her self-discipline in taking them as prescribed.

In summary, hypothesis five, parts a, b, and c, are all generally supported. Women who felt particularly threatened by the heart attack were more likely to engage in coping strategies that permitted them some escape, and hopefully relief from their fears. Those who believed it was their own behaviour that determined health outcomes, as well as those women who believed in the usefulness of the treatment regimen, evidenced the use of engagement-type coping strategies such as gathering information and looking for ways to both manage the problem and derive some positive meaning from it.

Hypothesis 6: **People whose coping efforts included seeking social support, accepting responsibility, planful problem-solving, and positive re-appraisal would be more likely to engage in risk-reduction behaviour than those whose coping efforts included avoidance, confrontation, distancing, and self-control.**

To test this hypothesis, principal components extraction (PCE) was performed on the eight dimensions of the Ways of Coping measure. The goal of PCA is to extract maximum orthogonal variance from the data set, with each succeeding factor.

This analysis, as well as identifying factors, tested whether the dimension matrix was adequately conditioned for factor analysis. To be factorable, the matrix should include at least moderate correlations. As Table 15 shows, with only one exception, between escape-avoidance and problem-solving, pairwise correlations tended to be between r = .5 and r = .7.

Table 15

Pearson Product-Moment Correlations for Ways of Coping Dimensions

	CONFCOP	DISTAN	SELFCONT	SOCSUPP	ACCRESP	ESCAVO	PROBSOL	POSREAP
CONFCOP	1.00	.52**	.63**	.51**	.59**	.61**	.45**	.54**
DISTAN		1.00	.73**	.40**	.65**	.42**	.50**	.61**
SELFCONT			1.00	.38**	.70**	.70**	.50**	.70**
SOCSUPP				1.00	.39**	.26**	.56**	.65**
ACCRESP					1.00	.70**	.41**	.51**
ESCAVO						1.00	.23	.33**
PROBSOL							1.00	.72**
POSREAP								1.00

Note: * p < .05, ** p < .01, N = 65.

Following extraction, rotation was carried out to enhance the interpretability of the solution (Tabachnick & Fidell, 1989). The orthogonal rotation chosen was quartimax, as it assumes two general factors. Theoretically, dimensions of the Ways of Coping measure can be classified into two categories; one that involves engagement with the stressor, and one that involves attempts to disengage. The factor output, factor analysis, and quartimax rotation are presented in Table 16. As is evident from the data, two factors, conforming to the theoretical classification, clearly emerged. The first factor, labelled, 'Engage' combined seeking social support, planful problem-solving, and positive re-appraisal. This factor accounted for 59% of the variance in ways of coping. The second factor, labelled, 'Disengage' combined escape-avoidance, confrontive coping, distancing, accepting responsibility, and self-control; it accounted for 15% of the variance in ways of coping. This means that, overall, women were far more likely to use coping strategies that promoted their involvement with the heart disease and their attempts to manage it, as opposed to resorting to strategies that facilitated their detachment from it. The loading of 'accepting responsibility' into the 'Disengage' factor may seem something of a paradox, but it will be remembered that the correlation between accepting responsibility and, for example, escape-avoidance as ways of coping was $r = .70$, $p, < .01$. As discussed earlier, this seems to imply an approach-avoidance conflict as women attempt to come to terms with the stress of coronary artery disease in the immediate aftermath of the heart attack.

Table 16

Factor Output for Factor Analysis on Ways of Coping Dimensions

Initial Statistics

VARIABLE	COMMUNALITY	FACTOR	EIGENVALUE	%VAR	CUM%
SELFCON	1.00	1	4.71	58.9	59.9
DISTAN	1.00	2	1.20	15.1	74.0
CONFCOP	1.00	3	.65	8.1	82.1
SOCSUPP	1.00	4	.41	5.2	87.3
ACCRESP	1.00	5	.40	5.0	92.3
ESCAVO	1.00	6	.33	4.2	96.5
PROBSOL	1.00	7	.15	1.9	98.5
POSREAP	1.00	8	.12	1.5	100.00

<u>QUARTIMAX ROTATION</u>

QUARTIMAX CONVERGED IN 3 ITERATIONS

ROTATED FACTOR MATRIX

	FACTOR 1	FACTOR 2
SELFCONT	.84	.31
DISTAN	.71	.41
CONFCOP	.75	.25
SOCSUPP	.32	.73
ACCRESP	.83	.20
ESCAVO	.90	-.17
PROBSOL	.31	.80
POSREAP	.43	.83

FACTOR TRANSFORMATION MATRIX

	FACTOR 1	FACTOR 2
FACTOR 1	.84	.54
FACTOR 2	-.54	.84

FACTOR 1 = DISENGAGE

FACTOR 2 = ENGAGE

Having reduced the ways of coping measure to two factors, engage and disengage, their association with health locus of control and health beliefs was reviewed. These correlations, to be found in Table 17, confirmed and clarified the findings reported earlier between these variables and ways of coping dimensions. As hypothesized, the engage factor was significantly correlated with an internal locus of control and with beliefs in the efficacy of all risk-reduction behaviours. The disengage factor, on the other hand, was associated with perception of threat and both external dimensions of the health locus of control measure.

Table 17

Pearson Correlation Coefficients for Ways of Coping Factors, Perceived Threat, Health Locus of Control and Health Beliefs

	FACTOR 1 ENGAGE	FACTOR 2 DISENGAGE
PTHRT	.03	.30*
INTERNLC	.23*	.04
EXOTHLC	.15	.30*
EXCHLC	.07	.34*
BDIET	.28*	.00
BEXER	.32*	-.14
BMEDS	.42**	.07
BSTRS	.30*	-.11
BSMKG	.25*	-.05

Note: ** $p < .01$ * $p < .05$ N = 65

Finally, the association of ways of coping factors with risk-reduction behaviour was examined. Table 18 presents these data that partially confirm the sixth hypothesis. Observing dietary restrictions in a social situation, taking medicines as prescribed, and following an exercise programme were all significantly positively correlated with the engage factor for ways of coping. In other words, women whose coping strategies include obtaining information (SOCSUPP), focusing their efforts on looking for ways to manage the stressor (PROBSOL), and attempting to derive some positive meaning from the experience (POSREAP) are more likely to engage in risk-reduction behaviours than those whose ways of coping include distancing, escape-avoidance, self-control, confrontive coping, and accepting responsibility.

Table 18

Pearson Correlations for Ways of Coping and Risk Reduction Behaviour

	FACTOR 1 ENGAGE	FACTOR 2 DISENGAGE
DIETH	.17	-.08
DIETS	.30*	.19
SMKG	.17	-.08
EXER	.30*	-.02
MEDS	.30*	.11
STRS	.11	-.19

Note: ** $p < .01$ * $p < .05$ N = 65

To summarize, the results from testing hypotheses five and six, when taken together, support many of the propositions of the conceptual model. Women who are most likely to engage in risk-reduction behaviours following heart attack, are those with an internal locus of control for health outcomes and a belief in the efficacy of the treatment regimen. These beliefs are associated with coping strategies that promote involvement with, as opposed to detachment from the stressor. These ways of coping have been shown to be associated with health behaviours that are likely to optimize heart health.

DISCUSSION

DISCUSSION

Summary

The primary goal of this enquiry was to describe and explain the role of self-serving biases in information-processing, in women who had suffered a first heart attack and who had been advised to alter their behaviour - sometimes radically - so as to reduce their risk of further morbidity and mortality. Women were selected as the study sample because they had been seriously under-represented in clinical cardiac research investigating primary and secondary prevention, and also because of the alarming increase in their rate of coronary artery disease.

As with any acute-onset, life threatening illness, immediate treatment by skilled practitioners is critical to survival. But over the long-term, the attainment of optimal heart health requires patients to play an active role in their own treatment, by attempting to modify the risk factors that are associated with their disease. For people who have suffered heart attacks, lowering of blood pressure and blood cholesterol by altering diet and exercise habits, taking medication as prescribed, and refraining from smoking, significantly reduce the likelihood of further morbidity and mortality. Of concern is the finding, among male samples at least, that once out of immediate danger, a surprisingly small number make any attempt to promote their own health by altering high risk behaviour. For those who do make some life-style changes in the short-term, most have reverted to pre-illness patterns of behaviour within the first year. Different explanations have been advanced for this so-called 'non-compliant' behaviour, including the nature of the relationship between patient and provider and the patient's beliefs about the illness. These explanations have gathered only limited supporting evidence. The present study sought to examine patients' beliefs, not about their care-givers or about their illnesses, but about themselves. Specifically, despite the severity of their medical condition, could they use self-enhancing cognitive strategies to modify their perception of risk and consequently, dissuade themselves of the need for behavioural change.

For more than a decade, social psychologists had been challenging the traditional view that the capacity to perceive reality accurately - "as it really is", as Jourard and Landsman (1980) put it - was an essential characteristic of the mentally healthy person. A great deal of research had shown that the ability to distort reality in a favourable direction was a precious human attribute that could be highly adaptive. Self-enhancing beliefs, or illusions as they are often referred to, have been found to promote emotional wellbeing, particularly under conditions of threat, not least because they provide people with the opportunity to soften their perception of the fearful circumstances in which they find themselves. So the capacity to translate life events into a less threatening form may have significant adaptive value, in that it may help preserve emotional equilibrium at times when chaos threatens to overwhelm.

In research with victimized populations three self-serving biases had consistently emerged, shaping people's views of themselves, their circumstances, and their futures. Taken together, these biases labelled overly-positive self-view, exaggerated perceptions of personal control, and unrealistic optimism may be protective in that they can prevent victims from becoming psychologically disabled in the face of adversity; in the present case, for example, when confronted by the fear of heart disease and its implications for the future. A major concern though, was whether, in the extreme - at both high and low levels - self-enhancing biases could discourage heart attack survivors from acting to reduce risk. The possibility that the cognitive re-structuring of events by women during recovery, could lead to further harm, was the focus of this study and the core idea around which the conceptual model guiding the research was developed.

Against this backdrop, what was important to a careful analysis of the role of self-enhancing beliefs in health-promotion behaviour, was an assessment of whether or not these three biases should be conceptualized as a single construct of self-enhancement for women suffering from heart disease, or whether they were more accurately described as separate dimensions requiring separate analyses and interpretation. Research on the benefits of self-enhancing beliefs in adaptation to threat had suggested that they co-exist. In other words, despite adversity, healthy psychological functioning could be maintained by a self-serving tendency in information processing that involved the simultaneuos existence of all three beliefs in the person's self-schemata.

Once the dimensionality issue had been settled, subsequent questions could be addressed. First, were self-enhancing beliefs helpful in explaining variation in ways of coping and risk-reduction behaviour? Second, was there a quadratic relation between self-enhancing beliefs and risk-reduction behaviour? In other words, were low and high scores on self-enhancement variables associated with behaviour that would promote, rather than reduce risk and if so, could this be explained by the degree to which the heart attack was perceived as threatening? Was there an optimal degree of self-enhancement that not only promoted psychological well-being, as Baumeister (1989) suggested, but also facilitated the sort of behaviour that would reduce the likelihood of further morbidity?

These questions prompted the development of a conceptual model that framed the hypotheses under study. Results lend support to parts of the model but not others. For example, an important thread was found that linked perceived threat to ways of coping and health behaviours. In addition, an internal locus of control and beliefs in treatment efficacy were associated with ways of coping that would be likely to promote rather than hamper engagement with the challenge of heart disease, and resulted in the carrying out of certain behaviours believed to reduce risk. These findings confirmed many of the proposed conceptual relations. Contrary to expectation however, self-enhancing beliefs contributed very little to the final model. Neither optimism, nor control, nor positive self-view was associated with either threat or ways of coping, however, a direct relation was found between personal control and taking medicines and following an exercise programme. In addition, women who believed in personal control over future illness onset, were less depressed and less anxious than those who doubted such control. These findings, in part replicate Taylor, Lichtman, and Wood's (1984) for the adaptive role of personal control in recovery from breast cancer. However the personal control expressed by heart attack survivors is not exaggerated, as it has been found to be for breast cancer patients. This raises the question as to whether the relatively unimportant role identified for self-serving biases in this sample, was disease-specific. This will be discussed at length later in this section as well as in the discussion of qualitative results.

Before going on to discuss the implications of the findings in greater detail, the reader is asked to bear in mind a major limitation of this study, namely that data were gathered from women at six to eight weeks post-infarction only. This time-phase was chosen because, as the first of what will hopefully be a series of studies of self-serving bias, health behaviour, and heart disease, it was important to obtain base-line data on these variables at the time when women were just beginning to embark on their lives after heart attack. Subsequent study will aim to repeat these measures at six, twelve, and twenty-four months after heart attack, to determine whether factors associated with behaviour do change as the event becomes more distant in the personal history of survivors.

In the interests of clarity, the following discussion will be framed around each hypothesis, and will relate findings to the configuration of the proposed conceptual model in contrast to its final form.

Hypothesis 1: **There will be an inverse relation between self-enhancing beliefs and perceived threat.**

Support could not be found for a self-serving bias in women's beliefs about whether or not they would suffer from a variety of illnesses in the future, or their beliefs in the degree to which they personally had control over future illness onset. In both cases, the mean was roughly at the midpoint of the scale. Positive self-view was also normally distributed, but the mean score was above the mid-point, indicating that women generally believed themselves to be in possession of many of the attributes that facilitated coping, such as being organized, self-disciplined, attentive, motivated, and determined. Although these measures of central tendency suggest a bias in positive self-view, having had considerable contact with all of the women who took part in the study, this researcher would be reluctant to describe the claiming of these attributes as 'biased' in their own favour. Their demeanour generally evidenced these characteristics and they were also audibly apparent in women's description of their lives and the challenges they had previously faced and managed. In light of these findings, the remainder of the discussion will refer to these beliefs simply as positive self-view, optimism, and personal control over illness onset.

In view of their relation to one-another, these beliefs could not be described as a single construct of self-enhancement. Even when personal control and optimism were further categorized according to disease type, the strength of association between them did not warrant their grouping as a single measure.

The moderate, inverse correlation between scores on optimism and personal control over illness onset scales is worthy of note. This indicated that a belief in future good health was associated with a belief that disease onset, should it occur in the future, was not under personal control. In other words, women may have attributed future illness outcomes to loci other than self. When these two variables were further categorized according to disease-type, the correlation between them strengthened for cardiovascular illness only. So women who did not believe that they would suffer from other cardiovascular illnesses in the future, also believed that cardiovascular disease onset, should it occur, was not under personal control. This may have implied that women believed their health, but not their illness was under personal control. In other words, attributing positive outcomes to self and negative outcomes to others may help to sustain an image of self that is concordant with a belief in one's own efficacy (Bandura, 1986). Future study would attempt to clarify this speculation.

In relation to the conceptual model, the connection between self-enhancing beliefs and perceived threat was not supported. Neither quantitative nor qualitative methods provided evidence that self-serving biases were utilized as a means of diminishing the perception of the heart attack as threatening. On the contrary, as the qualitative analysis in particular will show, women's appraisal of threat was very realistic and served as an important motivator in promoting risk-reduction behaviour. These findings are in contrast to a good deal of research that clearly demonstrates the importance of these biases for individuals coping with other illnesses, such as spinal cord injury (e.g., Bulman & Wortman, 1977) and cancer (Taylor, et al., 1984). It must be remembered however, that previous research had not examined a potential relation between self-enhancing beliefs and health promotion behaviour, but rather with self-enhancing belief and psychological adaptation only.

As will be emphasized during various parts of this discussion, there are unique characteristics of coronary artery disease, as well as the time chosen for data collection in this study, that might result in findings for self-enhancing beliefs that differ from those of previous studies. The sudden onset of the illness and the profound experience of vulnerability, the possibility of an excellent recovery, and the now-established knowledge of possible causal factors, set coronary artery disease apart from other illnesses in which self-serving biases have been found to play an adaptive role. If women are going to optimize their chances of recovery from this disease, they can not afford to distort reality, rather they must see the heart attack as a significant threat worthy of investment, committment, and challenge. It is with this structuring of events that their behaviours are more likely to be of a risk-reduction sort. A problem could arise though, for women who recovered well and who were symptom-free months after the heart attack. This is where time of data collection could have been problematic in this study. No symptoms and a level of well-being that, in some cases, would exceed pre-infarction wellness has not been achieved by eight weeks after the heart attack. If this 'desirable' state of affairs should come about, it could foster or re-kindle the sense of invulnerability that might have contributed to high-risk behaviour in the first place.

There was evidence, though it was casually observed rather than formally measured, that self-serving biases were operative before the heart attack. In the process of meeting potential respondents in hospital to invite them into the study, it was striking how many of them said to the investigator, "I never thought this would happen to me". This statement could have reflected the popular myth that heart attacks only happen to middle-aged men. On the other hand, it might have described the pre-morbid perception of invulnerability that Janoff-Bulman (1989) referred to. Until people are confronted by aversive events, they have a tendency to over-estimate the likelihood of experiencing positive events and under-estimate the likelihood of experiencing negative ones. Presumably, if people believe that harm will not befall them, it makes little sense to engage in effortful, evasive action. In other words, we do not act to prevent something we believe will not happen. Despite these fundamental assumptions of personal safety, so common in Western culture, primary prevention programmes, carried out with asymptomatic women, both with and without family histories of heart disease, need to directly address this belief in invulnerability and modify, though gently, its intractability.

<u>Hypothesis 2</u>: **There will be a positive relation between degree of incapacitation and perceived threat.**

There is a great deal of evidence in the literature, both empirical and biographical, that when physical capacity is disrupted, people feel afraid. Their fears, as Charmaz's (1983) landmark study found, relate to matters surrounding worsening health, loss of independence, and social isolation. The results found here for women with heart disease, replicate Charmaz's (1983) findings for patients suffering from a variety of illnesses. The moderately strong association between incapacity and threat in this sample, would suggest their importance in the recovery process. Their relative association with affective measures is also of interest, but this will be discussed under the third hypothesis, where the finding has the greater relevance. At six to eight weeks post-infarction, physical capacity is still limited, sometimes quite severely, although many patients are aware of increasing improvement. Subsequent study, carried out later in time after the heart attack, would anticipate a change in relation between these variables, specifically as physical capacity lessened or increased, perceived threat would wax and wane accordingly.

The normal distribution on the perceived threat measure, with the mean score being very close to the mid-point, was unexpected. Previous research with male heart attack survivors (e.g., Waltz, Badura, Pfaff, & Schott, 1988) registered uniformly high scores at two weeks post-infarction, that only diminished slowly over a four year period. The measures of central tendency for this sample indicated that women were not overly threatened by, for example, the prospect of never attaining their pre-illness level of functioning, losing their independence, or having to give up previously valued life goals. Given their experience and their expressed concerns over what the future might (or might not) hold for them, it had seemed inevitable to the researcher, during the data collection phase, that threat scores would pile up at the high end of the distribution. When they did not, the possibility of a real gender difference arose, wherein women, as some have suggested (e.g., Carter & McGoldrick, 1989) are more resigned than their male counterparts to the prospect of illness, however it was beyond the scope of this study to make any such statement. Certainly, there was no evidence that women utilized self-serving biases to soften any perception of threat, had it existed, so this finding was of particular interest.

With the exception of health behaviour, perceived threat was the only one for which the quantitative and qualitative results were different. The mid-point mean found on this 18 item self-report measure was by no means reflected during discussions with respondents either before or after they completed surveys. Nor was it apparent in interviews with women who were randomly selected to provide this additional source of data. The vast majority of women were quite open about the extent to which they were afraid; some admitted to being terrified. Two women described how they had gone back to emergency, one of them on three separate occasions, afraid that the slightest twinge may have meant impending death.

Perhaps a word of clarification is indicated here. Usually, researchers in psychology do not enter into discussions with 'subjects' prior to obtaining survey data, because there is a justifiable concern that such conversations may bias results. In this case, conformity to such a model would be impossible, some would say unethical given the nature of the research and the vulnerability of the respondents. When respondents were first met by the investigator in hospital, most of them (and sometimes their families) were eager to talk about their circumstances. During these discussions, women often expressed fears about what would happen after leaving hospital, and what the recovery period would be like, and whether they would be able to go back to leading their pre-illness lives. They talked about their experiences before the heart attack and many alluded to their attributional search. The researcher was careful not to enter into detailed discussions about the exact nature of the conceptual model under study, but when patients asked questions about the research, they were answered as truthfully as possible; there was never any attempt to mislead.

It is impossible to say whether these conversations biased data that were obtained six to eight weeks later. If Jourard (1951) was right, then those conversations were very important in the collection of valid data, because the data were gathered from within the context of a relationship that gradually developed between respondent and researcher. He believed strongly that this mutual unveiling was integral to the sort of self-disclosure that would allow psychologists to better understand behaviour, a position later supported by Gergen (1985).

How then, can the disparity in the findings from the two methods be merged? Can they be considered complementary, as is the goal of triangulation, or are they as rival as they appear? After spending many hours in the company of the women studied, it would be quite absurd to conclude that they were not, in general, threatened by the illness and its sequela, that they were not significantly worried about further illness, or isolation, or loss of independence, or death. Clearly they were and often to a great degree, but for some reason, this degree of threat was not reflected in scores on the Primary Appraisal Scale (Waltz, Badura, Pfaff, & Schott, 1988). The reader may wish to refer to the scale in Appendix A. Examination of the items reveals that they undoubtedly have the capacity to arouse the tensions of people who have recently experienced a heart attack. Although not as evident to the investigator at the beginning of this research, having learned about the experiences of heart attack survivors and their concerns for their future safety, it is now clear that respondents could have experienced considerable stress while completing the perceived threat measure. It is interesting to note that it was this particular scale that caused the greatest concern to members of the examining committee for this dissertation, and as a result led to them insisting that the researcher carry a paging device at all times, so she could be contacted by any respondent who might experience an adverse emotional reaction while completing the measures. Of particular concern was the potential for psychological harm that could occur if respondents completed the perceived threat measure while they were alone.

Two points are noteworthy here. First, all respondents in this study had been advised to modify the stress in their lives, because of its purported role in the development of their heart disease. Due to the potential for an increase in levels of stress, patients are counselled that they should try not to worry unduly over the sorts of things appearing on this questionnaire, such as loss of independence, worsening of health, or leading a restricted life. Second, although this was not included as a measure in this study, when attributing causality for their heart attacks, most women cited stress as the villain. But in general, they were at a loss as to how to manage it effectively, so ubiquitous was it in their lives.

In consideration of these issues, it seems not unreasonable to suggest that downplaying the significance of the worries itemized on this measure, might have represented an active attempt on the part of these women to practice stress management. So why, in conversation, would they do the opposite, and generally admit to feeling very worried and concerned in contemplation of the future? Perhaps because the two data gathering techniques impose significantly different experiences upon respondents, and these differences may really matter when people are afraid or suffering. Survey instruments, as reported to the investigator, were usually completed when the respondents were alone. This stands to reason, as completion of the questionnaires requires the sort of concentration that may best be found when other distractions are absent. But time alone can be problematic. Women described how it could be that at these times that their worries over their wellbeing would be greatest. In other words, being alone in and of itself, as volumes of social support data confirm, could be stressful. In this context, softening the perception of threat may be very adaptive. And this leads to the speculation as to whether self-serving biases might have been selectively utilized, when responding to a self-report measure that had the capacity, in and of itself, to increase the perception of threat. Any attempt to quantify threat in future studies of this sort should take this potential problem of measurement carefully into account. As Murphy (1987) noted, people who are incapacitated and feeling particularly vulnerable, find ways that allow them some time off from their most frightening thoughts.

Contrast this with the contemplation of fears and worries in the company of another whose presence may be reassuring. In the right circumstances, this can provide a much needed opportunity to acknowledge fear, examine its extent, and reduce its potency. In addition, in the context of a severely restricted health care system, particularly in the community, after discharge from hospital patients may have almost no contact from any provider of care, unless they suffer further illness. Women described how they felt cut adrift from supportive structures, once out of hospital. Their need for conversation with professionals was striking, and openly stated. The experience of the researcher in this study was that, with very few exceptions, women were most eager to discuss all aspects of their illness, and in the process, actively sought clarification and reassurance. All those who were invited to take part in interviews readily agreed and all twelve interviewees stated repeatedly that they found talking over their concerns, very helpful.

From all of this, it seemed reasonable to conclude that it was the difference in the data gathering processes, between quantitative and qualitative methods, that resulted in the difference in findings, where in the former instance threat was normally distributed, while in the latter, it was consistently high. It can not be emphasized strongly enough, that the intention here is not to deride quantitative measurement, however when it comes to human suffering, numbers alone and the way in which they are gathered, may not adequately plumb the depths. Furthermore, numbers may mislead. Arthur Kleinman's (1988) entreaty to social scientists springs to mind, wherein he urged that they not attempt to measure suffering by self-report measures alone, because of the "distorted and whittled-down image" that could result.

Although different conclusions with different implications were drawn when perceived threat was assessed by the two methods, there were many findings of interest in the pattern of relations between threat and other measures that were supportive of hypotheses.

Hypothesis 3a: **High levels of self-enhancing beliefs will be associated with low levels of anxiety and depression and high self-esteem.**

Once again, little justification could be found for retaining self-enhancing beliefs in the explanation of risk-reduction behaviour in women who had suffered heart attacks. The association between both optimism and positive self-view and the affective measures was very limited. In contrast with those whose self-esteem was low, women with high self-esteem were more likely to believe that they would not suffer further illness in the future and women with positive self-views evidenced significantly less trait anxiety than those whose self-views were less positive. At best, these associations can be considered rather tenuous. Possibly, this finding is also illness-specific in that given the purported controllability of risk factors for heart disease, what enhances women's emotional wellbeing is not a softening of the reality that confronts them, but a realistic appraisal of it.

In consideration of affect, personal control over illness onset appeared more important during the recovery period. It has long been recognized that positive affect is more likely to be experienced by people who have an inflated sense of personal control, particularly in aversive situations (e.g., Abramson & Alloy, 1981; Thompson, 1981). In her theory of cognitive adaptation to threat, Taylor (1983) argued for the benefits of self-serving biases, in terms of their capacity to preserve emotional well-being. With Lichtman and Wood (1984), she identified an important role for exaggerated personal control in women suffering from breast cancer, despite the fact that women both then and now have virtually no control over this disease, because factors that release the genetic predisposition, are still unknown.

As stated previously, data from this sample had not revealed that women generally had an above-average belief in personal control over future illness onset. This study found a generally weak inverse relation between personal control and both depression and trait anxiety. In other words a belief in control over future illness onset was associated in small degree with lower levels of depression and trait anxiety. Personal control was not related to either state anxiety or self-esteem. Taken together, these findings implied that women could hold a belief in only limited as opposed to exaggerated personal control over future illness onset, yet this did not appear to adversely affect their psychological wellbeing. A plausible explanation for these contrasting findings is that with heart disease, morbidity is believed to be controllable to a significant degree, both by patients' efforts and by practitioners' competence. This has largely to do with the fact that cardiovascular risk factors are much better recognized and the means for controlling them are better understood and more readily available. This was not the case with breast cancer when Taylor (1984) and colleagues conducted their study, nor indeed, is it the case now.

Health locus of control data were somewhat helpful in attempting to clarify the relation between a belief in limited personal control over future illness and a general absence of negative affect. It will be remembered that the locus of control scale selected for use in this study was considered especially appropriate because of its second external dimension, namely powerful others. In the examination of health-related behaviours after a life-threatening illness, it seemed essential to assess the degree to which powerful others, notably physicians, influenced respondent's beliefs about where the responsibility for health outcomes was located. The moderate positive correlation between internal and external (powerful others) locus of control ($r = .33, p < .05$) suggested that these women tended to draw on two sources of reinforcement for health outcomes - themselves and their caregivers. In comparison to chance as the locus of control, both of these dimensions were associated with less anxiety and depression, and higher levels of self-esteem. Women who believed that chance determined health outcomes, also experienced considerable threat ($r = .36, p < .01$), whereas threat was not associated with either internal locus of control or external locus of control (powerful others). So the potentially negative affective consequences of a limited sense of personal control over future illness, may be offset by a belief in shared responsibility for future wellbeing.

To elaborate, the experience of a life-threatening illness that strikes suddenly, leaves victims well aware of the importance of competent practitioners. From the moment the first acute symptoms are experienced, the 'powerful others' in this frightening episode are quickly recognized as critical to survival. Ambulance personnel, emergency room and intensive care unit staff, and specialists in clinical cardiology are often vividly remembered by patients and families, both for their capacity to respond effectively to crisis and for their efficiency in bringing an overwhelming situation under control. At what can feel like the most vulnerable moment in life, provided they remain conscious, patients witness the incredibly powerful role that medicine can play, in both their immediate survival and in their future wellbeing. Based on these experiences, it would be expected that when they contemplate their future health, women believe it depends not only upon their own efforts, as they are told repeatedly, but also upon the assistance they receive from competent others. So, if personal control has to be given up to some degree, as it does by those who depend on the expertise of professionals, provided it is surrendered to those upon whom one feels one can rely, then it seems less likely to result in negative emotional consequences.

This discussion of the findings for personal control over illness onset would not be complete without the consideration of a potential confound that existed in this study in the measurement of personal control as a self-enhancing bias. With the exception of patients who are so severely compromised by the extent of myocardial damage that no amount of personal effort can reduce it, following a heart attack, rehabilitation efforts do attempt to convince patients of the controllability of coronary artery disease. This message conforms to one of the primary strategies outlined in

Health and Welfare Canada's (1986) white paper, Achieving Health for All, later echoed in the Canadian Heart Health Initiative (Health & Welfare Canada, 1992), namely that men and women be encouraged to assert control over the modifiable risk factors that affect their heart health.

So in future studies it would be necessary to measure whether or not patients actually believe that coronary artery disease risk factors such as hyperlipidaemia and stress are controllable by any means, and second, if they believe that risk factors are controllable, to what extent do they believe in their own capacity to bring them under control. These are two related but logically distinct questions from the one measuring the bias that asked, "Compared to other women of the same age as yourself who have also suffered a heart attack, to what extent do you believe that you personally have control over whether or not the following illnesses will trouble you at some time in the future". In summary, given the approach this study has taken to the measurement of personal control, it is impossible to make any definitive statement about the role of personal control as a self-enhancing bias.

Hypotheses 3b and 3c: **As degree of incapacitation increases, respondents will be more anxious and depressed and evidence low levels of self-esteem. Those who were more threatened by the AMI would be more anxious and more depressed than those who felt less threatened.**

Although perceived threat and degree of incapacitation were, as expected, associated with one another, the difference in their strength of association with the affective measures was worthy of note. This pattern was also evident in narrative form. A disruption in physical activity, although frustrating at six to eight weeks post-infarction, had fewer adverse affective consequences than did the contemplation of future ill-health, as measured by the perceived threat instrument. This pattern among the correlations for threat, incapacity, and affect seemed to imply that the present-future distinction between incapacity and threat represented an important issue for women's emotional health in the period of recovery.

It will be remembered that the perceived threat measure addressed women's beliefs as to how they expected to be able to function in the future. The questions, broadly categorized, addressed concerns over further physical illness, leading a restricted life, experiencing isolation, and becoming dependent. According to Charmaz (1983), these potential consequences of chronic illness can contribute to a loss of self, and it is this loss of self that is the most fundamental form of suffering experienced by chronically ill people. The incapacity measure, on the other hand, focused exclusively on the here and now, in terms of what women's perceptions were of what they could accomplish physically at the time of data collection. At six to eight weeks post-infarction there is often marked day-to-day fluctuation in physical capacity and while this can be discouraging on the poorer days, evidence is drawn from the experience of better days that physical ability might improve. Women who are depressed are far more likely to feel threatened by the prospect of further incapacitation. Women who are anxious or who suffer from low self-esteem are also worried about future harm, but not to the same extent as those who are depressed. The affective consequences of the prospect of future disability, so it appears, are more severe than the affective consequences of physical disability in the here and now. This applies to depression in particular, but also to anxiety, and self-esteem. The implication of this is that attention needs to be paid to images of future functioning as they are developing, as they will be influenced, perhaps distorted, by women's emotional status in the here and now. Conceptually then, affective measures, particularly depression but also anxiety and self-esteem, contributed to the understanding of the relation between perceived threat and degree of incapacitation and they should all, therefore, be incorporated into further study.

Hypothesis 4: **Self-enhancing beliefs, perceived threat, and degree of incapacitation will each be associated with risk-reduction behaviour in the form of a quadratic relation.**

Neither optimism nor positive self-view bore any relation to behaviour, so further justification was found for deleting them from the conceptual model. Personal control, on the other hand, was directly related to two risk-reduction behaviours, namely taking medicines as prescribed and following an exercise programme. This was different from the configuration of the proposed conceptual model, where it was suggested that the relation between self-enhancing beliefs and risk-reduction behaviour was mediated by the perception of the heart attack as threatening. Worthy of note is the finding that the relations between personal control over illness onset and refraining from smoking, and dietary behaviour at home were very close to significance. Despite this failure to reach conventionally significant levels of association for more than two of the behaviours studied, the contribution to the model of personal control over illness onset should not be considered minimal at this stage of the research. Had alpha been set at .06 personal control would have been significantly associated with four out of the six health behaviours measured. These data ought to be taken seriously in early research in any area, when it is a ground that is being sought for a set of variables, as well as replication and extension of previous findings.

Of the three self-serving biases studied, it is interesting that control over future illness onset was the one that related most closely to behaviour. It would be expected that women who believed they could control future illness onset, would engage in the behaviours that they had been taught would promote that control. However, because of the potential confound, described earlier in the measurement of personal control, it is impossible to assess whether it was a self-enhancing bias that promoted this risk-reduction behaviour as opposed to a belief in the sense of control over cardiovascular illness, conveyed to women by their caregivers. Other than this linear relation between personal control and some risk-reduction behaviours, no consistent evidence could be found for the hypothesized quadratic relation between self-enhancing beliefs and behaviour.

The quantitative analysis of threat and risk-reduction behaviour provided no support for an optimum level of threat, however the relation between perceived threat and risk-reduction behaviour, as depicted in the conceptual model, was of considerable interest. Possibly one of the most important and surprising findings of the quantitative enquiry was that the more threatened women were by heart disease, the less likely they were to engage in risk-reduction behaviour. Perception of threat was associated with smoking, not following diet, and almost by definition, promoted involvement with, as opposed to avoidance of stress. An inverse relation between threat and following an exercise programme, closely approached significance. It seemed then those women who were threatened by a belief in a bleak future, characterized by a worsening of health, a restricted life, and a growing dependence, cast caution to the wind, and tried to derive whatever pleasure may still have been available for them in the life-style habits that the medical profession had urged them to eschew. Fear by definition, denoted the existence of stress, it also promoted smoking, disregard for diet, and a tendency toward inactivity.

The quadratic relation that had been hypothesized between perceived threat and risk-reduction behaviour had not been confirmed, however the relation obtained between threat and behaviour lent support to part of the hypothesized quadratic curve. It will be remembered that in hypothesizing a curvilinear relation between perceived threat and risk-reduction behaviour, the proposition was that at both high and low levels of threat, behaving in such a way as to reduce risk would be less likely. For example, low threat might have prompted women to believe that there was no real need to modify behaviour as they were not in any jeopardy. High threat may have also had the same behavioural consequences, but for different reasons. Women with this perception may have believed that their future was so bleak that nothing they could do would alter it, so why bother with these difficult behavioural demands. Results did not confirm this curve in its entirety however, although there was no evidence for low threat and disregard of the therapeutic regimen, higher threat scores were inversely related to risk-reduction behaviour. So as hypothesized, women who were sufficiently afraid may have subscribed to the view that, since the worst would befall them anyway, they may as well do as they wish in the here and now and obtain whatever comfort they could. Alternatively, they may have continued to engage in behaviours that they had often used to reduce stress, such as smoking and eating a comforting though treacherous diet - at least in the confines of their own homes - in the hope that these time-honoured strategies would serve to ease their tensions at a time when they were badly needed.

Exercise turned out to be a thorny and complex issue for many women, although at the outset of this study its relation to threat had not occurred to the researcher. Insights into the beliefs that affected their engagement with this component of the therapeutic regimen, were obtained from discussions with women who were referred for stress tests. These tests are designed to measure the extent of damage to the myocardium and resultant impairment. Patients walk on a treadmill to the limit of their endurance and are encouraged to continue until they experience discomfort, especially in the chest or legs. This is often a frightening and unpleasant experience. Many women reported that they refused to continue, not because they lacked the stamina, but because they were so afraid that they would have another heart attack. Their belief that the test would damage the heart further is not difficult to fathom - it makes perfect sense. While they are on the treadmill, people do experience many of the symptoms that occurred during the infarction, such as palpitations, breathlessness, chest discomfort, and sweating. Exerting their damaged hearts to this extent seemed anathema to a lot of women and they reacted fearfully to the recommendation. The intense focus on the activity of the heart is inevitable after a heart attack, and any disruption in cardiac rhythm can be very frightening. Both the stress test and even gentle exercise bring about an alteration in rhythm that can feel like something untoward is about to happen. In short, women were often not convinced of the benefits of exercise, not least because of the physical sensations that accompanied it. Those who felt particularly threatened may have believed that not exercising was a way of taking care of an already damaged heart; only future study can answer this. Besides shedding doubt on the reliability of findings from stress tests, these observations highlighted the importance of differentiating for patients between therapeutic and pathologic cardiac activity.

In general then, quantitative findings indicated that perceived threat was not conducive to health-promotion behaviour. The main exception was for taking medications. This behaviour was undertaken, virtually without exception and was carried out independently of women's scores on other variables. The role of threat in explaining risk-reduction behaviour appears quite central and would certainly be retained in continued refinements of the conceptual model. The problem though is that, as described previously, quantitative and qualitative methods have generated contrasting, though not irreconcilable findings. In the former instance, the more women feel threatened by their future health status, the less likely they are to behave in such a way as to promote their wellbeing. Qualitative data however, revealed that women identified the importance of threat in their commitment to life-style change. They expressed their worry that, in the absence of fear, they might not be as conscientious in following a treatment plan that was designed to reduce risk. However, despite their recognition of the importance of threat and their fears for their future health, women's risk-reduction behaviour was still found to be inconsistent. In other words, although the two data gathering techniques found different levels of threat in a general sense, high threat in neither case was conducive to a solid commitment to health-promotion behaviour.

Incapacitation also failed to exhibit any quadratic relation with behaviour. Aside from the expected finding that debility restricted activity, in other words the more incapacitated women were, the less likely they were to exercise, incapacitation exhibited no other direct relation to behaviour. Its contribution to the conceptual model largely had to do with its association with threat and the affective measures, thus it would be incorporated into further study.

Hypothesis 5a: **Women who feel seriously thretened by the heart attack may exhibit coping efforts that include escape-avoidance, distancing, confrontation, and self-control.**

The conception of coping that was believed to have particular relevance for the purposes of this study, and other studies that will hopefully follow, was that proposed by Folkman and Lazarus (1988). Of primary interest was their belief that coping was best understood as process, in which an individual's cognitive and behavioural response to stress will change, as the demands imposed by the stressor change. The fluctuant nature of illness, especially in the early stages of recovery from heart attack, render this conceptualization very meaningful in the lives of patients, rather than it simply being an interesting theoretical proposition in the lives of social scientists. In addition, Folkman and Lazarus's (1988) model makes no a priori judgement as to the effectiveness of the strategies that people use to cope. What is of interest, is the revision of beliefs and behaviours that promote adaptation within a shifting person-environment relationship.

Factor analysis of the dimensions of the Ways of Coping measure resulted in the emergence of two factors that conformed conceptually to expectation. The factors were labelled 'Engage' and 'Disengage' with the former encompassing coping strategies that promoted involvement with the stressor, namely heart disease, and the latter describing strategies that promoted avoidance of it.

It is not surprising, given the association between threat and negative affect, that women who were particularly afraid exhibited ways of coping that allowed them some respite from these unpleasant sensations. Their ways of coping, such as distancing, self-control, and escape-avoidance fostered detachment from the stressor, as opposed to involvement with it - in other words, they disengaged. At the same time however, they also evidenced some ambivalence, in that their tendency to avoid was associated with at least some acceptance of responsibility, in which they acknowledge their own contribution to the problem and look for ways to avoid its recurrence. This accounts for the way of coping known as 'accepting responsibility' appearing as a component in the 'Disengage' factor, along with distancing, escape-avoidance, confrontive coping, and self-control. This implied conflict between approach and avoidance seems to occur as women attempt to come to terms with the stress of coronary artery disease in the immediate aftermath of the heart attack. At a time of such uncertainty, and when they experience different levels of debility from day to day, it would be expected that their coping strategies would change markedly. This sort of oscillation between one coping strategy and another, is what Folkman and Lazarus (1988) predict in their interactional stress model, and it has particular relevance for any study of coping under conditions of uncertainty.

Over and above the survey results, interview data were very helpful in tracking changing strategies, because women would look back over the previous six to eight weeks and talk about the different beliefs and behaviours they had used to manage, at various times. Unless it is administered in accordance with a repeated measures design, there is no facility on a survey instrument for this sort of reflection and description.

The association between threat and ways of coping have important implications for behaviour. Thus far, we have the realization that women who feel threatened, cope in ways that foster avoidance of the threatening circumstances in which they find themselves. It turns out that this path can be a perilous one in terms of behaviour, as will be discussed under the final hypothesis.

Hypotheses 5b and 5c: **Women who have an internal locus of control and who believe in the efficacy of the treatment regimen will use coping strategies that include seeking social support,**

accepting responsibility, planful problem-solving and positive re-appraisal.

The findings for this hypothesis lent further support to the utility of the two factor solution for the dimensions of the Ways of Coping measure. As hypothesised, an internal locus of control and beliefs in the efficacy of the prescribed treatment regimen, promoted ways of coping that facilitated engagement as opposed to disengagement from the stress of heart disease. It is unfortunately not possible to determine whether the strategies women chose were ones they might have used in the past to manage other stressors in their lives, or whether they selected them on the basis of the particular stressor that confronted them in the present. Theory would predict however, that women with an internal locus would be more likely to attempt to gain at least some mastery over their circumstances and be motivated to effect the changes that would promote their wellbeing.

Equally important in engagement with the stressor however, as the data show, is a belief in the efficacy of the treatment regimen. A significant negative skew characterized the health belief variables, indicating that women really did believe in the efficacy of the treatment regimen and with the exception of diet, either at home or in a social situation, the quantitative measurement of behaviour showed it to be generally in keeping with these beliefs. The implications for the model were that women who were not unduly threatened, who had an internal locus of control, and who believed in the efficacy of the treatment regimen were using ways of coping that were expected to promote their engagement with risk-reduction behaviour.

Hypothesis 6: **Women whose coping efforts included seeking social support, accepting responsibility, planful problem-solving, and positive re-appraisal would be more likely to engage in risk-reduction behaviour than those whose coping efforts included escape-avoidance, confrontation, distancing, and self-control.**

The path depicted in the conceptual model ended with behaviours that are intended to reduce risk. To this point, the important thread that had been confirmed in the model, held personal control over illness onset, affect, degree of incapacitation, threat, and ways of coping in hypothesized configuration with one another. While rejecting the notion of 'good' and 'bad' coping, what this study found, was that 'Engage' ways of coping were associated with some health behaviours - following dietary restriction in a social situation, following an exercise programme, and taking medicine as prescribed - that would be likely to promote heart health. In this sense, these ways of coping, such as problem-solving, positive re-appraisal, and information-seeking, might be considered more effective in terms of the respondent's long-term safety, and they may be the ones that providers of care would feel obligated to promote.

An encouraging finding from this research was that women were considerably more likely to use coping strategies that fostered their involvement with the challenge that they faced, rather than attempting to cope by detaching themselves from it. Of course, this pattern might change; theoretically it would be expected to, but the concern is for what direction the change would take. Once they had attained a certain level of wellness, would women become 'disengaged' from the stress of heart disease, and cease to act in such a way as to off-set further morbidity. For people who have suffered heart attacks, or indeed any other serious illness where there is the potential for good recovery, it may be very difficult to persuade them to remain engaged with health promotion behaviour when they no longer feel any effects of the illness. In other words when coronary artery disease sufferers no longer have symptoms, are no longer incapacitated - when there is little or no evidence of the damage sustained by their hearts - they may believe that what is adaptive, is to disengage from the stressor, letting it become obscured by time.

For many women, particularly of the age-group studied, to perpetuate the idea of illness or vulnerability, and to continue to devote time to the promotion of one's own health, when there are no further bodily sensations to justify such self-interest, would be tantamount to malingering. Whether these beliefs develop or not during the process of recovery, and whether they lead to high risk behaviour, as speculated, are questions that can only be answered by further study.

Overall, in keeping with their health beliefs, women's scores on health behaviour variables were skewed towards the positive end of the distributions, indicating that they did follow the prescription designed to reduce risk. However interview data revealed a somewhat different picture in which women expended considerable effort in changing some behaviours, presumably those they believed would contribute most to their wellbeing, but not all. For many survivors, even those who do believe that risk factors are controllable, the demand for all these enormous changes in their lives, may simply be too tall an order. The difficulties inherent in stopping smoking when you have smoked for thirty years, exercising when you have never done so before, avoiding fat and salt when they have been the favoured components of your diet, and managing stress effectively, should not be understated. It seems that people will try to effect some, but not all of these changes. How they choose among the options for enhancing their health status can only be answered by further research.

In conclusion, the role of self-enhancing beliefs in the proposed conceptual model was very limited, but for reasons already described, this may be illness-specific. Neither optimism nor positive self-view have made a contribution that warrants their retention. A moderate belief in personal control has some positive affective consequences and it comes very close to playing a highly significant role in health behaviour. What is not clear however, is whether the personal control variable, as measured in this study, was reflective of a self-serving cognitive strategy or a belief in the health-promotion material taught by care-givers, namely that cardiovascular diseases are controllable by patients themselves.

Despite the very small contribution of self-enhancing bias, quantitative study of this sample of women confirmed numerous propositions delineated in the conceptual model under study, and resulted in a profile of characteristics that are associated with risk-reduction behaviour after a first heart attack. Women who are behaving in such a way as to promote their own health by following at least some of the treatment recommendations, do not worry unduly in contemplation of the illness they have suffered or what their future health status may be like, and they are not disabled by negative affect. In general, they believe in the efficacy of the treatment regimen that is recommended for optimizing heart health, and they recognize that responsibility for health outcomes is shared between themselves and powerful others. They cope with the psychological stress of heart disease by engaging with it, as opposed to detatching from it. In coming to terms with the difficulty they face, these women seek information and support from others, they search for positive meaning in the experience, and they expend deliberate, problem-focused efforts to modify or alter the situation for their benefit. Examination of this model has, by and large, confirmed its configuration, but most importantly, it has provided much guidance in the development of future research. Finally, it has identified necessary refinements to questions already asked, refinements that would hopefully result in a deeper understanding of health-related behaviour in persons suffering from heart disease.

QUALITATIVE DATA AND ANALYSIS

In keeping with the approach to quantitative data analysis, qualitative material is presented in relation to the conceptual model under examination. At the discretion of the researcher, a primary narrative has been selected from the interviews for each of the three major components of the conceptual model, namely self-enhancing beliefs, perceived threat, and ways of coping, although, there is considerable overlap among concepts when they are used to explain risk-reduction behaviour in post-infarction women. The primary narrative is a text excerpt that presents part of an informant's story, as it was told during the conversation between informant and researcher, thus it provides both context and continuity. Identification and explication of conceptual themes are drawn from this narrative segment. These three major concepts, as well as sub-concepts are then validated by incorporating parallel thematic text segments from across interviews. Each primary narrative is preceded by a brief description of the informant.

Case One

Mrs. E. P. was a 65 year old married woman and mother of six who lived with her husband in a modest, comfortable home in south Winnipeg. Large pictures of her children and grand-children, of whom she was unquestionably very proud, decorated all four walls of her living room. Forthright, and determined, Mrs. E. P. was a tall, handsome woman who appeared robustly healthy. She had had an anterior infarction that left her with moderate impairment of the squeezing capacity of her left ventricle, the chamber of the heart responsible for shunting oxygenated blood into the larger vessels. Her physical capacity was undoubtedly compromised and she complained of some breathlessness as a result of the type of exertion that would include vacuuming or walking briskly. However, she was recovering well and her physical endurance was increasing. Both Mr. and Mrs. P. agreed that her husband had been far more afraid of the heart attack than she had, and he was keen to assist his wife with her new way of life. She claimed to be absolutely committed to comprehensive life-style change and was eager to show the researcher her detailed diet, medication, and exercise charts that allowed close monitoring of her behaviour. As a result of a strong family history of coronary artery disease, this woman considered herself at significant risk for further cardiovascular problems.

Primary Narrative

K.T. Were you shocked or surprised that you had had a heart attack?

E.P. I was surprised but not shocked because I knew it was in the family and I knew I had high cholesterol....my father had a heart attack when he was 55. He died of cancer but he had a heart attack when he was 55. My mother died of a heart attack, so its in the family, so is high cholesterol.

K.T. You stated earlier that you didn't feel particularly threatened by the heart attack and yet you are working very hard to stay well.

E.P. If I have another attack, and I imagine some day I will, since it is in the family and I expect it, it will not be because I caused it. It will be something which just happens. I will have done everything that I can not to have one.

K.T. So it will be something over which you have no control?

E.P. That's right.

K.T. One of the things that can stop people from putting out the effort to stay well is that they think they are never going to be bothered by heart problems again. Some people think that everything will be fine from here on.

E.P. Oh, I know it can happen again. I am well aware of that but I'm doing everything I can myself to avoid it. But it will probably happen again. I mean everybody is going to die...how you die is another story. ....I can control quite a lot of it but I can't control all of it. I can take the medicines as prescribed, I can watch my weight which I am doing, I have cut fat out of my diet and upped the fibre, and tried to keep stress to a minimum and of course, I exercise.....I am controlling the risk factors that I can do something about.

K.T. And the one you have no control over is family history?

E.P. There are heart problems in the family, there is high cholesterol. There is just no controlling everything. You do the best you can.

K.T. What will help you maintain this life-style change?

E.P. All I can say is this, like I said before. I will do everything I can to prevent it. If God says I have another heart attack, then I have another heart attack but it won't be because I don't do my part.

K.T. So why do you think E. that so many people who start out with such good intentions, go back to doing all the unhealthy things they did before the heart attack?

E.P. I don't know. I can only speak for myself and as far as I am concerned, I know what happened and I know it can happen again. I am not putting blinders on, I am looking at the facts. I know it can happen again and I'm doing everything possible to prevent it.

K.T. So knowing it can happen again is important for your behaviour?

E.P. Like I say my mother died of a heart attack and my father had a heart attack. I know it's in the family so I'm expecting that in time, I'll have another one. But not if I can help it (leaning forward towards microphone and speaking loudly).

K.T. And a year from now if you are not experiencing any symptoms at all, you are not short of breath and you have no discomfort in your chest whatever you do, will you still be doing these things?

E.P. Oh Yeah.

K.T. Because you will still see yourself at risk?

E.P. Yes. I have always seen myself at risk.

K.T. So if people don't see themselves at risk, maybe that's why they don't continue to take care?

E.P. I will always see myself at risk because it's in the family, it's hereditary.

K.T. But if you are feeling well would you need to be reminded of the risk?

E.P. No. I don't have to be told that.... And now the damage is done. The first damage is done. My heart is not whole again it never will be.

K.T. Not whole?

E.P. It is whole except I have a slightly clogged artery. That damage is never going to go away. It is there. The next one will hit a little harder. I am just going to make sure I do my part.

Given her strong family history E.P. considers herself at significant risk for a further heart attack. Accordingly, her risk-reduction behaviour at the time of interview was exemplary, as the following segment reveals.

K.T. What is the hardest part of the regime for you?

E.P. Not having any salt in my food. And buying products that are salt-free. Checking every label - which I do. I was pretty careful before but not nearly as careful as what I am now.

K.T. You really have to know what you're looking for in order to read those labels effectively.

E.P. I read the fat in grammes. I know exactly what I am taking in. As a matter of fact I can show you what I do. Here is the chart of my breakfast for to-day (shows impressively detailed food charts to researcher)

K.T. Do you do this every day?

E.P. Every day. I keep track of my fat intake in percentages. The old sheets that I have are back here. I work everything out. I get my grammes of fat and I divide them out so I know exactly how much fat I have had on that day. Some days I have it as low as 7 or 8%. I've lost 13.5 pounds since I went into hospital, so it's going down slowly.....I've learned what I can eat and what I can't eat....and you can't cheat on it. Well you can, but I don't.... So I'm trying to get my cholesterol down, it's now 6.9, I'm trying to get my weight down, I am watching my fat intake, I am doing everything that I am supposed to do and I am exercising.... I am never going to be able to allow myself to get off this so it has become a way of life.

K.T If you compare yourself to other women like you, do you see yourself as doing better than others in this regard.

E.P. I can't speak for others. I can only speak for myself.

Conceptual Theme: Self-Enhancing Beliefs

Before attempting to weave theory and narrative together, a methodological issue concerning the measurement of self-enhancing beliefs in this sample, needs to be considered. Traditionally, in measuring these beliefs or "illusions" as they are often called (e.g., Baumeister, 1989; Taylor, 1983), respondents are asked to compare themselves to others on self-serving cognitive biases. In this study, the three that were under investigation were unrealistic optimism about future life events, specifically health-related events, exaggerated belief in personal control over future health outcomes, and overly positive self-view. Theory would predict that women who bias this self-relevant information in a positive direction, at least rating themselves above average on these dimensions, would evidence better cognitive and behavioural adaptation (e.g., Taylor, 1983; Taylor & Brown, 1988; Weinstein & Lachendro, 1982). In addition, Taylor and Brown (1988) assert that "Because it is logically impossible for most persons to be better than the average person, these highly skewed evaluations may be regarded as evidence of their unrealistic or illusory nature" (p. 195). From interview data and from discussions with participants who completed questionnaires only, this traditional approach to the measurement of self-serving biases appears to have been fruitless with this particular sample. The process of self-enhancement through social comparison, originally described by Festinger (1954), seemed an anathema to these respondents, perhaps because they could not identify the subjects of comparison.

The introductory statement of the three self-enhancing belief measures was, "Compared to other women of the same age as yourself who have also experienced a heart attack...." (see Appendix A). After respondents in the study had completed the surveys, they were asked the question during de-briefing, "Who did you have in mind when you were rating yourself on this scale"? Responses included, "My dad", "No-one, I'm the only woman I know who has had a heart attack", and "It really didn't make sense to me so I just thought about myself". E.P's. resistance to this comparison is evident from her narrative where she states repeatedly, "I can't speak for others, I can only speak for myself". Review of the complete interview shows that she made this statement over and over again, whenever the cognitive strategy of social comparison was broached. Eventually, the researcher concluded that E.P. was irritated by this line of questioning, as if it were in some way unreasonable to expect her to contrast her beliefs about herself with those of other women in the same situation. The narrative of Ms. A.H., a 52 years old law and economics teacher shed further light on this issue:

K.T. Can you think back for a minute to the questionnaires that said, "Compared to other women of the same age as yourself who have also experienced a heart attack, what do you think the chances are that a number of health problems will bother you in the future", who did you have in mind when you answered that?

A.H. Nobody.

K.T. You didn't have an image in your mind of anybody, any group of women the same age as yourself who had had heart attacks.

A.H. I don't have any friends who have had a heart attack.

K.T. So you had no reference group that you could think about to in order to answer that?

A.H. No. How I answered those questions was based on family history. If my family had something, I would rate the chances of it happening to me as higher. If there hadn't been any incidence of something in my family, then I rated my chances as lower.

Not having encountered similar others, that is, women of her age who had had heart attacks, A.H. was at a loss as to whom she could compare herself with. For this woman, the significant determining factor in whether or not future illness events will happen to her and the degree of control she can reasonably expect to exert over their occurrence, is family history. This is the criterion upon which she bases her calculation of risk, and wisely, since family history is the least conjectural of all cardiovascular risk-factors and the only one over which patients have no control. Mrs. O.L., a 59 years old widow of eight years had a similar problem with social comparison:

K.T. On some of the questionnaires that you completed I asked you to compare yourself with a group of other women who had also had a heart attack, and tell me what the chances were, in relation to them, that you would have further problems in the future. Do you remember that?

O.L. Yes.

K.T. Who did you have in mind Mrs. L.?

O.L. I don't think I had one particular person in mind. I would have say several groups - this is what I would sort of call our swim group, there is the widows group, and there might be the church group, when I would compare those groups I think I would average as well as anyone in there. I don't have all of the same kinds of talents as all of them, or some of them, but the few things I can do would probably equal what they do.

Thus it seems that the traditional paradigm utilized in the measurement of self-enhancing cognitive biases - comparing oneself with others - is not easily countenanced by mature women who have survived a life-threatening episode of coronary artery disease, and are asked to describe their beliefs about what the future holds. Contrast this with the experiences of introductory psychology students, whose self-other comparisons have been the mainstay of this area of research in social psychology. Sophomores eat, sleep, and drink with others like themselves. They go to classes, study, and move around campus in groups that consist of people who are similar. So when asked to compare themselves to others of a similar sort, they have a well-defined reference group in mind. Thus the directive to compare one's self as a student with other students is likely accomplished with relative ease, even though it may be argued that no person can have in mind a sufficient number of similar others to compute the average that is supposedly required to test the existence of these biases. One might therefore wish to question Taylor and Brown's (1988) claim in relation to an inflated view of oneself, for example, that, "Because it is logically impossible for most people to be better than the average person, these highly skewed, positive views of the self can be regarded as evidence for their unrealistic or illusory nature" (p. 195). In light of their day-to-day experiences then, it seems reasonable to suggest that this paradigm is better-suited to young students in their early years of higher education or, to be fair, to any other sample whose experience includes close contact with similar others who can readily serve as subjects of comparison. In this study, the paradigm might have survived had these women answered the survey questions after they had participated in a post-infarction support group such as Heart to Heart (Heart & Stroke Foundation of Manitoba) where they would have met other patients like themselves, recovering from heart attacks.

Despite their reluctance to compare themselves with others, or perhaps more accurately, the apparent irrelevance of self-other comparisons, the potential perils of cognitive bias still exist for these women. Too much optimism, too great a sense of control, and too inflated a belief in one's strengths and assets, over and above what is reasonably warranted, could lead women to believe that they were invulnerable, and thus obviate the need for health-promotion efforts. In other words, the potentially adverse effect of inflated beliefs about one's self upon reduction behaviour, need not depend upon the self-other comparison, unless you want to call those beliefs, illusions. Interview data provided no evidence that, once the heart attack had occurred, women utilized self-enhancing cognitive strategies to lessen the impact of either their current health status or the potential hazards that lay ahead.

In applying Taylor's (1983) theory of cognitive adaptation to threat to these data, it seems that, in contrast to breast cancer patients, women who are suffering from heart disease and who are evidencing better cognitive and behavioural adaptation do not down-play the present or future seriousness of their situation in an attempt to either enhance their self-esteem or reassure themselves about the future. This leads to the speculation that the adaptive nature of self-serving biases may be illness-specific. Taylor's (1983) analysis is primarily based upon one study that was conducted with 78 women with breast cancer and many of their family members. Of particular interest for the present discussion, was the finding that women who evidenced an exaggerated perception of personal control over their illnesses, who construed positive meaning from the cancer experience, and who made self-enhancing downward comparisons in an effort to bolster self-esteem, showed better adjustment to the highly aversive experience of breast cancer. Findings in the present study deviate markedly from Taylor's (1983). There are at least two plausible reasons for such differences. First, these two serious illnesses, breast cancer and coronary artery disease, differ in terms of the potential controllability of risk factors. And second, comparison others may come to mind more readily for breast cancer patients, the common wisdom still being, even among female coronary patients, that heart disease only affects men in their middle years.

Coronary artery disease and breast cancer differ significantly in terms of identifiable risk-factors and the degree to which individuals can, as a result of their own behaviour, modify those factors. In both cases, the non-modifiable risk factor, family history, is highly significant. Beyond this, we remain largely ignorant of the causes of breast cancer, so possible risk-reducing behaviours are as yet, unknown. In the absence of behavioural alternatives to reduce risk, it may be especially reassuring, as Taylor (1983) found, to exaggerate the degree of control that one can reasonably expect to exert over a largely uncontrollable disease.

Coronary artery disease is quite different in terms of modifiable risk-factors. Heart health can undoubtedly be enhanced by refraining from smoking, reducing intake of saturated fats and salt, exercising regularly, and attempting to modify the reaction to stress. It seems that if women who are recovering from heart attacks are going to engage in these potentially protective behaviours, it is at least in part, due to the fact that they see themselves at risk and also they believe that the prescribed life-style modifications will contribute significantly to the reduction of that risk. So, important in their adaptation is the belief that they can exert some control over modifiable risk factors, but that this control only goes so far. In other words, it ends with family history. In this group, there appears to be no evidence that beliefs in personal control were exaggerated. Recall E.P's statement,

> E.P. Oh, I know it can happen again. I am well aware of that but I'm doing everything I can myself to avoid it. But it will probably happen again. I mean everybody is going to die...how you die is another story. ....I can control quite a lot of it but I can't control all of it. I can take the medicines as prescribed, I can watch my weight which I am doing, I have cut fat out of my diet and upped the fibre, and tried to keep stress to a minimum and of course, I exercise.....I am controlling the risk factors that I can do something about.

Regrettably, measures of self-enhancing beliefs prior to infarction are unavailable, but the suggestion that they may differ before and after this life-threatening event, arose often during data collection. When the researcher met with women in the hospital to invite them into the study, patients frequently exclaimed, "I can't believe this is happening to me" or "I never thought I would have a heart attack". This latter statement was most likely to be made by women with no family history whatsoever. In part, this disbelief may be a function of popular wisdom that asserts, in error, that heart attacks only afflict middle-aged men. On the other hand, this reported pre-infarction sense of invulnerability might well have been a function of the capacity to cast oneself and the future in an overly favourable and reassuring light. For example, K.Z. a mother and grandmother in her middle forties, made the following statement:

> K.Z. When I think about having another heart attack - or about death..........you always think about yourself as not being that vulnerable, but once this has happened to you then you know you are. This brings you back to reality. I don't want to leave my little girl to struggle without a mother. My grandchildren can do without a grandmother. I love them dearly but that's different. I don't want to leave my daughter without a mother. She and my husband have been my motivation.

If that self-serving bias were to have existed prior to the infarction, we might speculate that it diminishes afterwards. In other words, once women have had their first heart attack and have been powerfully reminded of their vulnerability, they can no longer afford the comfort of self-enhancing cognition, if they are to become engaged with the risk-reduction process and lower their chances of further morbidity.

While their reported behaviours imply that self-enhancing cognitive biases were not operative six to eight weeks after the infarction, further research with this sample over time, will be required to examine this speculation in greater depth.

From examination of E.P.'s narrative, it was evident that her processing of self-relevant information in the threatening circumstances in which she found herself, did not fit well with Taylor's (1983) assertion that, "The effective individual in the face of threat, then, seems to be one who permits the development of illusions, nurtures those illusions, and is ultimately restored by those illusions" (p. 1168). Although it is believed to be adaptive, there was no evidence here that shaping events into a less threatening form was undertaken. On the contrary, many women were almost vehement in their raw assessment of the reality of threat, and it appeared that this was the essential starting point in life-style modification. In E.P's case her assessment of risk was also fostered by the facts of her family history over which she had no control. Realistic appraisal of risk seemed to encourage her, and other women, to mount a vigorous health-promotion effort over those risk factors believed to be under personal control. This contrasted with one of the hypotheses under examination in this research, namely that people whose self-enhancing beliefs were either very low or very high would be less likely to engage in risk-reduction behaviour than those whose beliefs were more moderate. E.P's behavioural efforts were optimum; there was nothing more that this woman could do to off-set the risk of a subsequent heart attack, but in conjunction with that risk-reduction behaviour were beliefs that were associated with the determination not to distort reality, but to see it very clearly. So for her, low levels on unrealistic optimism and exaggerated control were associated with impressive behavioural efforts to reduce risk.

E.P. I don't know. As I said, I can only speak for myself and as far as I am concerned, I know what happened and I know it can happen again. I am not putting blinders on, I am looking at the facts. I know it can happen again and I'm doing everything possible to prevent it.

The association between seeing reality clearly, as opposed to through the softening lens of self-enhancing beliefs, and optimal risk-reduction behaviour was echoed by other women.

R.R. You see your own mortality, that's what it is....That's what made me quit smoking, go on a diet, quit eating killer butter, start walking.

K.T. And what kind of strengths do you see in yourself that will help you keep on track here?

R.R. You should never ask me about strength. In an interview once before someone asked me what were my strengths and weaknesses. And I said, "My weakness was not knowing my strength".

K.T. That's very profound R!

R.R Isn't it? (laughing). It's just that I want to live, so I have to change everything that I was doing wrong. I just knew that I had to change my life-style if I wanted to continue living. I'm afraid now that if I have another heart attack, that'll be the end....If I continue the way I was, I'm just asking for it. I may as well take a gun and shoot myself as opposed to dying that slowly.

K.T. So as long as you know that you are doing everything you can to prevent this from happening again, you won't blame yourself?

R.R. That's right. I wouldn't blame myself.

K.T. So for you then, it doesn't make sense, it doesn't fit to try to soften the reality of this or to sort of distort it in some way so that the feeling of threat goes away?

R.R. No, no (emphatically).

K.T. So you feel that you are very realistic about what has happened and what might happen?

R.R. Yeah. I am a realist.

K.T. Sometimes people give themselves this message that everything is going to be fine. Like a sort of don't worry message - all will turn out well. Sort of like putting a rosy glow on things.

R.R. Oh God that's definitely not me - the eternal optimist? I'm the eternal pessimist. I'm too much the other way. I don't believe anything's gonna go right. But seriously, I always have hope, there's always hope.

In similar vein, the final example comes from A.H., whose strong family history of Alzheimer's disease led her to rate her chances of developing it, as much above average:

A.H. I'm not an optimist. No I worry. I'm not the type whose going to say that everything will be fine. How I answered those questions (self-enhancing beliefs scales) was based on my family history. If there's something in my family, I rate my chances of getting it as higher..... I have some control but not a whole lot. I watch my diet and I exercise. I think I have a fair amount of control - I can slow things down maybe. But with the Alzheimer's question, there are three men in my family with it, so I rate my chances of getting it as higher than average.

Being closely related to someone who has suffered the same illness, witnessing their experience and perhaps their ultimate demise, imposes an association with reality that is hard to soften with self-enhancing cognitive biases such as unrealistic optimism or exaggerated beliefs in personal control.

Despite what social cognition theory would predict as a result of this processing of personal data in the grim light of day, E.P. evidenced psychological adaptation on survey instruments that included high self-esteem and she was neither depressed nor anxious. Her realistic appraisal of risk had not disabled her behaviourally, on the contrary her enormous effort resulted in the reductions in weight and serum cholesterol that she was rightfully proud of. It is important to remember though, that she was feeling stronger and less incapacitated as each day passed. Were her condition deteriorating, a very different picture could have emerged both psychologically and behaviourally, as the following segment suggested.

K.T. Do you think that if you weren't as physically able as you are now, that you would be more anxious?

E.P. Possibly.

K.T. So your anxiety relates not to the heart attack so much but to physical symptoms. If you were getting breathless and having pain, and having difficulty getting around, you would be more worried?

E.P. Yes I would. I don't like it when I don't feel well.

It should be noted that a revolutionary change in life-style, such as Mrs. E. P. exhibited, was the exception rather than the rule in the study sample. As the quantitative analysis showed, even in the presence of both perceived threat and beliefs in the efficacy of the treatment regimen, women's risk-reduction behaviours in general, were patchy and inconsistent.

The third self-enhancing belief assessed in this study was overly positive self-view, a pervasive tendency to over-state one's strengths and assets and downplay weaknesses and deficits. Survey data for this variable showed that women rated themselves very highly on this scale, that was made up of those attributes believed by Folkman and Lazarus (1988) to facilitate effective coping, such as being organized, adaptable, resourceful, attentive, self-disciplined, motivated and so on. However, in face to face interviews women avoided describing themselves in such positive terms, even though, by the time of interview, they had already done so on the questionnaires. Blowing one's trumpet, so to speak, may be easier on paper than it is in the company of others. At interview, women tended to describe themselves in general terms as strong and determined, and in most cases, this strength was seen to have developed out of previous experience with adversity. Lessons learned in hard times, though painful in memory, were described by these women, as having been important in the development of the strengths that they could draw on during recovery. In other words, as C.S.Lewis (1962) put it, "We learn when it hurts". For example, J.M. a 64 years old mother of six who was married to an alcoholic stated:

> J.M. I have lots of strength. Whether it just comes with the territory, I don't know. I don't think I started out with it. But as you go along in life and you have to deal with all these things, there's nobody else to deal with it for you so you have to find strength. Some people never find that strength and they become kittenish, looking for someone to lean on. But I've always been able to make my own decisions and I can certainly live with them.

Mrs. E.P. believed that her strengths came from living through the depression when her family had experienced severe poverty. Later, she and her husband raised six children on a very small income, although E.P. was insistent that she had no help from him with this formidable child-rearing task. In the presence of her husband she stated rather triumphantly, "We had a traditional marriage - he never lifted a finger". However when asked to outline her positive attributes, she, like the other respondents, spoke in very general terms:

K.T. If you compare yourself to other women like yourself, do you see yourself as being well endowed or better endowed with those qualities that would help you to manage in these circumstances.

E.P. Like I said, I can't speak for others. I can only speak for myself. I think I am well endowed.

K.T. Have you grown up with that?

E.P. That's what my mother said. She said I was the most determined child she ever saw. She didn't like it very much. You see I lived through the depression. We knew what a hard life was. You learned how to live within your means and how to make things work. If you couldn't then you tried harder. Somehow we always managed.....We had a lot of stress then, we had lots of stress. It's like that when you wonder where your next meal is going to come from......It's hard but it teaches you how to manage.

In summary, interview data reflects the conceptual links in the model under examination between self-enhancing beliefs, perception of threat, ways of coping, and risk-reduction behaviour, but the shape of association is not as hypothesized. First, as quantitative results show, self-enhancing beliefs can not be considered a unitary construct. Using these variables to explain behaviour, interview data suggest that optimum risk-reduction behaviour is associated with low optimism, moderate belief in control over modifiable risk factors, and positive assessment of one's personal strengths. For these women, their cognitive realism in the appraisal of threat, and their capacity to draw upon time-honoured coping strategies that had developed through previous adversity, combined to result in impressive efforts to off-set future cardiovascular risk and promote health.

Case Two

Mrs. M. B. was a 59 years old married mother of two, whose children both lived away from home. She was a tall, slender woman, who looked much younger than her years. She had a vibrant sense of humour and reportedly, a fiercely strong will. She lived in a spacious, very well-kept home in south-east Winnipeg, with her husband and parrot. By the time of interview, eight weeks after the heart attack, M.B. had been back at work for two weeks. She was a senior staff nurse on the psychiatric unit of the local hospital, working permanent nights. She described her job as quite demanding, and the night shift seemed to be one that she was not best-suited to. One week prior to the interview M.B. and a number of other nurses who were approaching 60, had been offered a retirement package that she had decided to accept. M.B. and her husband had put their house on the market and planned to retire in Steinbach. Her infarction had affected the anterior wall of her heart and had occurred as a result of a 30% occlusion of one of her coronary arteries. To her credit, she had stopped smoking, a process that she said was like, "pulling teeth", and she evidenced great effort in eliminating fats and salt from her diet. This was a woman who exuded energy, talking and moving with great speed, and she struck the researcher as someone who might find it very difficult to relax and take things easily, an important recommendation to follow in the recovery phase. She seemed somewhat undaunted by her experience of heart attack, but as her story tells, she was no stranger to fear.

Primary Narrative: Mrs M.B.

K.T. Did you have severe pain when you were having your heart attack?

M.B. Yes. I was in a great deal of pain. It was a burning right in the middle of my chest. I wouldn't mistake it if it happened again. I would know what it was.

K.T. Did it frighten you?

M.B. No, not at all. For some strange reason I was quite blase about the whole thing. I actually was, it didn't frighten me. It didn't occur to me to be afraid...... it never did.

K.T. Why was that M?

M.B. I think a heart attack is more of an accepted fate. If you, like me, grew up in a wartime era, you accepted what the fates dealt out.....With a heart attack you are here today and gone tomorrow and you don't tend to be a lingering nuisance to anyone. This I find more acceptable than being a cancer patient. If you are nursing, like me, you see the devastating effects of cancer.

K.T. Do you think then that your nursing experience affects the way you manage your illness.

M.B. Well I think a lot of people, especially women, find the rest and being pampered a novelty, and tend to enjoy it. I find there is a tendency for women to enjoy the sick role. But then there are others who do what I do, which is to put on a brave front to keep the family going.

K.T. You said a little earlier M. that you were not particularly frightened by this experience, yet a lot of people describe themselves as having been very afraid. What sort of qualities or characteristics, what is it about you that might make you see this differently?

M.B. I think it's my background. I think it's the way I was brought up. The circumstances of childhood influence your attitude towards life in general. I was brought up - I was five when the war started - I was taught from a very early age that there was no point in being afraid. If you were going to get killed it was because that was what fate decreed for you. You couldn't live in fear and hide under the stairs every time there was an air raid, so you grew up with the idea that you died when your number was up.

K.T. Did you know children who did run under the stairs and cry when they were afraid?

M.B. Yes.

K.T. How were you different from them?

M.B. I think we were taught. I think that initially what happened during the war, was that my mother used to hide us under the stairs, because we were told that if you were under the stairs and the house collapsed, you wouldn't get hurt. So she made a bed under the stairs and we did this until my father came home on leave. He said to my mother, "Why are you going under the stairs? This is nonsense, the kids can't live under the stairs until the war finishes". He said, "If you are going to get killed, you are going to get killed regardless of whether you are under the stairs or upstairs in bed. This is nonsense". So after a lot of arguing they decided that we would go back to living life normally and this is what we did. It was my father who said, "Being afraid is not being a coward. You die a thousand times a year. You've got to go on with your life". Although it was difficult he would take us outside when they used to have the dog fights over the channel because we lived on the coast. And he would let us watch them as though they were fireworks. We were only very small. He used to say, "They are in the distance, they are not going to hurt you". After a while you started to accept the fact that people got killed. My sister got killed....during an air raid. By that time it wasn't an horrendous thing. Those were things you had been taught to accept. It would be an horrendous thing if it happened to a child in Winnipeg.

K.T. That's quite a story M. So your father was a strong role model for you in terms of staring fear in the face and getting on with your life.

M.B. That's right, yes.

K.T. Were the role models different for the children who hid under the stairs?

M.B. A lot of them didn't have fathers that were coming home. They had mothers who were frightened. It was an accepted fact, most of the women would be afraid for the kids. That's catching, the kids catch on. It was very difficult for most people. We were very fortunate, we didn't live in a big town. We did get bombed but for us that was exciting. We kids weren't afraid of the war. Death isn't as frightening when you have to stare it in the face on a regular basis. It's not as horrifying. It's not strange or unusual.

K.T. On this theme, I'm trying to understand M., you talked about why you might handle your fear differently from others - looking back to your childhood. Could that lead you to over-do things?

M.B. Probably.

K.T. And does that stop you from seeing yourself at risk for further health-related problems?

M.B. I think there is a possibility. I think you have to be pretty stupid to not be aware of the facts. Doing something about it is something else. I mean you know you shouldn't smoke, but what the hell, you do it anyway. You rationalize a lot. The future is down the road. You try to say to yourself, "I'm not going to do this so I can live longer". So it goes back to your childhood again. If I am going to go, if I am going to die, I am going to die.

K.T. Somewhat fatalistic then?

M.B. Right.

K.T. Without some consideration of the risk, we worry that people might not look after their health in a way that will optimize their well-being. Do you think that's true for you?

M.B. My problem has been accepting the seriousness or possible finality of a heart attack. I've tended to look at it like having another kid or having appendicitis. It is something I got over and I have an awful job trying to take myself seriously. I can't see myself using it as a focal point in my life.

K.T. But you do recognize some risk, because you are working very hard to reduce that risk.

M.B. Oh yes. I know the benefits of diet, and all the benefits of exercising and quitting smoking and I try to adhere to them as closely as I can. I realize that life-style changes are a must. But there are some things I can't accommodate. I can't be out of control. I have to control some things.

K.T. On a scale of one to ten how much control do you think you have over your well-being?

M.B. Since the heart attack, I would say about 9. I have good control.

K.T. So control in the sense that you believe you can control the degree to which you can stay well.

M.B. Yes.

K.T. You believe you can control your own wellness in terms of your own behaviour.

M.B. Yes, but not solely by behaviour. Medications play a role in it. If you are going to dismiss your heart attack entirely, which I am not stupid enough to do, and just go back to where you were before, then you are asking for another M.I. I have convinced myself I think, quitting smoking, changing my life-style, I'm 50% of the way. So I'm hoping anyway that at least I can lead a normal life. I don't want to make sacrifices and sit about.......I don't feel as though it's necessary.

K.T. Giving up smoking is a very difficult thing to do. You deserve a great pat on the back.

M.B. I deserve the Victoria Cross! Giving up smoking is the most difficult thing of all. It's the one you get the most benefit out of and I also think that diet is something that's very important.

Conceptual Theme: Perceived Threat

The story that M.B. tells of her childhood experience, growing up in war-time England, adds another dimension to the understanding of perceived threat, one that proposes the importance of role models in the development of the fundamental assumptions that people hold about the world and themselves. Years ago, Janis (1974) suggested that the way in which a person handles potential danger will, in part, depend upon past experiences that can provide assistance in knowing what might happen and what to do about it. Certainly, M.B. learning by her father's example, not to be overwhelmed by fear, appeared very relaxed about the danger that lurked in her coronary arteries.

Janoff-Bulman (1989) suggested that life-events were filtered and perceived through the self-schemata, deeply embedded within people's conceptual systems. She described three fundamental assumptions integral to the self-schema; that the world is benevolent, that adversity is not random, and that self is worthy. According to this analysis, the degree to which an illness event such as a heart attack is perceived as threatening, will, in part, depend upon the individuals view of self and the world. Arising from M.B's narrative is the additional proposition that one's orientation to threatening life-events is subject to role-modelling, particularly by trusted adults during the impressionable childhood years. M.B. was convinced that her father's influence was a significant element in her calm reaction to a significant threat.

M.B. It was my father who said, "Being afraid is not being a coward. You die a thousand times a year. You've got to go on with your life". Although it was difficult he would take us outside when they used to have the dog fights over the channel because we lived on the coast. And he would let us watch them as though they were fireworks. We were only very small. He used to say, "They are in the distance, they are not going to hurt you". After a while you started to accept the fact that people got killed.

It was not so much that the reality of threat was distorted - on the contrary. But one's reaction to threat was modified by the idea that you couldn't let it disable you, it was no use fretting over "what fate decreed for you". From the fear that she witnessed in the mothers of children who were without fathers, M.B. believed that fear was learned:

M.B. It was an accepted fact, most of the women would be afraid for the kids. That's catching, the kids catch on.

This unruffled response to threat however, did not appear to interfere with M.B's recognition of herself as being at risk, and thus taking action to modify that risk. Her risk-reduction behaviour was reportedly optimum thus, she believed, warranting the Victoria Cross. The only concern was that she might be over-doing things physically so soon after her heart attack, however she had no symptoms, such as fatigue, breathlessness or chest pain that might have served as signals that she needed to slow down a little.

In contrast to M.B., R.R's narrative powerfully suggests that threat can function as an important motivating factor in women's efforts to integrate prescribed life-style changes into their lives. Ms R.R. was a 42 years old single parent who had two sons aged ten and seven. Her office job earned a barely adequate living for her and although she found the workplace very stressful, she was afraid that heart disease would eventually rob her of her capacity to work. At the time of interview she was not experiencing any major symptoms. The physical demands made on her as a single parent raising young boys, was a constant source of stress, as she would feel herself torn between the responsibilities of parenting and the need for rest demanded by her healing heart. For R.R. being afraid was a positive force in her life.

R.R I wasn't frightened about the heart attack because my mom, when they diagnosed I had a heart attack, she was there. She was at the hospital, and I thought I'm not scared, because she had a heart attack and she lived. And she's here, she's talking to me, so, O.K., I'm still alive now, so there's nothing to be afraid of.

K.T. So she was like a model for you then.

R.R. Yeah, she went through the same thing, similar things so, so I wasn't worried. I wasn't afraid, at the time.

K.T. And did that change for you? You said, "at the time you weren't afraid".

R.R. Well just after, you know, I wondered if people weren't telling me something there, you know, that I was going to die right away. I guess cos you see your own mortality. That's what it is. ... this is something that just happens to you.

K.T. Do you think that sense of mortality, perhaps fear, might be something that would help you to lead a healthier lifestyle than you did before?

R.R. Oh yes, ... yeah, that's what made me quit smoking, go on a diet, quit eating butter, killer butter. And I want to go out and preach to everybody, but I don't, not yet, haven't got anybody to preach to yet. I just knew that I had to change my life-style if I wanted to continue living.

K.T. So for you it doesn't make any sense, it doesn't fit for you to try to soften the reality of this experience or to sort of distort it in some way so that the threat you feel goes away?

R.R. No, no. I'm just a realist I guess.

As we see here, perception of threat appears to wax and wane as the illness presents in its characteristically dramatic way and then unfolds. Fear of death is not uncommon during the acute phase but this can be attenuated by the knowledge or presence of another victim who has made a good recovery. R.R's cognitive appraisal of threat was juxtaposed with her attempt to cope. Her mother, a recovered AMI patient, suddenly became an important resource, living proof that one could be struck without warning by this life-threatening illness, yet survive and lead a normal life. This thought, recalled by the patient as having first occurred amidst the flurry of activity in the emergency room, helped her cope during the first hours of her illness. Recall her statement:

R.R. I wasn't frightened about the heart attack because my mom, when they diagnosed I had a heart attack, she was there. She was at the hospital, and I thought I'm not scared, because she had a heart attack and she lived. And she's here, she's talking to me, so, O.K., I'm still alive now, so there's nothing to be afraid of. She went through the same thing so I wasn't worried. I wasn't afraid at the time.

Not all patients experience severe chest-pain when coronary artery occlusion deprives the myocardium of its essential blood supply. However, for those who are suddenly struck by terrible, crushing pain, the sensation is an abiding memory, the vividness of which appears not to fade at all in the immediate recovery period. Despite the fear invoked by this excruciating pain, repeated evidence in the present study suggested that the memory can support risk-reduction efforts. For example, it is an unenviable agony for previously heavy smokers trying to break the habit. The motivation required is enormous and unless risk-perception is significant, it is unlikely that the determination required will be maintained. The vivid memory of severe chest pain, though devastating, can be helpful in that it nourishes perception of risk in an on-going way, and fortifies the patient's commitment to this most difficult challenge to life-style change. Seven weeks after her heart attack, characterized by excruciating pain that both emergency room and intensive care unit staff had much difficulty bringing under control, a former two pack-a-day smoker wept over the memory of her then stricken body, as she described the difficulty of smoking cessation.

E.W. When I got home I cried often for a cigarette. Then I'd think of the pain when I had the heart attack (at this point she exhibits a gesture frequently seen when women recall the pain, wherein she clenches her fist, and holds it over the

> centre of her chest while leaning forward and doubling up) ...I'll never forget that pain, its just that I cry every time I think about it...it scared me so much. I'll never have another cigarette but I want one so badly at times, its desperate. I won't give in though. When it gets bad I go for a walk.

Some women who have experienced pain, re-appraise it positively and point to the perils of being symptom-free in the future. This effort to create positive meaning from what might otherwise be a very frightening symptom, appears to be undertaken by women whose illness representation is dependent upon the presence of symptoms. In other words absence of symptoms and sensations from the body indicate absence of disease process, which in turn reduces the perceived need for health-promotion behaviour. This on-going reminder of vulnerability was seen by R.R. as crucial in her maintenance of health-promotion behaviour. Lack of symptoms, she feared, could undermine her efforts to stay well. As her narrative states:

R.R. This is what worries me though too, is that if I don't keep feeling the pain, will I keep up with my lifestyle change.

K.T. You mean if you don't have any symptoms would you keep up with your lifestyle change?.

R.R. Yeah. 'cos I want to live. That's what I keep saying. I want to live. I'm scared. It's scared me.

K.T. It scares everybody R.

R.R. But some people I don't think it scares enough though. People don't all change.

K.T. No they don't. It seems from what you are saying that you have to stay a little bit scared in order to stay well. When you don't have symptoms, you aren't going to keep up the changes.

R.R. I know and that's what scares me.

K.T. A little bit of fear will help?

R.R. I wanna keep that fear, yeah. I want to keep the memory. People forget childbirth, right (laughing). They always say, if you remembered what you went through the first time, you wouldn't go through it again. With child birth you want to forget cause if you want to have another kid you forget. And you do it again. But I don't want to go through another heart attack. I wanna keep that memory.

Drawing from her first experience with childbirth, she described how forgetting a pain experience led her, in part, to repeat the process a second time. For R.R., the analogy contributed to her sense of vulnerability in the absence of symptoms. Another respondent recognized only too well how important the pain memory was to her long-term wellness, even though she would never wish to actually re-experience the sensation. Describing her pain as "unbelievable", K.Z. drew this fine distinction in the following way:

K.Z. [The memory] it goes quickly. You'll quickly forget that's how you felt unless you are reminded of it and I don't want to be reminded of it but I do want to remember that.....the feeling that I had.

The importance of symptoms is clearly recognized by many women as central in their efforts to optimize heart health. However, this is something of a double-bind. They do not want to re-experience them, but they also recognize that they might well see themselves as no longer at risk if they no longer have symptoms. Virtually all the women interviewed conceded this point. Another example comes from Mrs. O.L., a 59 years old women whose husband had died eight years previously:

K.T. Do you think that not having any symptoms at all might encourage people to forget about what's going on and not take care?

O.L. I think that is very true. If I don't have any symptoms then I find myself mowing the lawn and fooling in the garden....then I stop and think, maybe I shouldn't be doing all this....If there was a twinge or something, then I would stop immediately, but because there isn't I think I'm fine and I'm barrelling away.

K.T. Do you feel that without those symptoms you might be reckless?

O.L. Yes. A couple of times when I got up fast I went a little dizzy and it was a reminder that I'm not supposed to do that. And sometimes if I walk for too long I'll get an uncomfortable feeling in my chest - it's a reminder. If you were connected to a monitor when you were doing all this, you would very easily see.

When O.L. was experiencing severe angina, she underwent angioplasty, a revascularization procedure, in which a balloon catheter is inserted through a distal artery, and fed into the occluded coronary vessel. The inflatable tip is expanded in the midst of the fatty plaque that is stemming the blood flow, and it squeezes the atheromatous material against the wall of the artery. This can provide immediate relief of pain and reduce the damage to the myocardium. The problem however, besides risks occurring during the procedure, is that the rubbery plaque can re-expand back into place and occlude the artery again. It was during this procedure that O.L., like K.Z. suffered a heart attack. O.L's coronary artery also collapsed during the angioplasty and had to be reinforced or propped-up by a dacron stint that will remain in the artery, growing into its wall over time. This procedure, despite the co-occurring disasters, saved her life. However, in conjunction with the potent medicines that she will also have to take for as long as she lives, technology has effectively rid this woman of symptoms, yet those symptoms are interpreted by her, as the eyes with which she could "very easily see" what was happening to her heart. If absence of symptoms is as potentially deadly as these narratives suggest, then a clinical and ethical dilemma presents itself to medicine. A good response to medication no doubt helped M.B. to reach rather excessive physical activity goals, for despite her level of exertion she claimed to be symptom-free. She knew though, that symptoms could have resulted in moderation of her behaviour:

K.T. A concern though is that if patients don't have symptoms, they may forget that their heart needs on-going care. Could that be a problem for you?

M.B. Yes. I recognize that as being a problem.

K.T. So if you had symptoms, they might help you in terms of......

M.B. Yes. 'cos then I would do something about it. But I don't have any symptoms. I don't even get breathless.

K.T. So for you, lack of symptoms is a blessing in one sense and a burden in the other.

M.B. That is right.

The degree to which patients feel threatened by the heart attack, by the likelihood of a further heart attack or by the possibility of death, can be greatly potentiated by care-givers who fail to provide adequate information. All too often, women in the present study reported their frustration over lack of information, unreliable information, and conflicting information, all of which contributed significantly to their perception of threat both during hospitalization and following discharge. The researcher approached K.Z. three days after she had been discharged from intensive care to invite her to participate in the study. Her irate husband, obviously tired and very worried, stood up and, towering above the researcher demanded, in a very loud voice, that she find someone who could tell them whether or not his wife had, in fact, had a heart attack in the first place. He had received conflicting information of a particularly perplexing sort. As his wife later explained:

K.Z. First I was told that I'd had three heart attacks, then I was told I didn't have any. Then I did have one during the angioplasty but no-one told me that until four days later.

K.T. That must have been extremely difficult. You didn't know what you were dealing with.

K.Z. Dr. B. (patient's G.P.) initially told us that I had had three heart attacks. Then he left and Dr. J. (cardiologist) came in shortly after that and my husband said, "Did she really have three heart attacks?" Dr. J. said, "No, no, she hasn't had any heart attacks". He didn't know why Dr. B. would have said I had three. I don't know -it was a real mix-up. We just sat there with our mouths open.

K.T. Were you angry?

K.Z. I was cheezed off. Then Dr. B. went on holiday, and he had another doctor taking over and he also said I hadn't had any.

K.T. So which account do you buy?

K.Z. As far as I know, I went in with unstable angina. I had an angiogram and they wanted to do an emergency angioplasty but because it was the weekend and because I seemed to be stabilizing, they felt it would be better to wait till Monday. I waited for the whole weekend for the angioplasty....I had it on Monday morning and on Thursday I found out that I had had a heart attack during the angioplasty. My husband knew.

K.T. Somebody told him?

K.Z. One of the doctors told him...I thought something must have gone wrong because I felt absolutely horrible...I felt something had happened. I had the feeling that something wasn't quite right. We didn't question too much because we knew so little about it.

K.T. So you had an intense need for information because you weren't sure what was going on. It seems like having information is a way of coping for you.....

K.Z. Yeah, yeah. The nurses wouldn't say anything. They didn't tell me what medicines I was taking and why....I had to go back last Friday, six weeks later (six weeks after discharge from hospital) and I said to the doctor, "What do I have? What is it called? I leaned over and said, "Would you please tell me what I have. Is it a disease, is it a condition, or what? What is the name of it? I didn't know whether to call it by the atherosclerosis, and I couldn't pronounce that each time but I knew it had some connection with it. I knew they had cleaned out these arteries. Basically I had to educate myself.

From K.Z's narrative, we learn that her physicians' contradictory descriptions of what had happened to her left her with no choice but to piece together an explanatory model of the illness that made sense to her. This was essential for her as she attempted to take stock of the harm she had endured, to contemplate and hopefully act so as to off-set future harm, and to muster her resources to cope with the challenge of a new and very different life-style. Her analysis was based upon her own experience and the small amount of objective data that she was finally able to glean. According to her account, she was admitted with unstable angina and suffered a heart attack during angioplasty. This account depicts the cause of the infarction as iatrogenic.

As Janis (1974) noted 20 years ago, vigilance or the attentive search for information is particularly important under conditions of threat. Folkman and Lazarus (1988) later confirmed Janis's (1974) assertion and included it in their Ways of Coping Inventory under the dimension, 'seeking social support'. Informational support, to use their term, can be essential for persons in adverse circumstances because it assists in the undoing of harm and in the prevention of future harm.

Responding to the threat of heart disease, women were invariably future-orientated. They barely acknowledged the harm that their hearts had sustained as a result of the infarction, instead focusing heavily upon the threat of future harm and how they would take up the challenge of reducing that risk of harm. One possible explanation as to why this is so, is that patients, through no fault of their own, have very little idea how their hearts work. This is a notorious gap in information that may leave them feeling ill-equipped to discuss the extent of the damage. Mrs. O.L. put it this way as she discussed her angioplasty:

O.L. You see it in a picture or a model and it seems so neat, the arteries are here and the veins are there and so on. During the angioplasty you see it a little differently, working with blood pulsing through it. Just seeing my heart there with the arteries made me realize how ignorant I am of my heart and how it works....I thought of my heart, "you poor little heart, I have made you work too hard and caused you all these problems".

K.T. So you saw your heart on the monitor when they did the angioplasty?

O.L. Oh yes, but it didn't seem to be part of me. It was over there somewhere on a screen.

Over half a century ago, in Being and Nothingness (1943) Sartre described a similar experience in which his 'self' seemed completely detached from the parts of his anatomy that the physicians scrutinized with such interest during x-ray examination.

> "So far as the physicians have had any experience with my body, it was with my body in the midst of the world and as it is for others. Of course during a radioscopy I was able to see the picture of my vertebrae on a screen, but I was outside in the midst of the world. I was apprehending a wholly constituted object as a this among other thises, and it was only by a reasoning process that

> I referred it back to being mine; it was much more my property than my thing" (p. 303).

This raises interesting speculations about the effect of organ visualization for diagnostic purposes, upon the body-self relation. But this question is far beyond the scope of the present study.

Another plausible explanation for the reticence in discussing damage to the heart is that culturally, it is so very central to one's sense of self, not just physiologically but also psychologically and spiritually. Besides its centrality in human biologic life, the heart is a symbol of one's nature and generosity, of the capacity to care, love, nurture, and forgive. Any physical damage that it sustains may be perceived by the patient as having the capacity to threaten these important elements of the self-concept. Not realizing that they may be suggesting to their patients the very worst of human 'being', physicians and nurses, in an attempt to convey an understanding of the nature of the damage to their hearts "in a language that patients can understand" almost invariably resort to descriptors such as 'hard', or 'dead'. In the vernacular of the cardiology out-patient department, many patients learn that a percentage of their heart is "dead". This inaccurate terminology is clearly very distressing for patients who are trying to manage their anxieties in the recovery period. While this may seem to the practitioner to be a useful image in transmitting complex information clearly and expediently, it is unquestionably traumatizing in a psychological sense. Mrs. A.S described how she was brought, unwillingly, into intimate contact with her heart during her angiogram, a serial x-ray of the coronary vessels following the injection of a radio-opaque substance into a peripheral artery. It is a commonly utilized diagnostic test that provides unique information as to the size and location of the occlusion, and may help determine the best approach to treatment. Some women, like A.S. reported that they were not given the choice of whether or not they wanted to watch the screen during these procedures, rather it was presented as something that would fascinate and distract their attentions from worries surrounding the procedures. This is clearly not always the case:

A.S. It's hard to explain what feelings you have that leave a scar for the rest of your life. To know and see that part of you is dead. It's hard.

K.T. You saw this when you had your angiogram?

A.S. That's right. I was told which one of my arteries was in the picture. Dead. It looked like the tentacles of an octopus around my heart, tearing and squeezing. And you want to peel it and pull it away because it looks so ugly inside of you and you know about it now. In your mind you can't get over it because it's there, it's there....It would be better if I hadn't seen and if I had had it explained to me in a different way, that I am sick, that my heart is sick or whatever, instead of saying dead.

For Mrs. A.S., the term, 'dead' implies an irreversible situation that effectively leaves no room for recovery, that a term such as, 'sick' or 'injured' might have implied. Though frightening, one can not ignore that these images in this case may have served as a motivating influence because at the time of the interview, six weeks after her heart attack, A.S. had radically altered her diet and lost 43 pounds as a result, was exercising regularly, and reported feeling much better. She repeatedly expressed a strong commitment to following life-style change recommendations. So from a theoretical perspective, we may argue that despite the traumatogenic experience of angiography and the troublesome images that prevailed upon her, perceived threat was at an optimum level for A.S. in that she was making a concerted effort to modify her risk-factors and preserve her well-being over the long term.

In contrast, R.R. did not experience the visualization of her heart, rather she had the 'death' of 55% of her heart described to her by her family physician. Her cognitive response to the information that a significant percentage of her heart was dead, was that no amount of effort could possibly salvage the situation, so why bother to try. Her narrative provides evidence for the perils of this mortal language in so far as it has the potential to dampen as opposed to heighten her motivation.

> R.R. He says half my heart is dead. He just about blew me away. I'm a single parent - my kids are seven and ten. If half my heart is dead, I've had it haven't I? Not much I can do to turn that around.

To add to this woman's difficulties in understanding the damage to her heart, her general practitioner discharged his responsibilities to her regarding the transfer of information, by giving her a photocopy of the letter he had received from her cardiologist. This letter was not only hand-written and indecipherable, but it was also full of medical jargon and laboratory values that were utterly incomprehensible to the patient. Despite the potentially disabling conclusion she came to after all of this, namely that there was not much she could do to alter a hopeless situation, at the time of interview she was trying very hard to follow the treatment regimen and make some major changes in her life-style.

Interview data are helpful in imposing some degree of directionality in the relation between threat, incapacitation, and affect. However the eligibility criteria for entry into the study reduced the variability in degree of incapacitation, thus limiting the analysis. Women from whom data were gathered were fairly evenly matched in terms of their physical capacity by six to eight weeks post-infarction. This was largely due to the fact that, according to study entrance criteria, they could not have other life-threatening pathologies co-existing with their heart disease, they could not have experienced major complications in the recovery phase, and they could not be classified at Level 4 of the Canadian Cardiovascular Society Classification for physical functioning. Despite this limitation, there is some indication that women recognized how important the retrieval of physical activity was in the maintenance of positive affect. Being able to attain, or at least come close to attaining the level of physical functioning that characterized pre-infarction life sends a strong message to patients, attesting to improvement. Women vigorously pursued their pre-illness self in relation to activity level.

In the case of M.B. her determination to restore her former physical capacity was impressive, though it caused the researcher some concern. At the time of interview, six weeks post-infarction, M.B. was back at work full-time and single-handedly maintaining her large, immaculate home and garden. A passionate football fan, she was attending games as often as possible and, from her description, enthusiastically entering into the fray at the top of her lungs, whenever the opportunity arose. One dreaded to think what sort of psychological effect severe incapacitation would have upon this woman if it were to last for any length of time.

M.B. I don't want - want is what I want to emphasize - I don't want to slow down, I don't want to get old, I don't want to be ill. I want to be as I have always been....People like me tend to rationalize. I feel fine, I look fine, I am performing up to what I was doing before. So why should anyone tell me that I shouldn't be doing this and I shouldn't be doing that. I'm having a job forcing myself to slow down like people are telling me to do, instead of just listening to my own body.

K.T. If you had symptoms as a result of all that you are doing, might that be helpful in a way?

M.B. Yes, 'cos then I would do something about it, but I don't have any symptoms.

K.T. So lack of symptoms is a blessing in one sense and a burden in the other.

M.B. That's right. The cardiologist is going crazy 'cos I don't take any notice of him..... But you see I'm so happy to be back at work. I am so pleased with myself that I can work and not feel tired or not feel any different to what I was before. I'm pleased that I'm also doing the house-keeping. I know I'm the type that needs to be busy. I need to be doing things... I probably overdo it. I have an awful time slowing down. I've always lived at a frantic pace. Being told not to is so aggravating. I'd go balmy if I couldn't do what I do.

Thus, M.B. describes how, provided she has no symptoms, she feels secure in reverting to her physically demanding life-style. Were she not able to restore her sense of self in this way, it seems very likely that the affective consequences for her would be dire. Over and over again women describe how physical limitations lead to despair. With her youngest daughter's wedding only weeks away, P.M. expressed her sadness this way:

P.M. I made a cake yesterday because my sister is coming to stay. I wanted to sit down badly, I was so tired. I sat there and just wept.

K.T. So these physical limits are hard to take.

P.M. Yeah. The hardest - when I can't do something I get so frustrated. I've done everything at top speed ever since I can remember.

As a final example, A.H., a teacher, recognizes that her emotional well-being is very much dependent upon the restoration of her physical capacity:

A.H. To be able to go back to work, to be able to function around the house the way I did before, so that I am just like a person without a heart condition. That's what I want.

K.T. Does your emotional reaction change as your recovery proceeds?

A.H I went through a period when I was feeling very sad, then I was angry, then I was anxious. But I was most anxious when I first came home. But I haven't at all been bothered recently.

K.T. Do you think that is related in any way to your increasing ability and strength?

A.H. Definitely, and people telling me, "My, you look good, you look so healthy. You haven't looked so healthy in a long time. That really helps me. I'm so scared of being sick.

K.T. So would things be very different for you in terms of your emotional response if you were physically very debilitated?

A.H. I'm sure they would. I'd be crying all the time, I'm positive.

To re-iterate, because there were no severely incapacitated respondents in this sample, women could only speculate as to what sort of emotional reaction they would experience should these undesirable circumstances be imposed upon them. They were unequivocal in their assessment of this feared though feasible eventuality in their lives. It was as if they knew vicariously what Robert Murphy (1988) tragically learned first-hand that, "Of all the psychological syndromes associated with disability, the most pervasive and the most destructive is a radical loss of self-esteem" (p. 73).

It is so tempting to join with these women and celebrate their physical recovery. These returning physical abilities, far more than any laboratory values, provide them with the most intimate, meaningful, and comprehensible evidence of well-being. It was difficult not to be infected by M.B's obvious delight in her activity level, as she described how she would swoop through her house with a vacuum cleaner, without feeling any adverse effects. However, the researcher worried that M.B's. healing heart might not be able to withstand the demands she was placing on it. So despite the reassuring message that may be available to women who are so physically active six weeks after the heart attack, this reassurance might come at very heavy cost.

There is a sad sequel to M.B's. story that should be told. On the night of September 1 1994, she was re-admitted to St. Boniface Hospital with a second, more severe heart attack. Her condition was serious enough to warrant medical intensive care. Later that day she underwent emergency angioplasty to improve blood flow to the heart and relieve her very severe chest pain. She returned home in the shadow of considerable physical limitation that she, no doubt, would find unbearable. At the time of writing, M.B's. condition is unknown.

Case Three

Ms. A.H. was still very debilitated when the researcher met her in hospital to invite her into the study. At 52 years of age, she was the only woman in the sample to have suffered a silent infarction, in other words she had very few symptoms and no chest pain during the acute episode. Her husband called an ambulance because she collapsed in the kitchen at seven o'clock in the morning when she was making coffee. The only symptoms she ever experienced were nausea and weakness. Once at the hospital, due to the absence of symptoms, no-one recognized that she required prompt attention, and so she was left to wait with her husband for some time. Eventually, a technician ran an electro-cardiogramme and raised the alarm when he discovered that she was in the midst of an infarction. A flurry of activity ensued and she was admitted to medical intensive care, where she remained for a week. The symptomless experience of heart attack worried her tremendously, in the sense that should it happen again, she would not experience the cardinal signs that would lead her to phone for help. It is not surprising that she took herself back to hospital a number of times during her recovery phase, because she interpreted some minor discomforts, common in early recovery, as a further, silent heart attack.

A.H had taught law and economics for many years and she was eager to return to work. Information-seeking was a coping strategy she had always relied upon in the past to manage stress, and she had gathered a fair amount of material about heart disease. So it came as a surprise to her, that she could not bring herself to look at any of it. This may have been a function of the kind of heart attack she experienced. But there is an alternative explanation that may be found in an apparent contradiction in the quantitative data on ways of coping, where a strong positive correlation was found between the conceptual opposites, escape-avoidance and accepting responsibility.

Primary Narrative: Ms. A.H.

A.H. I should probably be doing more research on heart disease myself. I find it difficult to read those articles. I think it brings it home and maybe I don't want to bring it home.

K.T. Does the material frighten you?

A.H. A bit. I mean, I am constantly aware of the heart problem. It's not that I'm trying to pretend that I don't have one. But to see the information in black and white bothers me. Sometimes it bothers me.

K.T. O.K. Let me see if I've got this right. On the one hand you want to increase your knowledge because that's a way of coping for you, but then at the moment you feel like you need to avoid it, and that's a way of coping for you too.

A.H. That's right. I've read a few of the things I have here, but I haven't gone out searching for more information. I could go to the library and borrow books but I haven't done that. That's most unusual for me. Usually I research myself to death. Whenever I am going to teach a new topic I have everything ever written on it - I have all the books. I'm always improving my notes, so I borrow another law book or whatever. But with this, I'm avoiding any of that. It sounds contradictory doesn't it?

K.T. Maybe.

A.H. Maybe in time it will change. I really don't know. It has come as a great surprise to me. When I came home from hospital, we phoned the Heart and Lung Association and a whole bunch of places to get information and I just assumed that I would keep seeking information, but I haven't.

K.T. So you recognize that for you, at this time, avoiding this stuff helps you to cope. I wonder whether reading that material in some way is symbolic of having heart disease -it somehow confirms that you do have this condition that you would rather not have. Might it be the same with some of the other recommendations A., like watching your diet, exercising, not smoking. Could it be the case that if you do those things, that confirms for you that there is a problem that needs to be fixed? Or does that not fit.

A.H. No. I'm watching my diet, I've cut right down on the smoking - I haven't quite stopped but I'm almost there, I'm exercising, taking my medicines. To actually sit down and read, I don't know - for some reason I can't read about it at all right now....I want to detach myself from it as far as the reading goes, but not from the rest of it. I think this whole thing reminds me of death. It really reminds me of death, and I think by reading about it, I feel closer to death.

Conceptual Theme: Ways of Coping

Conceptually, Folkman and Lazarus (1988) describe information-seeking as a form of social support that, in conjunction with other dimensions of coping, such as accepting responsibility and problem-solving, are likely to lead to behaviours that would off-set risk, whereas others, such as escape-avoidance and confrontation may lead to behaviours that would increase risk of further complications. The mixed feelings A.H talked about, in terms of learning about heart disease, point to the difficulties we may have in tracking the coping process. The approach-avoidance behaviours do appear contradictory - gathering information because of an eagerness to learn, then being unable to open the pages of the books and pamphlets that sit untouched, on her desk. Even she was perplexed:

A.H. Maybe in time it will change. I really don't know. It has come as a great surprise to me. When I came home from hospital, we phoned the Heart and Lung Association and a whole bunch of places to get information and I just assumed that I would keep seeking information, but I haven't.

Using the ways of coping variable to help predict or explain health behaviour is like aiming at a moving target, so to speak, particular when we are trying to understand behaviour in the constantly fluctuating context of recovery from a life-threatening illness. Theoretically, that process is characterized by cognitive and behavioural changes that are a function of the continuous appraisals of a shifting person-environment relationship (Folkman & Lazarus, 1988). Thus it is to be expected that coping is hard to measure and explain, and it should not be forgotten that tone time only measurement undertaken in this study, is of limited value and serves as a foundation for further study.

It will be recalled that Folkman and Lazarus (1988) define coping as the cognitive and behavioural efforts to manage specific demands appraised as taxing or exceeding the resources of the individual. Given the nature of the illness that was under investigation in this study and the treatment regimen that was prescribed for all participants, it was argued that risk-reduction behaviour, in and of itself, was a significant way of coping with the stress imposed by coronary artery disease. The risk-reduction behaviours of the women in this study, as they were seen and reported, certainly tended towards treatment adherence, however that adherence could not be described in general, as meticulous. Some respondents, like E.P. and E.W., both of whom were interviewed, exhibited exemplary risk-reduction efforts, and it appears from the data that their behaviour stemmed from their realistic cognitive appraisal of risk and their beliefs in the efficacy of the treatment prescribed. Others, equally cognizant of risk and convinced of the benefits of behavioral change might target two or three behaviours, but find themselves unable to integrate the entire treatment regimen into their lives. So for example, some women would only cut down on smoking by a half or a third, but make significant changes to their diet and exercise habits. Others might persevere with smoking cessation but choose not to deprive themselves of some of the high fat foods that they enjoyed so much. From a self-regulation perspective, such as provided by Conrad (1985), these data are suggestive of the creation of a "practical practice" (p. 29), in which the medical regimen, only a part of the illness whole, is integrated into the patient's life in a way that is meaningful and manageable for that particular individual. Of concern, of course, is that even minimal health promotion efforts, occurring in the immediate aftermath of an infarction, well documented in the literature with male samples, may not endure (e.g., Hentinen, 1986; Sivarajan et al., 1983). Whether this tendency is also found in women, could only be discerned from longitudinal research that were to examine beliefs and behaviours with a repeated measures design.

From the narratives, there are many examples that illustrate the three-part cognitive appraisal sequence that Folkman and Lazarus (1988) describe as underpinning behavioural attempts to modify the stress, in this case the stress of heart disease. Responses of the women in this study suggest that the steps in this appraisal process are not mutually exclusive, but rather they overlap, with the individual shifting back and forth between phases in a non-linear fashion, as the illness unfolds.

In primary cognitive appraisal, the degree of harm sustained is realized by the respondent, and an estimate is made of past behaviours that may have contributed to its occurrence. For example Mrs. J.M. had been warned many times by her physician that her excessive body weight, largely brought about by a diet high in fat, salt, and sugar, was placing her at high risk, a risk that was potentiated by a strong family history of heart disease:

> J.M. Just this morning I was thinking, am I going to have another one of these and will that be the end? It isn't pleasant to live with that thought. You start thinking of all the things you wished you had done, but now it gets critical. The whole problem is that I have used food to carry me through. I can't use food any more, I've got to deal with things some other way. So I'm trying to say to myself, " You want to be here, you want to watch the grand-children grow up and see how the world is going to turn out and so on, so you've got to cope without the food". When something upsets me, I'll look for something sweet to eat. It's almost like a gun going off. Now I've swallowed this anger, I have to go out and swallow the sugar. I can't do that any more.

J.M. had been "panic stricken" by the experience of heart attack, no doubt potentiated by the recent death of her sister as a result of heart attack. She was still grieving over this sudden death of a close family member only one year before. Her previous way of coping with stress was perceived by her as having created the difficulties she now faced, and she recognized the importance of trying to change that approach.

In secondary appraisal, an evaluation of what might happen and how bad it might be, is undertaken. The recognition of threat, future harm by definition, causes the woman to consider possibilities for prevention of further morbidity. In looking for ways to off-set further risk, an evaluation of options, resources, and limitations has to be undertaken. R.R. described this phase of the cognitive sequence and her resultant behavioural plan as follows:

R.R. I knew I wanted to live. So the way I coped was to change totally. Like a 180 degree or whatever reversal in my life-style. And that's how I coped, I quit smoking. I knew I had to change my life-style if I wanted to continue living.

The resources that she recognized as helping her bring this threat of future harm under control included, "determination", "stubbornness", and the strong desire to continue living and be able to take care of her young sons.

E.P. was equally realistic about what might happen. She considered carefully what she herself could do about it, while at the same time, recognizing the limitations imposed by family history:

E.P. I know what happened and I know it can happen again. I am not putting blinders on, I am looking at the facts. I know it can happen again and I'm doing everything possible to prevent it.

Evaluating one's resources at this stage highlights the demand for information, information that Janis (1974) believed was particularly important under conditions of threat. For women in this study, that information was often missing or incomplete. Obviously, it is very difficult to determine what you might do to manage, when you are not even sure of the exact nature of the threat that you face. The shockingly divergent stories that K.Z. was told left her bewildered as to what she should do.

K.Z. Dr. B. (patient's G.P.) initially told us that I had had three heart attacks. Then he left and Dr. J. (cardiologist) came in shortly after that and my husband said, "Did she really have three heart attacks?" Dr. J. said, "No, no, she hasn't had any heart attacks". He didn't know why Dr. B. would have said I had three. I don't know -it was a real mix-up. We just sat there with our mouths open.

In the end, in an attempt to modify the stress, she constructed her own account: one that made sense to her:

> K.Z. As far as I know, I went in with unstable angina. I had an angiogram and they wanted to do an emergency angioplasty but because it was the weekend and because I seemed to be stabilizing, they felt it would be better to wait till Monday. I waited for the whole weekend for the angioplasty....I had it on Monday morning and on Thursday I found out that I had had a heart attack during the angioplasty.........Basically, I had to educate myself.

From this position of self-enlightenment, she developed her coping strategies that included vigorous behavioural efforts to off-set future risk, efforts that were potentiated by her desire not to deprive her eight year old daughter and husband, respectively, of a mother and wife.

In the stage of cognitive re-appraisal, theory maintains that individuals review the situation from the perspective of what could be gained as opposed to what has been lost (Folkman & Lazarus, 1988). This sense of challenge, like threat, is future orientated. In the case in question then, women would be more likely to reduce the stress of challenge if they have a positive outlook, are enthusiastic and interested in the challenge as it has been presented, and believe that they have some of the resources to manage.

It becomes apparent from this analysis that, due to the nature of cardiovascular disease, patients have the potential to simultaneously experience harm, threat, and challenge and to describe and exhibit discernible cognitive and behavioural responses to each of the three types of stress. Narrative evidence suggests that women who are recovering from heart attack are cognitively and behaviourally most deeply invested in the challenge that confronts them. In other words, their image of themselves moving safely into the future, depends significantly upon their ability to make the life-style changes that are likely to optimize heart health. Theory would predict that responding to challenge in this adaptive way, depends in part, upon positive re-appraisal of the life-threatening event, in which a search for meaning, as Taylor (1983) suggested, is be undertaken. Two examples illustrate this point:

P.M. I've always loved beauty and colour, but I find it more so - and my grand-daughter more so now. I find myself now hugging everybody. A friend came yesterday that I haven't seen since my heart attack, usually I don't hug Joe, but I gave him a big hug. I realized that I was lucky to see him again. I wasn't getting fulfilment before. Now I find myself more conscious of the world..........This is a warning for me, a warning for me to try to change my life. To slow down and start enjoying what I've got and be thankful for it.

This theme was pursued at quite some length by K.Z. For example:

K.Z. I'd like to take this heart attack and make it more positive for myself. I think it was sort of the step I needed to take stock.....I don't think I would have done that unless I had a good shake. This was rather extreme though. I never had time to stop and enjoy things, especially my little girl. Now I'll appreciate things more.

In thinking about the importance to women's safety of their response to challenge, the perils of frightening, disabling language used in describing damage to the heart again springs to mind. In the often incomprehensible hi-tech environment of cardiovascular medicine, patients can be very easily thwarted in their cognitive and behavioural efforts to reduce risk, by language that suggests an irretrievable state of affairs. Recall R.R's statement:

R.R. He says half my heart is dead. He just about blew me away. I'm a single parent -my kids are seven and ten. If half my heart is dead, I've had it haven't I? Not much I can do to turn that around.

In disclosing some of these general findings to practitioners, who have been particularly interested in how this research is progressing, it is fair to say that both physicians and nurses have welcomed the findings in relation to language, and they claim to be trying hard to find alternatives.

Conclusion

The process of triangulation undertaken in this study, not only allows for valid quantification of variables, but also for the opportunity to enter, if only briefly, into the context of the respondent's experience. Here, a sharpened image of beliefs and behaviours can be obtained. With qualitative and quantitative methods being applied during the same time period, the researcher was able to compare data derived from these techniques and to evaluate the strengths and weaknesses of each. Using two methods to answer the same set of questions is undoubtedly an arduous process, but given the nature of the research undertaken here, the level of understanding that was reached was considerably greater than if either qualitative or quantitative methods had been used alone. A problem though, is that having learned first-hand the benefits of multiple methodology, this researcher expects to feel some modicum of uncertainty in relation to findings, whenever only one method or the other is used to address empirical questions of this sort.

It is clear that qualitative techniques can, as purported, enhance the century-old tradition in psychology of quantitative description and explanation of hypothesized relations between variables. From conversations with respondents, whether in formal interviews or casual discussions, it was apparent how helpful the qualitative data could be in refining the survey instruments. It was also evident that, no matter how well-developed the instruments might be, if the researcher is trying to account for phenomena that are in ever-changing relation to one-another, such as thoughts, beliefs, intentions, and behaviours, closed-ended questions will never be wholly adequate.

But by itself, qualitative data obtained from notoriously small samples, can be so vivid and persuasive, that the serious limitations of such sampling can be too easily overlooked. Another potential pitfall of the qualitative technique used here, is that when respondents are particularly reflective, insightful, and articulate during interview, their stories can seem like the ultimate account against which all other survivors' experiences should be measured. On the other hand, survey instruments that by design, limit the description respondents are allowed to provide, can result in the narrowed and distorted image that Kleinman (1988) and others (e.g., Bernheimer, 1986;) have warned about. In conducting this research, both these problems have been found to exist. In describing them, as a means to concluding this thesis, the intention is to convey to the reader what has been gained through the use of a pluralistic methodology.

Of considerable interest in this study was the relation between self-enhancing beliefs and risk-reduction behaviour, and whether that relation could be explained by the degree to which a first heart attack was perceived by respondents as threatening.

It was believed that if a survivor were psychologically predisposed to perceiving this sudden, potentially fatal illness as moderately threatening, as opposed to minimally or overly threatening, then she would be most likely to act in such a way as to off-set future risk.

Survey data revealed an absence of the self-serving bias that, according to Taylor (1983) and others (e.g., Bulman & Wortman, 1977; Taylor, Lichtman, & Wood, 1984) could play such an important role in the psychological adaptation to threat. It found that women were not unduly threatened by the experience of heart attack or thoughts of their future health status, that their coping strategies generally evidenced engagement with the stressor, and that overall, their health behaviour showed adherence to the treatment regimen for all five behaviours. Interview data confirmed the absence of a self-serving bias, but it found threat to be consistently high. It yielded an image of coping that was difficult to track and showed behaviour to be quite uneven; it drew attention to the complexities surrounding women's health promotion efforts.

In narrative form, women clearly described how a sense of threat and vulnerability was crucial to life-style change, but it was apparent that a heart attack, in and of itself, would be unlikely to adequately account for either perception of threat or health behaviour in survivors, even if the resultant physical limitations were similar. Other variables associated with the actual attack itself emerged as important, both in the perception of threat and in the motivation of behaviour. The degree of pain experienced is potent in memory, as is shortness of breath, and whether or not the patient lost consciousness. Women did report an association between their symptoms at the time of hospitalization and their perception of threat. This in turn appeared to affect their health behaviours. For example, those who were reduced to tears as they recalled their excruciating pain, describe their fears more readily and demonstrated significant commitment to some of the hardest behavioural changes to maintain, namely stopping smoking and following a low fat diet. The respondents who had silent infarctions with no onset symptoms, or those who had minimal symptoms, were less afraid about the episode itself, but worried about how they would know in the future, if they were having another heart attack.

Besides symptoms at the time of onset, discussions revealed that not only is the **on-going** experience of symptoms an important motivator in health behaviour, of greater concern is that women worry that absence of symptoms might actually derail their risk-reduction efforts. In addition, a positive family history that gave women the example of a comparison other, seemed to enhance their sense of vulnerability as well as their acknowledgement of the need for behavioural change. Being closely related to someone who had had a heart attack, witnessing their experience and perhaps their ultimate demise appears to be of great importance, at least in the assessment of risk. The need to measure these variables would not have been apparent from survey data. Obviously these questions can be asked quantitatively, but without the discussions undertaken with the women in this study, the need to ask them would have been overlooked. A thorough review of the literature failed to show that either onset variables, on-going symptoms, or family history were important in relation to understanding health behaviour.

Qualitatively, the examination of coping proved to be very difficult indeed, and without the structure provided by the survey instrument, patterns in women's experience would have been obscured. Whereas they could talk easily about issues such as their beliefs in future health, their experience of anxiety, their beliefs in treatment efficacy, or their health behaviours, they struggled to find the words that described the ways in which they coped. Coping is undoubtedly a more abstract concept, a response that goes on without too much attention being paid to it. In interview women repeatedly asked for clarification of the question, "How have you coped with the stress of this illness". Initially, many women claimed not to know how they coped, but when examples were given from the survey, they would know immediately whether or not that strategy applied to them. So although they could recognize ways of coping that they had used, they found these very difficult to generate without some assistance. The Ways of Coping Inventory (Folkman & Lazarus, 1988) furnishes a breadth of this concept that would be difficult, if not impossible to replicate in interview, and it results in a more refined analysis than could be obtained from discussion alone.

From the Health Behaviour Scale (Miller, Johnson, Garrett, Wickoff, & McMahon, 1981), the pattern of behaviours that emerged was one of generally high levels of adherence. While it had been previously used with male samples, in contrast to the qualitative data obtained here, it provided what Kleinman (1988) would describe as a distorted view. Women's health behaviours appeared not to be consistently high as the scale suggested. As they attempted to integrate these often difficult behavioural limitations into their lives, their behaviours were, as a self-regulation account would predict, very mixed, sometimes inconsistent, and clearly subject to variation in accordance with physical and emotional wellbeing, both of which could fluctuate markedly in the early days of recovery. So in this case, the instrument was not broad enough to capture the nuances that were so apparent from discussion.

In the qualitative assessment of behaviour the researcher fell into the trap that can be created by expressive repondents who are very enthusiastic about the opportunity to describe their experiences. Some women who had managed to effect some behaviour change were rightly gratified by this sort of progress. They could describe their successful dietary change, or exercise regimen, or smoking cessation in dramatic terms, accompanied by a detailed account of how very difficult the change could be. Sometimes women would describe a single change in behaviour as if they had completely altered every aspect of their lives, so consuming was their effort. So it could happen, in analyzing interview data the researcher could take just one of these rich descriptions of change in one behaviour, and conclude that health-promotion behaviour overall, was exemplary. Only by letting some time lapse between these compelling face to face encounters and re-reading the transcripts, could a more realistic, even-handed analysis be completed.

Used together, these complementary methodologies have provided considerable insights into women's behaviour following heart attack, they have illuminated the potential pitfalls of interviewing and the inadequacy of existing psychometric measures, and they have indicated the direction future enquiry should take. For the researcher, this study has resulted in a deep appreciation of the misery that coronary artery disease can bring to women's lives and also of the extraordinary difficulties people face when they attempt to change the habits of a life-time. The major task facing the research community is to find ways to prevent this disease and to that end, it will be important for women to realistically appraise the extent of their own vulnerability.

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APPENDIX A

Survey Instruments

Multidimensional Health Locus of Control Scale

(Wallston, Wallston & DeVellis, 1978)

Please circle the number which corresponds to how much you agree with each of the following statements. Use the following scale for your responses.

1 = strongly disagree
2 = disagree
3 = neither agree nor disagree
4 = agree
5 = strongly agree

1. If I get sick, it is my own behaviour which determines how soon I will get well again.
1 2 3 4 5

2. No matter what I do, if I am going to get sick, I will get sick.
1 2 3 4 5

3. Having regular contact with my physician is the best way for me to avoid illness.
1 2 3 4 5

4. Most things that affect my health happen to me by accident.
1 2 3 4 5

5. Whenever I don't feel well I should consult a medically trained professional.
1 2 3 4 5

6. I am in control of my health.
1 2 3 4 5

7. My family has a lot to do with my becoming sick or staying healthy.
1 2 3 4 5

8. When I get sick I am to blame.
1 2 3 4 5

9. Luck plays a big part in determining how soon I will recover from an illness.
1 2 3 4 5

10. Health professionals control my health.
1 2 3 4 5

11. My good health is largely a matter of good fortune.
1 2 3 4 5

12. The main thing which affects my health is what I myself do.
1 2 3 4 5

13. If I take care of myself, I can avoid illness.
1 2 3 4 5

14. When I recover from an illness, its usually because other people (for example nurses, doctors, family, friends) have been taking care of me.
1 2 3 4 5

15. No matter what I do, I am likely to get sick.
1 2 3 4 5

16. If it's meant to be, I will stay healthy.
1 2 3 4 5

17. If I take the right actions I can stay healthy.
1 2 3 4 5

18. Regarding my health I can only do what my doctor tells me to do.
1 2 3 4 5

Ways of Coping Questionnaire
(Folkman & Lazarus, 1988)

A heart attack is undoubtedly, a stressful event. Different people use different ways of dealing with stressful events. Please read each of the following statements and indicate the extent to which you used each strategy in order to cope with the knowledge that you had had a heart attack. Please use the following scale for your responses.

0 = Does not apply or not used
1 = Used somewhat
2 = Used quite a bit
3 = Used a great deal

1. I just concentrated on what I had to do next - the next step.
0 1 2 3

2. I tried to analyze the problem in order to understand it better.
0 1 2 3

3. I turned to work or another activity to take my mind off things
0 1 2 3

4. I felt that time would make a difference - the only thing to do was to wait.
0 1 2 3

5. I bargained or compromised to get something positive from the situation.
0 1 2 3

6. I did something that I didn't think would work - but at least I was doing something.
0 1 2 3

7. I tried to get the person responsible to change his or her mind.
0 1 2 3

8. I talked to someone to find out more about the situation.
0 1 2 3

9. I criticized or lectured myself.
0 1 2 3

10. I tried not to burn my bridges but leave things open somewhat.
0 1 2 3

11. I hoped for a miracle.
0 1 2 3

12 I went along with fate - sometimes I just have bad luck.
0 1 2 3

13. I went on as if nothing had happened.
0 1 2 3

14. I tried to keep my feelings to myself
0 1 2 3

15. I looked for the silver lining so to speak. I tried to look on the bright side of things.
0 1 2 3

16. I slept more than usual.
0 1 2 3

17. I expressed anger to the person(s) who caused the problem.
0 1 2 3

18. I accepted sympathy and understanding from someone.
0 1 2 3

19. I told myself things that helped me feel better.
0 1 2 3

20. I was inspired to do something creative about the problem.
0 1 2 3

21. I tried to forget the whole thing.
0 1 2 3

22. I got professional help.
0 1 2 3

23. I changed or grew as a person.
0 1 2 3

24. I waited to see what would happen before doing anything.
0 1 2 3

25. I apologized or did something to make up.

0 1 2 3

26. I made a plan of action and followed it.

0 1 2 3

27. I accepted the next best thing to what I wanted.

0 1 2 3

28. I let my feelings out somehow.

0 1 2 3

29. I realized that I had brought the problem on myself.

0 1 2 3

30. I came out of the experience better than I went in.

0 1 2 3

31. I talked to someone who could do something concrete about the problem.

0 1 2 3

32. I tried to get away from it for a while by resting or taking a vacation.

0 1 2 3

33. I tried to make myself feel better by eating, drinking, smoking, using drugs or medication.

0 1 2 3

34. I took a big chance or did something very risky to try to solve the problem.

0 1 2 3

35. I tried not to act too hastily or follow my first hunch.

0 1 2 3

36. I found new faith.

0 1 2 3

37. I maintained my pride and kept a stiff upper lip.

0 1 2 3

38. I rediscovered what is important in life.

0 1 2 3

39. I changed something so things would turn out alright.
0 1 2 3

40. I generally avoided being with people.
0 1 2 3

41. I didn't let it get to me; I refused to think about it too much.
0 1 2 3

42. I asked advice from a relative or friend I respected.
0 1 2 3

43. I kept others from knowing how bad things were.
0 1 2 3

44. I made light of the situation - I refused to get too serious about it.
0 1 2 3

45. I talked to someone about how I was feeling.
0 1 2 3

46. I stood my ground and fought for what I wanted.
0 1 2 3

47. I took it out on other people.
0 1 2 3

48. I drew on my past experiences. I was in a similar situation before.
0 1 2 3

49. I knew what had to be done so I doubled my efforts to make things work.
0 1 2 3

50. I refused to believe that it had happened.
0 1 2 3

51. I promised myself that things would be different next time.
0 1 2 3

52. I came up with a couple of different solutions to the problem.
0 1 2 3

53. I accepted the situation since nothing could be done.
0 1 2 3

54. I tried to keep my feelings about the problem from interfering with other things.
0 1 2 3

55. I wished that I could change what had happened or how I felt.
0 1 2 3

56. I changed something about myself.
0 1 2 3

57. I daydreamed or imagined a better time or place than the one I was in.
0 1 2 3

58. I wished that the situation would go away or somehow be over with.
0 1 2 3

59. I had fantasies or wishes about how things might turn out.
0 1 2 3

60. I prayed.
0 1 2 3

61. I prepared myself for the worst.
0 1 2 3

62. I went over in my mind what I would say or do.
0 1 2 3

63. I thought about how a person I admire would handle this situation and used that as a model.
0 1 2 3

64. I tried to see things from the other person's point of view.
0 1 2 3

65. I reminded myself how much worse things could be.
0 1 2 3

66. I exercised.
0 1 2 3

Self-Enhancing Beliefs Scale (Unrealistic Optimism)

Please imagine for a moment a group of women of the same age as yourself who have also experienced a heart attack. In comparison to these other women what do you think the chances are that the following health problems will trouble you at some point in the future. Please circle the appropriate response using the following scale:

- 4 = very much below average
- 3 = much below average
- 2 = moderately below average
- 1 = below average
0 = average
+ 1 = slightly above average
+ 2 = moderately above average
+ 3 = much above average
+ 4 = very much above average

1. Diabetes
-4 -3 -2 -1 0 +1 +2 +3 +4

2. Arthritis
-4 -3 -2 -1 0 +1 +2 +3 +4

3. High Blood Pressure
-4 -3 -2 -1 0 +1 +2 +3 +4

4. Stroke
-4 -3 -2 -1 0 +1 +2 +3 +4

5. Heart Attack
-4 -3 -2 -1 0 +1 +2 +3 +4

6. Alzheimer's Disease
-4 -3 -2 -1 0 +1 +2 +3 +4

7. Ulcers
-4 -3 -2 -1 0 +1 +2 +3 +4

8. Migraine Headaches
-4 -3 -2 -1 0 +1 +2 +3 +4

9. High Cholesterol
-4 -3 -2 -1 0 +1 +2 +3 +4

10. Depression
-4 -3 -2 -1 0 +1 +2 +3 +4

Self-Esteem Scale
(Rosenberg, 1965)

Please circle the number which corresponds to how much you agree with each of the following statements.

1 = strongly disagree
2 = disagree
3 = neither agree nor disagree
4 = agree
5 = strongly agree

1. I feel that I am a person of worth, at least on an equal plane with others.
1 2 3 4 5

2. I feel that I have a number of good qualities.
1 2 3 4 5

3. All in all I am inclined to feel that I am a failure
1 2 3 4 5

4. I am able to do things as well as most other people.
1 2 3 4 5

5. I feel that I do not have much to be proud of.
1 2 3 4 5

6. I take a positive attitude towards myself.
1 2 3 4 5

7. On the whole I am satisfied with myself.
1 2 3 4 5

8. I wish I could have more respect for myself.
1 2 3 4 5

9. I certainly feel useless at times.
1 2 3 4 5

10. At times I think I am no good at all.
1 2 3 4 5

Centre for Epidemiological Studies Depression Scale
(Radloff, 1977)

Below is a list of the ways you might have felt or behaved recently. Using the scale provided please circle the number under each statement which best describes how often you have experienced these feelings/behaviours **during the past week.**

0 = rarely or none of the time (less than one day)
1 = some or a little of the time (one to two days)
2 = occasionally or a moderate amount of the time (three to four days)
3 = Most or all of the time (five to seven days)

1. I was bothered by things that usually don't bother me.
0 1 2 3

2. I didn't feel like eating; my appetite was poor.
0 1 2 3

3. I felt that I could not shake off the blues even with help from my family or friends.
0 1 2 3

4. I felt that I was just as good as other people.
0 1 2 3

5. I had trouble keeping my mind on what I was doing.
0 1 2 3

6. I felt depressed.
0 1 2 3

7. I felt that everything I did was an effort.
0 1 2 3

8. I felt hopeful about the future.
0 1 2 3

9. I thought my life had been a failure.
0 1 2 3

10. I felt fearful.
0 1 2 3

11. My sleep was restless.
0 1 2 3

12. I was happy.
0 1 2 3

13. I talked less than usual.
0 1 2 3

14. I felt lonely.
0 1 2 3

15. People were unfriendly.
0 1 2 3

16. I enjoyed life.
0 1 2 3

17. I had crying spells.
0 1 2 3

18. I felt sad.
0 1 2 3

19. I felt that people dislike me.
0 1 2 3

20. I could not 'get going'.
0 1 2 3

Self-Enhancing Beliefs Scale (Overly Positive Self-Evaluation)

Compared to women in general, how would you rate yourself on the following characteristics. Please circle the appropriate response using the following scale:

- 4 = very much below average
- 3 = much below average
- 2 = moderately below average
- 1 = below average
0 = average
+ 1 = slightly above average
+ 2 = moderately above average
+ 3 = much above average
+ 4 = very much above average

1. Organized
-4 -3 -2 -1 0 +1 +2 +3 +4

2. Responsible
-4 -3 -2 -1 0 +1 +2 +3 +4

3. Adaptable
-4 -3 -2 -1 0 +1 +2 +3 +4

4. Philosophical
-4 -3 -2 -1 0 +1 +2 +3 +4

5. Self-disciplined
-4 -3 -2 -1 0 +1 +2 +3 +4

6. Resourceful
-4 -3 -2 -1 0 +1 +2 +3 +4

7. Sensitive
-4 -3 -2 -1 0 +1 +2 +3 +4

8. Objective
-4 -3 -2 -1 0 +1 +2 +3 +4

9. Imaginative
-4 -3 -2 -1 0 +1 +2 +3 +4

10. Motivated
-4 -3 -2 -1 0 +1 +2 +3 +4

11. Attentive
-4 -3 -2 -1 0 +1 +2 +3 +4

12. Discriminating
-4 -3 -2 -1 0 +1 +2 +3 +4

13. Creative
-4 -3 -2 -1 0 +1 +2 +3 +4

14. Determined
-4 -3 -2 -1 0 +1 +2 +3 +4

State Anxiety Inventory

(Spielberger, 1983)

A number of statements which people have used to describe how they feel when they think of their heart attack are given below. Read each statement and then circle the number that best indicates how you feel about your heart attack right now, that is at this moment. There are no right or wrong answers; do not spend too much time on any one statement but give the answer which seems to describe your present feelings most closely. Please use the following scale.

1 = not at all
2 = somewhat
3 = moderately so
4 = very much so

1. I feel calm.

1 2 3 4

2. I feel secure.

1 2 3 4

3. I am tense.

1 2 3 4

4. I feel strained

1 2 3 4

5. I feel at ease.

1 2 3 4

6. I feel upset.

1 2 3 4

7. I am presently worrying over possible misfortunes.

1 2 3 4

8. I feel satisfied.

1 2 3 4

9. I feel frightened.

1 2 3 4

10. I feel comfortable.

1 2 3 4

11. I feel self-confident.

1 2 3 4

12. I feel nervous.

1 2 3 4

13. I am jittery.

1 2 3 4

14. I feel indecisive.

1 2 3 4

15. I am relaxed.

1 2 3 4

16. I feel content.

1 2 3 4

17. I am worried.

1 2 3 4

18. I feel confused.

1 2 3 4

19. I feel steady.

1 2 3 4

20. I feel pleasant.

1 2 3 4

Trait Anxiety Inventory
(Spielberger, 1983)

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the number beneath each statement to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one statement, **but give the answer that best describes how you generally feel.** Please use the following scale.

1 = almost never
2 = sometimes
3 = often
4 = almost always

1. I feel pleasant.

1 2 3 4

2. I feel nervous and restless.

1 2 3 4

3. I feel satisfied with myself.

1 2 3 4

4. I wish I could be as happy as others seem to be.

1 2 3 4

5. I feel like a failure.

1 2 3 4

6. I feel rested.

1 2 3 4

7. I am 'calm, cool and collected'.

1 2 3 4

8. I feel that difficulties are piling up so that I can not overcome them.

1 2 3 4

9. I worry too much over something that really does not matter.

1 2 3 4

10. I am happy.

1 2 3 4

11. I have disturbing thoughts.

1 2 3 4

12. I lack self-confidence.

1 2 3 4

13. I feel secure.

1 2 3 4

14. I make decisions easily.

1 2 3 4

15. I feel inadequate.

1 2 3 4

16. I am content.

1 2 3 4

17. Some unimportant thought runs through my mind and bothers me.

1 2 3 4

18. I take disappointments so keenly that I can't put them out of my mind.

1 2 3 4

19. I am a steady person.

1 2 3 4

20. I get in a state of tension or turmoil as I think over my recent concerns and interests.

1 2 3 4

Health Attitude Scale

(Miller, Wikoff, McMahon, Garrett, & Johnson, 1981)

Following heart attack women are advised to make life-style changes that may improve their health. I am interested in knowing how you rate each of these recommendations on the word scales that appear on the following pages. Each life-style recommendation is followed by a word-set of opposites. Think about each life-style change and then circle the number for EACH word pair that is closest to the word that best describes how you feel about it.

A) EATING A DIET LOW IN FAT AND SALT

SUCCESSFUL UNSUCCESSFUL

3 2 1 0 1 2 3

VALUABLE WORTHLESS

3 2 1 0 1 2 3

HARMFUL HELPFUL

3 2 1 0 1 2 3

DIFFICULT EASY

3 2 1 0 1 2 3

GOOD BAD

3 2 1 0 1 2 3

HEALTHY UNHEALTHY

3 2 1 0 1 2 3

UNNECESSARY ESSENTIAL

3 2 1 0 1 2 3

AGGRAVATING SOOTHING

3 2 1 0 1 2 3

FAIR UNFAIR

3 2 1 0 1 2 3

B) FOLLOWING AN EXERCISE PROGRAMME

SUCCESSFUL UNSUCCESSFUL

3 2 1 0 1 2 3

VALUABLE WORTHLESS

3 2 1 0 1 2 3

HARMFUL HELPFUL

3 2 1 0 1 2 3

DIFFICULT EASY

3 2 1 0 1 2 3

GOOD BAD

3 2 1 0 1 2 3

HEALTHY UNHEALTHY

3 2 1 0 1 2 3

UNNECESSARY ESSENTIAL

3 2 1 0 1 2 3

AGGRAVATING SOOTHING

3 2 1 0 1 2 3

FAIR UNFAIR

3 2 1 0 1 2 3

C) TAKING MEDICATIONS

SUCCESSFUL UNSUCCESSFUL

3 2 1 0 1 2 3

VALUABLE WORTHLESS

3 2 1 0 1 2 3

HARMFUL HELPFUL

3 2 1 0 1 2 3

DIFFICULT EASY

3 2 1 0 1 2 3

GOOD BAD

3 2 1 0 1 2 3

HEALTHY UNHEALTHY

3 2 1 0 1 2 3

UNNECESSARY ESSENTIAL

3 2 1 0 1 2 3

AGGRAVATING SOOTHING

3 2 1 0 1 2 3

FAIR UNFAIR

3 2 1 0 1 2 3

D) REDUCING STRESS

SUCCESSFUL UNSUCCESSFUL

3 2 1 0 1 2 3

VALUABLE WORTHLESS

3 2 1 0 1 2 3

HARMFUL HELPFUL

3 2 1 0 1 2 3

DIFFICULT EASY

3 2 1 0 1 2 3

GOOD BAD

3 2 1 0 1 2 3

HEALTHY UNHEALTHY

3 2 1 0 1 2 3

UNNECESSARY ESSENTIAL

3 2 1 0 1 2 3

AGGRAVATING SOOTHING

3 2 1 0 1 2 3

FAIR UNFAIR

3 2 1 0 1 2 3

E) STOPPING SMOKING

SUCCESSFUL						UNSUCCESSFUL
3	2	1	0	1	2	3
VALUABLE						WORTHLESS
3	2	1	0	1	2	3
HARMFUL						HELPFUL
3	2	1	0	1	2	3
DIFFICULT						EASY
3	2	1	0	1	2	3
GOOD						BAD
3	2	1	0	1	2	3
HEALTHY						UNHEALTHY
3	2	1	0	1	2	3
UNNECESSARY						ESSENTIAL
3	2	1	0	1	2	3
AGGRAVATING						SOOTHING
3	2	1	0	1	2	3
FAIR						UNFAIR
3	2	1	0	1	2	3

Health Behaviour Scale

(Miller, Johnson, Garrett, Wickoff, & McMahon, 1981)

The following items refer to how people who are recovering from heart attacks behave in different situations. Please describe your behaviour in the two situations that follow.

A) WHEN I AM AT HOME

a) I follow my prescribed diet.

1	2	3	4	5
Rarely				Always

b) I refrain from smoking

1	2	3	4	5
Rarely				Always

c) I follow prescribed activities

1	2	3	4	5
Rarely				Always

d) I take the medications prescribed for me

1	2	3	4	5
Rarely				Always

e) I avoid stressful situations

1	2	3	4	5
Rarely				Always

B) WHEN I AM IN A SOCIAL SITUATION

a) I follow my prescribed diet.

1	2	3	4	5
Rarely				Always

b) I refrain from smoking

1	2	3	4	5
Rarely				Always

c) I follow prescribed activities

1	2	3	4	5
Rarely				Always

d) I take the medications prescribed for me

1 2 3 4 5

Rarely Always

e) I avoid stressful situations

1 2 3 4 5

Rarely Always

Self-Enhancing Belief Scale (Exaggerated Control)

Imagine again a group of women of the same age as yourself who have also experienced a heart attack. In comparison to these other women, to what extent do you feel that <u>you personally have control</u> over whether or not the following health problems will trouble you at some point in the future. Please circle the appropriate response in accordance with the following scale:

- 4 = very much below average
- 3 = much below average
- 2 = moderately below average
- 1 = below average
0 = average
+ 1 = slightly above average
+ 2 = moderately above average
+ 3 = much above average
+ 4 = very much above average

1. Heart Attack
-4 -3 -2 -1 0 +1 +2 +3 +4

2. High Cholesterol
-4 -3 -2 -1 0 +1 +2 +3 +4

3. Alzheimer's Disease
-4 -3 -2 -1 0 +1 +2 +3 +4

4. Arthritis
-4 -3 -2 -1 0 +1 +2 +3 +4

5. Diabetes
-4 -3 -2 -1 0 +1 +2 +3 +4

6. Stroke
-4 -3 -2 -1 0 +1 +2 +3 +4

7. Depression
-4 -3 -2 -1 0 +1 +2 +3 +4

8. High Blood Pressure
-4 -3 -2 -1 0 +1 +2 +3 +4

9. Migraine Headaches

-4 -3 -2 -1 0 +1 +2 +3 +4

10. Ulcers

-4 -3 -2 -1 0 +1 +2 +3 +4

Primary Appraisal Scale (Perceived Threat)

(Waltz, Badura, Pfaff, & Schott, 1988)

People who have had heart attacks have described their particular concerns over possible aspects of the illness. Please use the following five point scale to indicate the degree to which you feel worried by these concerns.

1 = not at all
2 = somewhat
3 = neutral
4 = moderately so
5 = very much so

1. The possibility of a further heart attack

   1 2 3 4 5

2. The possibility of not getting well again

   1 2 3 4 5

3. The recurrence of pains associated with heart disease.

   1 2 3 4 5

4. The fear of death.

   1 2 3 4 5

5. Not being able to make plans for the future.

   1 2 3 4 5

6. Not being able to achieve those things in life that I had planned to do.

   1 2 3 4 5

7. Not knowing what I am still able to do.

   1 2 3 4 5

8. The possibility of a worsening of my health.

   1 2 3 4 5

9. No longer being able to cope with physical and emotional strain.

1 2 3 4 5

10. Never again becoming what I was before the heart attack.

1 2 3 4 5

11. A decrease in what I am able to do.

1 2 3 4 5

12. Having to give up many things in the future.

1 2 3 4 5

13. Being sometimes helpless and alone.

1 2 3 4 5

14. Being reminded of my illness by fatigue and heart symptoms.

1 2 3 4 5

15. Having to cut back what I expected and aimed for in life.

1 2 3 4 5

16. The possibility of a loss of independence in the future.

1 2 3 4 5

17. An adverse impact of illness on my relations with other people.

1 2 3 4 5

18. No longer looking forward to the same joy in life as before the heart attack.

1 2 3 4 5

Degree of Incapacitation Scale

Please read the following statements and circle the number that best describes what you are presently able to do in regard to physical activity .

I would experience tiredness, rapid heartbeat, breathlessness, and chest discomfort (pain, pressure, tightness) if:

1) I carried a heavy load or ran up the stairs.

2) I carried a moderate load or walked up a steep hill.

3) I carried a light load on level ground or walked slowly up a flight of stairs.

4) I walked on the level or took a shower.

Please circle the number that best describes your current physical ability:

1) I can carry out usual activities without experiencing any physical symptoms.

2) I haven't had to abandon any former activities but I carry them out at a slower pace.

3) I have had to change jobs (if previously employed) and abandon at least one usual activity.

4) I am unable to work either in or out of the home and have had to give up many usual activities.

Demographic Data

1. **What is your year of birth?** ______________________________

2. **Education**

   Grade 8 or less ____

   Some High School ____

   High School Diploma ____

   Some College ____

   College Degree ____

   Graduate Degree ____

3. **What is the approximate annual income of your household?**

   ----

4. **Marital Status**

   Never married ____

   Common Law ____

   Married ____

   Widowed ____

   Separated/Divorced ____

5. **Have you read the Heart Talk book?**

   YES ____ NO ____

6. **Did you have angioplasty following your heart attack?**

   YES ____ NO ____

APPENDIX B

Protocol For Semi-Structured Interviews

Preliminary questions regarding the heart attack will assist the patient to become centred on the episode and will allow the respondent to verify dates of illness and recovery period elapsed since hospitalization.

A) ORIENTATION

What was the date of the heart attack?

What were you doing when it happened?

How did you know that you were having a heart attack?

Had you ever experienced symptoms like this before?
[If yes, when, what did you do, were you ever treated for these symptoms, if so, by whom?]

What do you remember about your hospitalization?

B) PERCEIVED THREAT

Has this been a particularly frightening experience for you or not?

If yes, does that fear change as time goes by? How (greater/lesser). What in particular are you presently afraid of in relation to your heart attack?

If no, is this characteristic of the person's general response to threatening circumstances. When in your life have you felt afraid?

C) SELF-ENHANCING BELIEFS

The way in which these questions are asked will be based upon the degree to which the respondent describes the heart attack as threatening.

IF PERCEIVED THREAT IS LOW
You have just described yourself to me as someone who did not feel particularly threatened or frightened by what others might see as a very frightening experience.

1) POSITIVE SELF-VIEW In comparison to others - let's say others who would be afraid of a heart attack - what is it in your make-up do you think that stops you being frightened by it?

2) OPTIMISM So your heart attack didn't frighten you to any great extent. What about the future. What do you think the chances are that other illnesses will trouble you further down the road.

3) CONTROL So you don't believe that other illnesses will trouble you further down the road. To what extent do you believe that you have control over whether or not those illnesses occur?

IF PERCEIVED THREAT IS HIGH.

In comparison to others - let's say others who would not be afraid of this sort of event, a heart attack - what is it in your make-up do you think that causes you to be afraid?

2) OPTIMISM This heart attack has been for you, as it is for many people, a very frightening event. What about the future. To what extent are you worried that other illnesses will trouble you further down the road.

3) CONTROL So you do worry somewhat about other illnesses but to what extent do you believe that you have control over whether or not those illnesses occur?

D) EMOTIONAL REACTIONS

ANXIETY

After a serious illness many people experience strong feelings as they go through the process of recovery. There are two emotional reactions that can be particularly troublesome. One is anxiety. I don't know whether this has or has not been part of your experience but let me ask you (NAME) would you generally describe yourself as an anxious person or do you tend to be the cool, calm, and collected type?

IF THREAT IS HIGH: So given that tendency to worry, it comes as no surprise to you that you feel very threatened by your heart attack.

IF THREAT IS LOW: So given your tendency not to be a worrier, it fits with your typical reaction to things that you have not felt overly threatened by the heart attack.

IF ANXIOUS: What sort of things do you do to help reduce your feelings of anxiety?

DEPRESSION

The other common emotional reaction to serious illness is sadness or depression. Has this been a problem for you?

During your recovery period has it been the case for you that your mood has been affected by your physical strength?

E) COPING

Different people use different ways of managing or coping with the stressful events in their lives. Can you tell me some of the ways in which you generally cope with stress? (Examples of ways of coping include attacking the problem head on/ shutting it out/ not letting it get to you/ finding support from other people/ holding ourselves responsible and so on.

Think particularly about your illness and being in hospital.

What has been the hardest part of this illness for you and what have you done to cope?

F) HEALTH LOCUS OF CONTROL

I am interested in knowing what or who you think has the most control over your health.

G) HEALTH BELIEFS

After a heart attack people are told to do certain things to improve their heart health.
What were you advised to do? (e.g reducing fat, taking regular exercise, stopping smoking, managing stress, and taking medicines. [Establish understanding of each part of the regimen and the respondent's belief in its efficacy for her]).

Not everyone believes that these things are effective in helping to stay healthy.

What is your view about these guidelines? Do they make sense to you?

Do you think you will be able to do these things? Why? What is it about you that makes you believe that you will follow the recommendations for maintaining a healthy heart?

H) HEALTH BEHAVIOURS

The wording of this section will depend upon previous answers to questions about beliefs in treatment efficacy, and the degree of incapacitation exhibited by the respondent.

Tell me what it is that you are doing that you believe will contribute to the promotion of your health?