CHAPTER II
REVIEW OF LITERATURE

The hypothesis that some diseases are caused by stress and may be related to certain aspects of personality, has been widely accepted, although the evidence for it is not always very convincing. Many physicians over the centuries, relying on personal experience and insight have postulated such relationships (Eysenck, 1980). However, the notion of psychosomatic disorders and especially of Ischaemic heart disease only became widely accepted through the advocacy of dynamically oriented investigators. The tangled history of this concept in the last 30 years or so tells of many methodological inadequacy, theoretical incompatibility and experimental poverty. The concepts of 'stress' and 'personality' are also usually considered as quite separate but this is a grievous error. They are closely related for two main reasons. In the first place, the very notion of 'stress' cannot be understood without specification of the particular organism involved in the supposedly stressful situation. The experimental literature is full of demonstrations that situations which are experienced as stressful by one person (say an introvert) are experienced as pleasant by another (say an extrovert). Stress can only be defined in terms of strain experienced by the individual and identical situations may or may not give rise to strain in different individuals. There are definite theories relating personality to stress, many of which have received strong experimental support (Eysenck 1967, 1981a). Although stress research has become fashionable only recently the medical profession has been concerned with stress for centuries. Hippocrates separated suffering caused by disease
(pathos) from suffering involved in fighting it (ponos). Thus he suggested a stresslike aspect of illness - the energy and wear caused by attempts to fight disease. Since then many notions of stress have appeared. For example Selye identified stress as a stimulus that elicits a physiological response, aimed at restoring physiological balance of the organism after provocation by an external agent. Holmes and Rahe's work (1964) focussed on stressful events rather than on measuring an actual response to an event. Lazarus emphasised the cognitive appraisal to an event, elaborating the viewpoint that an event can be stressful only if the individual perceives it to be so. In a recent report by the Institute of Medicine, National academy of Sciences on Stress and Human Health, concludes that "after 35 years, no one has formulated a definition of stress that satisfies even a majority of stress researchers," (Chesney & Weidner 1985).

The result of this new emphasis is the emergence of new questions, as well as of new standards required of scientific evidence, concerning the contributions of behavioural factors to cardio-vascular morbidity. A behavioural or psychological variable which is a candidate for identification as a significant contributor to cardio-vascular morbidity and mortality may fulfill this role in any one of three possible ways. First, it could be a predictor (risk marker) of one or more of the specific outcomes and have diagnostic or screening value by indicating the probability of a given outcome, without being part of the causal chain leading to the event. Secondly, it could be a precursor and represent an early stage of the
pathological outcome or a condition or state preceding the onset of disease; as such, the variable itself can be a suitable target for intervention assuring that its timely treatment or modification may reverse or avert the morbid process. Thirdly, it could be a modifiable risk factor, or a distal determinant of morbidity, which if modified at an early stage, may reduce the overall chances that disease could develop.

A sound epidemiological strategy aiming to test eligible variables for any one of these roles should be guided by strict inference rules which in their initial formulation were linked to communicable diseases and became known as the Henle-Koch postulates. The original criteria was reformulated and amended (Yerushalmi and Palmer and by Lilienfeld 1959) to fit the search of causes in chronic non-communicable diseases. The suspected symptoms must be found more frequently in persons with the diseases. The suspected symptoms must be found more frequently in persons with the disease than in persons without. Persons having the symptoms should develop the disease more frequently than those not having it. The importance of the relationship between the characteristic and the disease should be established. The incidence of the disease should increase in proportion to the duration and intensity of the suspected factor. The distribution of the suspected factor should parallel that of the disease. A spectrum of illness should be related to the exposure to the suspected factor. Reduction or removal of the factor should reduce or eliminate the disease. Populations exposed to the factor should develop the disease more commonly than those not exposed.
There are good reasons to surmise that owing to methodological difficulties, results reported up to date maybe, in fact, an underestimate of the actual contribution of psychosocial factors to cardio-vascular morbidity. The main type of variables implicated in psychosocial cardio-vascular disease research are independent and dependent. The independent variables fall into three broad groups (i) Objectively observable attributes or events (ii) Subjectively experienced and reported states, events and perceptions and (iii) Mixed or complex inferences combining both objective and subjective data. The Objective variable considers Type A behaviour, test measures, Habits, Health behaviour, Job characteristics and social network. The Subjective variable considers mental states, attitudes, self-image, locus of control, social isolation. The Mixed or complex variable considers stressful life events, coping style, social cohesion, "goodness of fit." On the dependent variable side of the equation, we can also divide the outcomes into three broad groups (i) Process variables e.g. coronary atherosclerosis (ii) Point events e.g. clinical point events such as infarct; electrical point events like fatal ventricular fibrillation. (iii) Episodic or recurrent events e.g. subjective phenomena like angina or objective events like rhythm disturbances (Jablensky 1982).

Cox and Mackay's transactional view of stress is thought to be the most adequate and the most useful in helping us to organise our existing knowledge. Stress, it is argued, can only be sensibly defined as a perceptual phenomenon arising from a comparison between the demand on the person and his ability to cope. An imbalance in this mechanism,
when coping gives rise to the experience of stress and to stress response. The latter represents attempts at coping with the source of stress. Coping is both psychological (involving cognitive and behavioural strategies) and physiological; if normal coping is ineffective, stress is prolonged and abnormal responses may occur. The occurrence of these and prolonged exposure to stress per se may give rise to functional and structural damage. The progress of these events is subject to great individual variation.

The main feature of the type of personality associated with coronary heart disease may be described as an exaggeration of certain otherwise rather normal behaviour patterns found in today's culture. There is a quantitative difference in behaviour between these patients and other males. The former are more active and their aggression finds its main outlet in working activities and daily life. Coronary Heart Disease seems to occur with greater frequency in individuals who tend to work harder and longer hours than others. Work is also the principal means by which these persons attempt to climb the social ladder. They channelize their aggression into hard work more than others, especially during middle age. The striving for power also demonstrates itself in the family setting as a tendency to dominate spouse and children. The desire to provide well for one's families often drives these individuals to go into ventures which are beyond their capacities. Such individuals are found more in the urban setting. These individuals do not like to take help from others. On the whole they strive for 'male achievements'. A Myocardial infarction seems to
occur following an interpersonal conflict that is sometimes acute and severe but that in many cases, is one of a series of at first seemingly trivial irritations having special meaning for the affected person. This frustration stemming from their conflict does not cause these men to engage in openly aggressive behaviour, or react in a passive manner. They tend to work harder and inhibit emotional discharges. In several patients, the onset of illness coincided with several factors related to chronic recurrent or acute conflicts such as 1) lack of success i.e. real or threatened failure or defeat in the work situation b) lack of love and submission c) no possibility for relaxation. This somatic etiology is specific in three ways. People with a personality structure like that described above will not develop Myocardial infarction if their exaggerated striving for dominance is rewarded by success in work and gratification in the family situation. A conflict in the family and/or work situation does not lead necessarily to Coronary heart disease when the person can freely discharge his feelings. Only when the combination of three causal factors like personality, conflict and inhibited behaviour combine, might lead to disease. After this hypothesis was tested, the data have given significant support to the influence of psychosocial factors in the development of Coronary Heart Disease (JJ Groen 1986).

The importance of psychosocial factors in the pathogenesis and clinical course of coronary heart disease is becoming increasingly appreciated, since Friedman and Rosenman introduced the concept of type A behaviour pattern (TABP), a considerable proportion of the research
relating to psychosocial factors has been devoted to this action-emotion complex. Although TABP has been recognised as an independent risk factor for Coronary Heart Disease in middle-aged men, more recent studies have not found its expected association with the risk of death from Coronary Heart Disease. Ruberman et al in a study of a large cohort of male survivors of (MI) found instead, that high levels of social isolation and life-stress were associated with a fourfold increase in the risk of death over a period of 36 months. It has been suggested that Type A behaviour makes subjects more prone to stress. Here is yet another definition of stress: Stress is the adaptive tension resulting from the interaction between individuals and their environment. Such interaction requires constant adaptation, and this involves three basic processes: (1) the recognition of the interactive situation, (2) the elaboration of its meaning and implications, and (3) the generation of a response.

Adaptive responses, in turn, comprise a behavioural component, affecting perceptions and accompanying physiological changes is the physiological responses to stress. In human beings, the adaptive processes are complex and subtle, and are influenced by a variety of factors such as past experiences, primary conflicts, personality traits psychopathology and the like. The interplay of these factors with the basic perceptive phenomenon determines the adaptive response to a given situation. In turn, the behavioural component of the adaptive response acts as a feedback loop on the stress generated by the interaction. If the adaptive behaviour is adequate, stress is limited or reduced (negative feedback). If
the adaptive behavior is not adequate, stress is prolonged or increased leading to further adaptive efforts (positive feedback). These are accompanied by more intense or prolonged physiological responses, and perhaps by increasingly unpleasant or disturbing affective perceptions, thereby setting the stage for somatization and malaise.

The physiological responses to stress have been extensively studied, both in animals and in man. From this research, the concept has evolved that there are basic physiological patterns of response accompanying adaptation to environmental events. The fight or flight response reaction, involving sympathetic adrenal medullary activation and the conservation - withdrawal response, involving activation of vagal and hypophysoadrenocortical mechanisms; Components of both patterns of response have been linked to essential hypertension, coronary artery occlusion, arrhythmias, and sudden death, thus establishing a pathophysiological relationship between psychophysiological phenomena and Coronary Heart Disease. It is recognised however, that the pathogenesis of all these processes is multifactorial and could act synergistically with other pathogenic factors.

Theoretical as well as practical considerations suggest the need for research into psychosocial stress constellations in pre-morbid phases. Animal studies and psychophysiologic research today increasingly support the stress concepts of Canon and Selye and their differentiation by Lazarus and Mason. The neural-autonomic and nominal components of
strong CNS excitations (sympathetic icotonic reactivity) are influenced through the hypothalamus, vis-a-vis the sympathetic nervous system on one hand and the pituitary ACTH-adrenal cortex axis, on the other. The sympathetic nervous system can have a direct effect on organ innervation (intensified by the action of glucocorticoids) and it can also release epinephrine which reaches the myocardium by way of the blood stream via the adrenal medulla. The physiologic functions of the catecholamines include cardiovascular control, metabolic regulations and regulations of endocrine secretion. The adrenal cortex also releases corticosteroids into the blood. Two types of effects may be expected to result from such massive emotional excitements; 1) effects resulting from continuous, long-term repetitions of homeostatic regulations which, acting as a 'bias' gradually become pathogenetic (e.g. continuous demand, renal secretion and plasma fatty acids). (2) Precipitating states of excitement which actually trigger the morbid event after prior damage (Dembroski 1986).

The frequency of life changes has also been associated with the occurrence of MI. Many researchers have identified residential moves, recent promotions, recent changes in workload and recent changes in marital status as important precipitating factors in MI. Sociocultural changes, such as changes in living arrangements or occupation have also been associated with an increased risk of a heart attack. Other researches have included bereavement, loss of prestige and loss of employment as risk factors for MI. Dissatisfaction with one's personal life or with work and perceived lack of job achievement are among psychological factors
frequently related to MI. In addition depression seems to be an important precursor of cardiac death among patients who have previously suffered a MI. Despite the relationship between life changes and emotions to sudden death and MI, it should be kept in mind that most studies are retrospective and can be easily confounded. In addition, most of the work on life changes has employed Holmes and Rahe Schedule of Recent Experience (SRE), which does not take into account factors that may play a mediating role between environmental events and illness outcomes. To cite just one example, not all individuals will experience a change in occupation in the same way. Subjective perception of an event may be crucial in determining its effect on a person's health and indeed researchers have demonstrated that the relationship between life changes and illness may be due to events perceived as undesirable. Stern and colleagues (1976) have also found that the greater the extent to which individuals perceive their life events as uncontrollable, the more illness they report. Considering some of the precursors of CHD such as death of a spouse, loss of prestige and loss of employment, it might be argued that personal losses over which a person has only limited control pose more severe consequences for an individual's health than do simply negative events.

Some evidence of this notion comes from a study completed (Glass and his colleagues 1977) at Texas where there were 3 groups ranging from 35 to 55. The results indicated that in contrast to the healthy controls, twice as many hospitalized patients (both coronaries and non-coronaries) had experienced at least one stressful event during the year before their
illness. The three groups did not differ in the number of negative life events involving losses were related to illness. In addition to the life-events questionnaire, all three groups were administered the Jenkins activity Survey. Not surprisingly, the coronary patients had higher JAS scores than did either the non-coronary or control group. In sum although Glass's study is retrospective, it raises an interesting hypothesis; certain behavioural characteristics of the individual (type A) in the presence of stressful events may increase a person's risk of suffering from Coronary Heart Disease.

Individuals who are engaged in a chronic struggle to achieve more and more in less and less time, and who are in competition against others, exhibit a set of behaviours that is called Type A behaviour pattern. Persons who are relaxed, unhurried, deferent and less provoked by challenges in the environment are described as Type B. Thus the type A and Type B behaviour patterns may reflect different coping strategies with environmental stress. The association between Type A behaviour and CHD was first documented in the Western Collaborative group study, a prospective epidemiologic study of 3154 initially well men working in California. By the 8.5 yr follow up, CHD had occurred in 257 men. Final results indicated that men classified as Type A at intake were 2.37 times as likely to develop CHD over the follow up period as Type B subjects after adjusting for other risk factors, the independent relative risk for Type A behaviour was 1.97. Thus Type A behaviour appears to double the risk of CHD at all levels of other risk factors. Since this study, the relationship
between Type A behaviour and CHD has received additional confirmation in the Multiple Risk Factor Intervention Trial (MRFIT).

Many different stressors have been investigated but the results are not easy to interpret. Stress can take many different forms and these probably do not have the same significance for a particular disease. In addition different coronary syndromes may have different association with the same stress.

If we consider the evidence relating such variables as general neuroticism, anxiety, depression and hypochondrasis to risk for Ischaemic heart disease, most of the evidences are from retrospective studies which are very difficult to interpret in that any relationships could represent psychological results of the disease rather than antecedents.

There is firm evidence of interaction between stress, type A behaviour and physiologic responses. Several studies have demonstrated a heightened cardio-vascular reactivity to stress in type A individuals. Dembroski et al (1977) investigated reactivity of pulse rate and blood-pressure in 10 Type A and 14 Type B men. The Type A men's pulse rates and blood pressures rose significantly more in association with controlled stress. Friedman (1975) compared 15 type A and 15 type B men who had similar plasm catecholamine levels under resting conditions. Under the stress of a competitive situation, the plasm norepinephrine concentration in Type A persons rose to 30% while that of the Type B remain unchanged.
Thus we have a hint that Type A persons might be susceptible to developing IHD because of a supersensitivity to the metabolic effects of stress.

Another group of variables that are usually thought to decrease environmental stress have been called social support factors. Berkman & Syme (1979) gave a social support questionnaire to subjects for a nine year prospective study of 6928 adults in California. Berkman & Syme found that high scores of social support were associated with two fold to fourfold relative risk. It seems probable that social support is protective specifically against Ischaemic Heart Disease but it is uncertain whether it acts independently of the traditional risk factors. With the exception of work on Type A, coronary prone behaviour, research into personality and clinical heart disease has been inconsistent and methodologically weak. The problems of using retrospective techniques are even more marked than in the case of hypertension. Infarction, angina and other signs of cardiac disorder are distressing and life threatening experiences have an enormous psychological impact on patients. They can lead to a major changes in lifestyle, reappraisal of aims and ambitions and drastic revision to attitude to health.

Thus the responses to psychological assessments in diagnosed cases may have little or no relation to prior state. The reporting biases or genuine changes in outlook of those who know they have heart disease confound almost all retrospectgive surveys. Seger et al (1974) highlighted these
drawback in a screening study of 1695 men. The 176 who were identified clinically as having IHD scored higher than healthy men on manifest and covert anxiety scales. The second of these explanations was supported in a comparison between personality ratings made prospectively and retrospectively in the Chicago Heart Study (Lebovits et al 1967). Survivors of MI showed a number of change on MMPI scales related to neuroticsim when compared with pre-illness scores. They also reported increases in awareness and concern for bodily symptoms. Furthermore the psychological profiles of those who died after infarction were different from those of survivors, (Lebovits et al 1967, Bruhn et al 1969).

Several positive associations between neuroticism and heart disease have been reported (e.g. Bengtsson et al 1973; Thiel et al, 1973; Finn et al 1974). Prospective studies of personality are not subject to the same doubts about changes after diagnosis. Some evidence suggests that neurotic traits predispose to angina (Floderus 1974). The incidence of angina in Israel prospective survey was thrice as high amongst individuals who endorsed the three anxiety questions positively compared with negative responders (Medalie et al. 1973a).

Strictly speaking, the Type A pattern is not considered to be a trait. Rather it is a set of overt behaviours that is elicited from susceptible individuals by the appropriately challenging environment. Neither is the type A pattern considered to be a typology. Rather it is thought to be a continuum of behaviours ranging from extreme Type A to extreme non-Type
A or Type B. The Framingham Type A scale also measures depression, neuroticism and anxiety and it uniquely measures negative effect and adverse symptoms that are associated with a competitive pressurised lifestyle. It is of interest to note that unlike the Framingham measure, the SI and JAS scores are not related strongly to anxiety measures and anxiety is related to incidence of coronary heart disease. Eysenck and Fulker (1982) also looked at the heritability of the three components - tenseness, ambition and activity of the A type. The raw heritabilities ranged around 0.4 but corrected for attenuation they accounted for about two-thirds of the total variance, leaving only one-third for environmental factors. This agrees well with the known heritabilities of extraversion and neuroticism. Now when we turn to the actual relationship between personality and cardiovascular disease, the evidence seems to unearth a rather curious dichotomy. In both retrospective and prospective studies workers seem to have established a positive correlation between type A behaviour (i.e. neuroticism and extraversion) and cardiovascular disease (Steptoe 1981) but when we turn to hospitalised patients the picture is rather different. Bass, in a study quoted by Eysenck and Fulker (1982) studied three groups of patients, the first of which (N=30) complained of angina but were cleared of actual cardiac damage. The second group (N=16) showed signs of slight cardiac disease, and a third group (N=53) was seriously affected by cardio-vascular impairment and required surgery. The subjects were given a thorough psychiatric interview, the Eysenck Personality Questionnaire and the Bortner Type A questionnaire. The results showed the first group (no heart disease) to have the highest psychiatric morbidity,
high scores on extraversion and neurotension and the highest scores on the A type behaviour questionnaire. The intermediate group with some cardiac impairment had the next highest psychiatric morbidity, the highest E score of all groups and the medium Type A scores. The group with serious cardiac disease scored lowest on psychiatric morbidity, on extraversion and neuroticism on the A=type behaviour.

In this type of research one could also be open to the possibility that different types of cardiovascular disease may be related to different type of personality. Thus Floderus (1974) suggests, and provides some evidence for the suggestion, that angina pectoris, hypertension and tachycardia may be related to high neuroticism and introversion, while MI and hyperlipidemia may be related to high neuroticism and extraversion, the relationship between extraversion and MI has been demonstrated by Bendine and Groen (1963). Many other studies (e.g. Bass et al 1979; Frankenhauser, Lundbent and Forsmann 1980) clearly indicate the relevance of neuroticism and extraversion to the assessment of different types of coronary prone behaviour.

The findings of Bass Dimsdale et al, and Ahnve et al (1981): an inverse relationship between neuroticism and extraversion for type A behaviour and coronary heart disease may provide an explanation along the same lines as the inverse relationship between neuroticism and cancer, i.e in terms of a lessening in strain experienced by people exposed to more frequent stressful situations, given that high neuroticism scores...
are more likely to experience severe strain than low neuroticism scorers under identical situations, this would render high neuroticism scores less susceptible to stress and strain, and have less liable to cardiovascular disease. The adequacy of such a theory would of course depend crucially on the hypothetical involvement of stress in the causation of cardiovascular disease. Here the evidence is positive. It has been found that widows suffer an above-average mortality rate in the first five years after bereavement and much of this is accounted for by cardiovascular disease (Parkes, Benjamin and Fitzgerald 1969). When men of 40 to 60 years of age who had recently suffered a heart attack were compared with a matched control group, they showed a significantly high incidence of divorce and tendency to report more frequently loss of close friends (Thiel, Parkes, and Brue, 1973). Other studies have suggested that heart disease is more common in those who have emigrated (Medalie et al 1973).

Trait anxiety/neuroticism (Kahn 1964) is the most obvious variable which might influence perceptions of stressfulness since it defines the person as being in a state of unease about the uncertainty of events; as already indicated, not many studies have included measures of trait neuroticism/anxiety. Kohn (1974) found a modest relationship between an objective measure of role conflict (the sum of pressures to change behaviour as reported by the role senders who had formal influence on the person in the focal role) and perceived role conflict. Further analysis showed however, that this relationship largely resulted from those in the sample who were high on anxiety proneness. Buck (1972) used perceptual
measures of stresses, self-report personality measures (including anxiety) and self reports of felt job pressure. These variables correlated very highly so that over 80% of the variance in job pressure was accounted for by the other variables. However perceived stresses correlated so highly with the personality variables that adding the stress or variables only accounted for a little more of the variance (9% for managers, 17% for manual workers).

Payne (1988) attempted to predict mental health (GHQ) amongst the unemployed from a model of environmental stress where the level of overall stress was determined by the balance of problems, opportunities and supports in the environment of unemployed. All measures were self report and collected over a period of two years on three occasions. At the third phase only trait neuroticism was measured using the Eysenck Personality Inventory. Trait neuroticism was strongly correlated with perceptions of problems including perceptions of financial problems. Reporting on the results of the Minnesota Heart survey, Sorenson et al (1985) found two of the sub-scales of the Jenkins activity survey to relate to aspects of the job situation which are less subjective than the role and job demand measures. Those relationships may occur because the Type A's self select into such jobs, or being types A's (and therefore partly neurotic) they may over-report the nature of their job conditions, though in this particular study that seems much less likely.
In the dispositional variables which are pertaining to study self-esteem and locus of control are important. Several writers on stress have begun to look for syndromes or collections of traits that protect people from stress. Warr (1987) has attempted to provide a conceptual structure for understanding well-being. He distinguishes between five aspects of mental health which include effective well-being, competence, autonomy, level of aspiration and integrative functioning which refers to the balance between the other four dimensions. Warr also points out that all these dimensions of symptoms/characteristics can vary over time and that they can only be treated as characteristics of a person when they occur frequently and have done so for a long time. Warr refers to this as a person's baseline mental health to make the good point that in studies of stress one is concerned with deviations from that baseline. This alone is a justification for studying individual differences in this field. Few psychologists would disagree that positive self-esteem is essential to emotional well being and this function is exemplified in people's need to protect or enhance their feelings of personal worth and effectiveness (Greenwold, 1980). The motivational perspective holds that people protect their self-esteem by making internal attributions for success and external attributions for failures and this is a consistent findings in social psychology. This cognitive style has variously been labelled as the "self serving attributional bias." Nondepressed individuals also consistently view themselves as the cause of positive outcomes but deny responsibility of negative outcomes, thus showing the self serving attributional bias previously described. Social psychologists have tended to take for granted that those ranking lower in the various
status hierarchies would have lower self-esteem than the more favoured members of society. In every society people are characteristically ordered along a number of dimensions of stratification, for example, occupational, social, class, racial, religious, gender, age and ethnic. Occupations are arranged in a well-recognised hierarchy of prestige (Hodge, Siegel and Ross 1964), ethnic preferences (including racial) are surprisingly uniform across broad segments of the society and persist over long periods of time (Bogardus 1959) and so on. This general assumption would appear to rest primarily on the following three principals of self-esteem formation (1) reflected appraisals; (2) Social comparison (3) self attribution. The principle of reflected appraisals suggested by the theories of Mead & Cooley holds that if others look up to us but if they derogate us, then our self esteem will be low; Rawls (1971) minces no words in the respect of others. The second principle of self-esteem formation is that of social comparison (Festinger 1954). Social comparison is at the heart of social evaluation theory described by Pettigrew (1967) as follows: The basic text of social evaluation theory is that human beings learn about themselves by comparing themselves to others. A second tenet is that the process of social evaluation leads to positive, neutral or negative self ratings which are relative to the standards set by the individual employed for comparison. Since it is frequently the case that privilege and disprivilege are cumulative and reinforcing, low position along one stratification dimension may produce a corresponding position along another.
The third principle of self-esteem formation is self-attribution. Kelley (1967), Bern's (1972) version of this principle, stemming from the radical behaviourist perspective of BF Skinner undertakes to explain behaviour without reference to internal psychological processes which it correctly holds, are inherently unobservable. According to this view even reports of inner states (such as hunger, anger, excitement, sympathy) ordinarily understood to be based on private internal stimuli - may in reality reflect past training in the application of certain descriptive terms to overt behaviour and the conditions under which it occurs. Bandura (1978) observes people derive much of their knowledge (about themselves) from direct experience of the effects produced their actions.

The self-esteem maintenance hypothesis also explains nondepressed individuals consistently enhance themselves relative to others and why this enhancement is accentuated under condition of high ego involvement (Alloy, Abramsons and Kossman 1985, Miller 1976, Nicholls 1975) or of direct threats to self-esteem (eg. Alloy and Abramson, 1982) The functional consequences of a self-esteem maintenance motive may be quite important. Individuals who exhibit self-enhancing biases may be less vulnerable to the effects of stressful situation and experience less self-esteem loss when faced with stress (Abramson & Alloy 1981, Fisher 1984, Hanger 1984).

In one of the most recent definitions Rosenman (1983) describes TABP as a set of "behavioural dispositions such as ambitiousness,
aggressiveness, competitiveness and impatience, including specific behaviours such as muscle tenseness, alertness, rapid and emphatic voice style and the pace of most activities and emotional responses such as irritability and increased potential for hostility and anger. He concludes: "TABP is associated with hyperadrenergic responsiveness in the daily milieu, due to perception of environmental stressors and events as challenges and threats to control. Type A individuals perceive too many things as a threat to their control over the environment and as making demands that are incongruent with their preferred rate of activity." It is important to note that this definition no longer analyses TABP in the framework of a single personality trait but favours the notion of a "characteristic style of coping response to environmental stressors". Moreover, motivational as well as cognitive processes are admitted as playing a decisive role. Research exposing subjects to uncontrollable aversive events (e.g. unsolvable puzzles) found that when compared to types B types A increase their initial efforts to control (i.e. become hyperresponsive) but give up responding when their efforts at control meet with repeated failure (Glass 1977).

Evidence shows that primary socialization plays an important part in two ways. Strong need for control is either the outcome of model learning or it acts as a compensation for experience of low self-esteem or marginal socio-emotional status during childhood and early adolescence. While these developmental issues have to be further established in longitudinal studies, our main argument focusses on the cognitive, perceptual
consequences of enhanced need for control in adult life. Individuals experiencing high need for control tend towards unrealistic appraisal of demanding, challenging situations and of their related internal coping potential. Fear of losing control is thought to stimulate over commitment either in the form of underestimation of demands and associated overestimation of coping potential, or in the form of overestimation of demands and underestimation of resources. The first case is likely to occur early in adulthood where good health, professional training and achievement motivation facilitate over commitment in terms of increased responsibility, enhanced job-involvement and extension of work related duties to private life. Experience of rewarding feedback coming from significant others reinforces this pattern. Due to this excessive need for control both patterns, that is the under and overestimation of challenges, are at first experienced as successful strategies by the individual. Yet under conditions of increased demands and obligations, continuous overcommitment may precipitate distressing experiences. Increased demands associated with limited coping abilities are likely to occur during middle adulthood, especially so in distinct occupational groups such as low status blue collar workers. Increased demands associated with limited coping abilities precipitate further stages of such a career leading to manifestation of premature exhaustion and "burn out" whereas moderate challenges or even increased demands which can be successfully met delay onset of these signs. In which way does need for control precipitate a coping career?
It is assumed that distressing experiences are not perceived in an adequate way in individuals with a strong sense of control. Cognitive patterns established in early adulthood under more successful circumstances persist even if increased efforts to meet demands are necessary and even if successful coping is unlikely. Deleterious effects on the cardiovascular system is expected in those individuals who maintain their vigorous efforts under long-lasting, control limiting conditions such as poor job security, forced downward mobility and increased financial pressure. These threats to social status do exist not only under clear-cut conditions such as job loss, but also under conditions of low control over the working environment, as expressed in situations of ambiguous or zero feedback from supervisors as well as uncertainty about pay-off of investment efforts. On the other hand in a benign working environment even individuals with enhanced need for control may be protected against intense distress as they experience more adequate reward. Thus harmful stages of their coping career may be experienced later in their life cycle.

A further step in the coping career of individuals with enhanced need for control can be characterized as follows: as the potential of distressing experiences increases and as signs of fatigue become more apparent such as vividly described in the "syndrome of vital exhaustion and depression" (Appels 1983) a more realistic awareness of the "coping me" can be expected. Feelings of "immersion" are admitted and signs of coping failure, for example, severe disturbances of the sleep-wake cycle (Siegrist 1985) become evident. This is the case in the highly vulnerably period of
imminent diseases manifestation. In many individuals, however, realistic awareness of coping failure is established only after onset of disease such as acute (MI). Successful efforts commonly experienced during early adulthood as well as in privileged living conditions are thought to be harmless to the cardiovascular system. It is only when efforts are followed by poor pay off or by loss of control that they develop their critical impact. In accordance with other investigators (Karasek et al 1982; Frankenhauser 1983; Henry 1983) we have labelled this type of experience "active distress" (Siegrist et al 1982). Active distress synergistically stimulates the sympathoadrenomedullary and the pituitary - adrenocartical system and by doing so promotes neurohormonal disbalance, which has been shown to impair the cardiovascular system (Schneiderman 1983). Active distress is likely to occur under two conditions, first in social contexts that threaten acquired social status and that impose demands under conditions of low predictability, secondly in individuals who exhibit rigid cognitive strategies of formerly successful coping under these control limiting circumstances.

One of the largest and most impressive studies was conducted by Krause and Strykes (1984) on locus of control. Their data were taken from the National Longitudinal study of Middle aged men who were aged 45-54 in 1966. Data from the 1969 and 1971 panel interviews were used. They used a shortened version of the locus of control scale which deleted items known to load on factors other than generalized locus of control (e.g. schooling and politics). Their sample contained over 2000 men and when these are divided into internals (1339) and externals (751) they found that
men with external locus of control orientations experience higher levels of psychophysical distress because of stressful events (job and economic events) than men with internal locus of control. The effects of age, marital status, race, education, occupation, income and health status in 1969 were controlled. More detailed analysis showed some intriguing results. The sample was divided into four groups of extreme internal, moderate internal, moderate external and extreme external. The relationship between stress and distress is significantly different for the moderate internal group from all other groups. Having moderate internal locus of control beliefs reduces the impact of job and economic stress. For extreme internals and extreme externals the effects of stress on psychophysiological distress did not differ, though the two variables are related for both groups. The group most vulnerable to stress was the moderate external. Krause and Stryker suggested that extreme externals are vulnerable to stress because they are less likely to both taking positive action, whilst the high internals are paralyzed by their own guilt since they believe their failure to cope is their own fault. In another study conducted by Krause (1986) on 351 older adults - he found that extreme internals and extreme externals had more depressive symptoms. He also showed that internals actually reported fewer negative life events and suggested this was because they initiated actions to avoid or ameliorate them. Thus being high internal is a mixed blessing to promote stress.

Lefcourt (1983) states that locus of control correlates with anxiety/neurotism. In the short term stress has an immediate impact on
nearly everyone irrespective of their locus of control. However, given the passage of time internals succeed in leaving their disappointments behind whilst the externals use them to confirm their belief that the world is outside their control, so their effects live on for longer.

The degree of control of the job situation may be another important dimension. Karasek et al studied the development of cardio-vascular symptoms and signs, "dyspnea", "heart weakness", "chest pain" and elevated blood pressure", among random male adult Swedes. Subjects who had reported at least two of these signs and symptoms were demonstrated to run five times the age-adjusted risk of dying a coronary death. An ample association was found between report of psychosocial job environment in 1968 and subsequent report of cardio-vascular symptoms. Those who reported good control of their job situation and or that they felt that a reasonable amount of skill was required in their job ran less risk of whether the job demands were high or not. The worst combination from the standpoint of risk however, was high demands and low control. In prospective and retrospective studies of population registers, occupations with a combination of pronounced psychological demands and low decision latitudes were observed to have a higher incidence/prevalence of MI than to have other occupations in Sweden. A measure of locus of control has been related to cardiovascular reactivity in several studies. In a study of college males, Houston (1977) found that subjects with internal locus of control exhibited greater Heart Rate responses during a memory task under conditions of both avoidable and unavoidable shock than did
those with external locus of control. In a study of college males, Manuck et al (1986) found that, compared to those with external locus of control, subjects with internal locus of control responded to a difficult concept formation task with significantly greater systolic blood-pressure responses. In one study, the same differences approached significance in the second study. In a study of college males by De Good (1985), subjects were exposed to an aversive shock-avoidance procedure in which the subject's control over rest period was varied. Subjects either had control and could temporarily escape the situation by taking a rest period or did not have control and had rest periods imposed upon them. The greatest dystolic blood pressure reactivity was observed among subjects with internal locus of control who did not have control over rest periods, and among subjects with external locus of control who did have control over rest periods. Thus dystolic blood pressure reactivity was greatest when the actual controllability of the aversive situation was incongruent with the individual's general belief with internal locus of control. In sum it appears that individuals with internal locus of control exhibit greater cardiovascular reactivity in various situations though those with external locus of control may exhibit greater dystolic blood pressure reactivity under certain limited circumstances. Both the behavioural and psychoanalytic theory illustrated that during the year before MI, vicious circles may develop. The increasing distance between aspiration and activity evokes a series of negative feelings, especially among those who are very active by nature. If one starts to feel helpless, one might direct one's energy in a last effort towards the solution of one's problem. If no relief is experienced, the feeling of
helplessness and hopelessness may be deepened. One feels tired and ill, and this leads to an increase in irritability. These irritations stimulate the hormones which may reinforce anginal pain may evoke feelings of anxiety/neuroticism, loss of control, uncertainty and loss of self esteem, thus making the chance to regain one's self confidence smaller and thus depression with its hypochondriac elements is reinforced.

It is apparent that conventional risk factors only account for part of the occurrence of CHD. The psycho-social hypothesis discussed in this thesis suggest that the personality and environments might also be very important. If the hypothesis is right, then we may expect to prevent CHD by dealing with psychosocial stress and increasing the individuals coping ability. The attraction of this hypothesis is that it can explain why some patients who get MI are overweight, while others have high serum cholesterol or high BP depending upon their genetic susceptibility. It can also explain the cases who do not have any of the recognizable risk factors. It is a working hypothesis upon which we should gather evidence without joining any specific lobby or being overawed by the eminence of the authorities with differing views.