The type a coronary-prone personality : a coping mechanism for situational control

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Coronary heart disease has evolved into a staggering and deathly threat to life. Its occurrence has increased rapidly in the last century, and is quite common in today's modern societies. This disease is especially prevalent in the United States. The number of deaths that may be contributed to heart diseases are greater than those resulting from cancer, strokes, and accidents combined. This high mortality from heart attacks and other cardiovascular diseases places the United States twenty-fourth, in terms of life expectancy for men, among all the nations of the world (Haft and Berlin, 1979).

Of significance, is the fact that the increase in coronary heart disease has paralleled the rise in industrialization. The most advanced, industrialized, and developed countries of the world have the highest coronary death rates. As countries begin to develop, their rates of coronary diseases and resultant deaths also increase (Haft and Berlin, 1979).

What is the factor that relates coronary heart disease and other cardiovascular problems to societal advancement and increased occupational demands? This paper will examine this question by first reviewing the studies done by Meyer Friedman and R.H. Rosenman which have provided evidence to suggest that there is a link between stressful situations and coronary heart disease, and which led to the development of the personality type A which is coronary prone. The physiological effects that stress may produce and the ways in which this may lead to coronary heart disease will be discussed. Also examined will be the proposal by Glass (1973) which suggests that the Type A behavior pattern is a coping mechanism whereby Type A individuals try
to maintain control over their environment even though the situation may be uncontrollable. Further studies based on this proposal will also be reviewed.

It is often suggested that emotional and occupational factors, predominantly stress, provide the link between heart disease and industrialization. Stress may result as one becomes involved in an accelerated pace of life and as greater demands are placed on one to achieve and produce. This stress then affects the heart and other organs.

Stress, as defined by Webster (1976), is, "a physical, chemical, or emotional factor (as trauma, histamine, or fear) to which an individual fails to make a satisfactory adaptation and which causes physiologic tensions that may be a contributory cause of disease". Hans Selye (1976), a pioneer in stress research has described stress as "the nonspecific response to any demand, including efforts to cope with the wear and tear in the body caused by life at any one time". The physiologic component of stress is apparent in these definitions. Stress has also been described as anything that places an extra demand on a person. This demand, which often results from an unanticipated event, will require the person to respond to it and to make an adjustment. The way in which one responds to an event will determine the adjustment and the ultimate effect the stress will have on a person. For this reason, the way in which one perceives a situation, which will vary greatly from one person to another, affects the response (Veninga and Spradley, 1981).

This idea of a relationship between stress and coronary heart disease is not new. In 1892 Sir William Osler (1892) wrote that a coronary prone individual was a "keen and ambitious man, the indicator of whose engines are set at full speed ahead", and he believed that "the high pressure at which men live and the habit of working the machine to its maximum capacity are responsible
for (arterial degeneration) rather than excesses in eating and drinking..."
Later research has provided a great deal of evidence to support this early hypothesis. The definitive research, begun in 1958, was done by cardiologists Meyer Friedman and R.H. Rosenman. Their extensive 8.5 year research study provided essentially the first evidence to support the theory that psychological stress may be a causative factor in the development of cardiovascular diseases. Their studies were initially begun with a questionnaire interview distributed to executives of various companies who were under a physician's care for treatment of coronary disease, and to physicians who had treated coronary patients (Friedman, Rosenman and Carrol, 1958). When asked what they believed to be the cause of their condition, 70% of both groups felt that the major factor contributing to heart difficulties was a specific emotional activity which was characterized by an excessive drive competition, the need to meet deadlines, and economic frustration. Fewer than 5% believed that their conditions were due to anxiety, worry, or fear, or that dietary fat might be the causative factor. The belief that stress, as evident in competitive drive, frustration and a necessity to meet deadlines was a component in the development of heart disease led Friedman and Rosenman to further investigate this hypothesis in later studies.

Based on their previous questionnaire study, and from their own experience of working with coronary patients, Friedman and Rosenman formulated a description of a behavior pattern that they hypothesized to be characteristic of a coronary-prone individual. This overt behavior pattern was labelled "Type A" and has the following characteristics:

1) intense, sustained drive to achieve self-selected but usually poorly defined goals
2) profound inclination and eagerness to compete
3) persistent desire for recognition
4) continuous involvement in multiple and diverse functions constantly subject to time restrictions (deadlines)
5) habitual propensity to accelerate the rate of execution of many physical and mental functions
6) extraordinary mental and physical alertness
   (Friedman and Rosenman, 1959)

A Type B behavior was also formulated which was the converse of Type A and is defined as the absence of Type A characteristics. Type B behavior was characterized by the relative absence of drive, ambition, sense of urgency, the desire to compete or the involvement in deadlines. A third behavior pattern, Type C, was characterized as being similar to Type B, but including a chronic state of anxiety or insecurity.

Friedman and Rosenman selected male subjects from a varying range of businesses and corporations and from the ranks of both executives and non-executives. This was important because the study was concerned not with the level of employment or the economic situation of the subject, but with the overt behavior pattern. Because the behavior pattern was overt, the subjects for the groups of Type A and B men were chosen by the selected associates who felt that the subject exhibited the behavioral characteristics of either an A or B type. Group C was composed of forty-six unemployed blind men. Behaviorally, this group was similar to Group B, but also exhibited a chronic state of insecurity and anxiety which was due to financial insecurity, as well as a physical insecurity which was due to their blindness.

Groups A and B then underwent a personal interview in which further behavioral characteristics were noted. On the basis of this interview, both groups were then subdivided into completely or incompletely developed behavior patterns. The completely developed Type A exhibited the following additional behaviors:

- excessively rapid body movements
- tense facial and body movements
- hand or teeth clenching
- excessive unconscious gesturing
- explosive conversational intonations
- propensity to finish the interviewer's questions for him
- general air of impatience
- admission of sustained drive and competitiveness
- necessity to accelerate many activities
- awareness of chronic sense of urgency in daily living

The completely developed Type B exhibited the following additional behaviors during the interview:

- sat relaxed; moved slowly and calmly
- showed no muscular tension
- spoke slowly
- rarely indulged in tense gestures
- exhibited no impatience; denied even moderate drive or ambition
- shunned competition
- avoided involvement in deadlines
- felt no sense of urgency
  (Friedman and Rosenman, 1959)

The distinctions between the two groups are obvious and most often diametrical. Two very different personality types emerge from these categorizations. Most important are the differences in drive and competitiveness, and the feelings of urgency.

Group A subjects could be described as "doers" and were felt to be capable of accomplishment. The authors felt that one of the most obvious and significant characteristics of this group was the harassment they felt due to commitments, ambitions and drives. The primary source of this feeling was because the subjects felt they were consistently faced with insufficient time in which to do the things they wanted to do or felt compelled to do. A second characterizing feature was a willingness and eagerness to compete in all types of activities. This intense competitiveness was found to extend beyond the realm of occupational challenges. Complementing these competitive drives was an intense desire to win regardless of the type of competitive activity.

In contrast, the most pronounced difference in the completely developed B personality was the relative or complete absence of the sense of time urgency that was so prevalently manifested in Type A subjects. Additional
differences were evident in that Group B men were relatively uninterested in
competitive activities, advancement or multiple goal pursuits. Generally,
Type B subjects were more content with their lives as they were.

The personal interview technique, when fully developed by Friedman and
Rosenman, became known as the Structured Interview. During this interview
subjects are presented with questions that are designed to elicit responses
that would be characteristic of Type A behavior. Observational emphasis is
placed on speech and motor behaviors and the way in which a subject answers a
question, rather than on the answer content. Several judges then rate the
subject's behavior on a four-point scale to determine the behavior type. The
Structured Interview has been proven a valuable and reliable tool in determining
behavior types and is now the preferred method of determining a Type A
personality (Dembroski and McDougall, 1979; Blumenthal, McKee, Haney, and
Williams, 1980).

At the initial stage of this study, Friedman and Rosenman found that
evaluations of interviews, questionnaires and physiological testing revealed
that the men of Group A smoked more than those of Group B and had a higher
incidence of parental clinical coronary artery disease. Arcus senilis was
seen three times more frequently among As than Bs or Cs. Arcus senilis is
a ring seen in the cornea of the eye and is often present in those with
coronary heart disease. High serum cholesterol levels and a more rapid
clotting time were also seen in Group A individuals. Both factors are
indicative of, or can lead to, cardiovascular problems. Upon a physical
examination, it was found that 28% of the Type A men exhibited symptoms of
clinical coronary disease. All of these subjects were members of the completely
developed Type A behavior pattern group. Only 3.6% of Bs and 4.3% of Cs
exhibited a clinical problem.
Using similar initial procedures, Friedman and Rosenman began the extensive Western Collaborative Group Study. This study annually followed 3,154 initial subjects for 8.5 years in order to assess which behavioral and physiological factors would be determined to be a risk for coronary heart disease. In the final 8.5 year follow-up, symptomatic coronary heart disease, as well as myocardial infarction and angina pectoris which had not been previously diagnosed, was found to be significantly associated with the following factors (Rosenman, Brand, Jenkins, Friedman, Straus and Wurm, 1975):

- parental history of coronary heart disease
- cigarette smoking and the number smoked per day
- Type A behavior pattern
- systolic and diastolic blood pressure
- serum levels of cholesterol and triglycerides
- beta/alpha lipoprotein ratio

The Type A behavior of the younger members of Group A was found to be associated with an increased incidence of both symptomatic and unrecognized infarction. The behavior pattern of older group members was associated with symptomatic infarction and angina pectoris.

The authors summarized that there was a predictive relationship between the Type A behavior pattern and coronary heart disease. While it was recognized that the relationship of any single factor would also be a reflection of its association with other factors, it was not felt that the relevance of the Type A pattern as a predictive factor was due only to its relationship with other factors.

A multivariate analysis was then performed to assess the predictive strength of the individual factors and to get an idea of the relative importance of the factors. This analysis produced a reduced set of risk factors which was found to have the same predictive strength as the full set. The significant predictive risk factors, in rank order, for the age group 39-49 years were (Rosenman, Brand, Scholtz and Friedman, 1976):
1) serum cholesterol
2) behavior pattern
3) cigarette smoking
4) age
5) systolic blood pressure
6) corneal arcus

For the 50-59 year age group, the significant predictive risk factors were:

1) behavior pattern
2) cigarette smoking
3) systolic blood pressure
4) serum cholesterol

Triglycerides and diastolic blood pressure, which were shown to have significant predictive strength in univariate analysis, were not found to be significant in the multivariate analysis. The authors concluded that they did not have significance beyond that found when associated with other factors. These findings affirmed that there is a strong association of the Type A behavior pattern with the incidence of coronary heart disease.

How does an overt behavior pattern become translated into a heart disease? The mediating factors between the behavior and the disease are physiological. The Type A behavior pattern results in a great deal of stress. Because of the pressure of deadlines, a sense of time urgency and an inclination to compete, to achieve and to win, more situations are perceived as stressful by Type As, and the Type A person will experience a larger amount of stress than a Type B.

The human body is equipped to respond to stress, but in a general way. The body reacts to any type of stress with the same response. The response occurs through the action of the sympathetic nervous system. This system acts through the catecholamines adrenalin and noradrenalin which are released from sympathetic nerve endings and the adrenal glands. The release of these chemicals causes a physiologic reaction that allows the body to protect itself. This protective response is called the fight-or-flight response. Under the influence of these hormones, the heart begins to beat more strongly and rapidly. This increases the blood flow and leads to an increase in blood pressure. The blood
is redistributed to key areas. The brain, heart and muscles all receive larger amounts of blood while the skin, gut and kidneys receive less. Sympathetic stimulation also increases the tendency of the blood to clot. The senses of seeing and hearing are heightened. These reactions occur in order for the body's responses to be quickened. The body is preparing itself to either take action against the stressor - fight, or to remove itself from the stressor - flight.

The fight-or-flight response works by four processes (Veninga and Spradley, 1981). The first step in this response is mobilization in which the body prepares itself for muscular activity. The pituitary sends out hormones to stimulate the adrenals and the thyroid. The thyroid then enables the body to increase its energy supply so that it is able to cope with the extra physical demands. The adrenals send hormones to all parts of the body. Of significance is the catecholamine release. The muscles of the body tense, blood vessels constrict and the pulse rate and blood pressure are elevated. The digestive process is slowed and hearing and smell become more acute.

Quite a bit of energy is needed to put the body into this state of readiness. For this reason, the 2nd step involves an increase in energy consumption. The body must then increase its energy output to keep up with the demands of stress. One often has excess energy during the initial stage of a stressing situation. Because of the increased body efforts of production, one often feels exhausted after sudden stress.

The third step is the muscular action involved in the fight-or-flight response. The goal of the body's preparation is to take some muscular action to rid itself of the stress. This is why we hear the incredible stories of people "fighting" to free themselves when trapped in a wrecked car and succeeding, when under normal circumstances, this feat would have been unlikely. In the path of an oncoming car, one is able to flee from the possible danger with
unusual speed and quickness resulting from the "flight" response. It is necessary for the body to take some muscular action and use the increased energy, thus releasing the body from a state of preparedness.

The fourth stage is the return of the body to a state of equilibrium. The body has released the energy and returns to a normal state. By direction of the parasympathetic nervous system, the heart resumes its steady rate and blood pressure is lowered. Vasodilation occurs and adrenal activity returns to a normal level. The body then feels relaxed and rested.

The fight-or-flight response is inborn and is part of the genetic code. This response has evolved over the years from our earliest ancestors. In primitive times, it was a survival advantage. If in danger of attack from a wild animal, it was necessary to be able to fight and kill the animal or to be able to run and get away from it. The increase in the tendency of the blood to clot was advantageous in the case of a wound. The response was appropriate for the type of stress (Haft and Berlin, 1979).

The stresses of a modern life are very different from early ones, but the physiologic response remains the same and is often inappropriate and can be dangerous. The stresses that are encountered today are often emotional, psychological and occupational stresses and not physical ones. The body's coping mechanisms enable it to accomplish great physical action, but often the choice is not fighting or fleeing. Due to the type of stress, this response is inappropriate and no action can be taken. This results in a build-up of tension. The stresses may also occur time and time again or even be ongoing. The body is constantly preparing itself for action without being able to take action. This can lead to eventual damage of the body (Haft and Berlin, 1979).
Excessive levels of adrenalin and noradrenalin can raise the blood pressure to dangerously high levels and these levels may be maintained for a long time period. During stress responses, serum lipid levels are elevated. Cholesterol levels are high under stress and triglyceride and free fatty acid levels can rise. It is believed that chronic lipid elevation may play a part in the development of the cardiovascular disease, atherosclerosis. It is known that high serum levels of cholesterol and triglycerides are associated with heart disease (Rosenman et al. 1975, Rosenman et al. 1976). Stress also reduces the ability of tissue to repair itself (Haft and Berlin, 1979). Adrenalin may accelerate the aging of the cardiovascular system which underlies coronary heart disease (Carruthers, 1980). For those persons known to have heart disease, excess stress can have further damaging effects because the heart must work harder under stress.

Fast paced modern life styles are beset with stressful situations. It is known that characteristic Type A behaviors are evident only when elicited by certain types of environmental circumstances such as uncontrollable situations (Brunson and Matthews, 1981). An individual's perception of situations or the stress of that situation may cause stress to have different effects (Veninga and Spradley, 1981). Some people view certain situations as being more stressful than others may view it. Because individuals have different perceptions of stress, Type As may view more situations as stressful than Bs.

One factor that may be part of an explanation for the rapid rise in coronary heart disease occurrence is that the Type A behavior pattern is culturally reinforced (Chesney and Rosenman, 1980). The Type A characteristics describe a competitive, achievement oriented and goal-seeking individual eager for recognition and advancement. He is an over-achiever involved in multiple pursuits who is alert and attempts to work at a rapid pace. This could be a
description of a bright, successful young executive. These characteristics are not seen as a clinical problem, but rather are rewarded by our work-oriented and achievement-motivated society.

Glass, Snyder and Hollis (1974) proposed that the Type A behavior pattern was a coping strategy which was used to maintain control over potentially uncontrollable events. The initial study that contributed to this theory dealt with the Type A characteristic of time urgency (Glass et al., 1974). A Type A individual has a predisposition to react with behavioral characteristics of As in the presence of an appropriate eliciting situation. One such situation is a task that requires a low rate of responding. This study found that Type As were unable to judge a prescribed length of time and wait long enough to make a response. They were also less successful than Bs in accomplishing this task and showed more signs of tension and hyperactivity. The demands of the low response task conflicted with the elicited behaviors of the Type A characteristic of time urgency tendencies and this led to difficulties in solving the slow response task which resulted in tension. In a second experiment of this study, the performance of Type As on a task was deliberately interfered with. The subjects showed pronounced behavioral signs of impatience and irritation because they were not allowed to pace their own activities.

In an effort to conceptualize this personality type, the authors maintained that Type A individuals have a need to control their own environment and are primarily concerned with achieving this control. A lack of control increases feelings of helplessness which lead to tension and anxiety. As a result, As accelerate the pace of their activities in an attempt to avoid the anxiety that will result from failure to cope successfully with environmental demands. When there was a potential for losing control in the slowed response task, time urgent mechanisms were activated which accelerated the responses.
Glass further defined this theory in *Behavior Patterns, Stress and Coronary Disease* (1977a).

"Type A individuals exert greater efforts than Type B individuals to master stressful events which they perceive as a threat to their sense of control. These active coping attempts eventually extinguish in the face of uncontrollable stimuli, for without reward the relentless striving and time urgency of the Type A individual leads to frustration and psychic exhaustion, which culminate in giving up efforts at control. An almost ironic reversal of behavior is then observed, with Type A individuals showing greater signs of helplessness than their Type B counterparts."

Glass also provides evidence to suggest that the three major descriptives of Type A behavior - achievement striving, time urgency and aggressiveness - relate to this coping strategy. In experiments designed to provide evidence of the relationship between these factors and coronary heart disease, Glass (1977a) found that when an event was perceived as threatening to their environmental control, Type As exert greater efforts to master that event than do Type Bs. Type As were also found to work hard to succeed, suppress subjective states, such as fatigue, if they could interfere with their performance on a task, pace their activities rapidly, are not tolerant of interruption and will show hostility during their efforts to complete a task. These behaviors were in contrast to those exhibited by Type Bs. Glass suggests that all these efforts serve in an attempt to assert control over environmental demands and requirements.

Further experiments were designed to test subjects' responses to uncontrollable stress. Glass found, as proposed, that upon presentation of a salient threatening event that is perceived as uncontrollable, Type As react with increased responsiveness or hyperresponsiveness, unlike Bs, which can be interpreted as an attempt to assert control. Upon ended exposure to uncontrollable stress, there is a decrement in the response efforts made by Type As. The perception of a task as uncontrollable often leads to learned helplessness after extended periods of exposure.
These findings were consistent with earlier research which suggests that speed and impatience or a sense of time urgency are the most important factors in determining the relationship between the Type A pattern and helplessness reactions (Krantz, Glass and Sydnor, 1974). When time urgent As perceive a lack of control, they give up the controlling efforts. As report feeling a greater degree of helplessness in uncontrolled rather than controlled situations. It was suggested that this showed a linkage between reactions to uncontrollable stress and the coronary-prone behavior pattern. Type A, as well as perceived uncontrollability, may well be precursors for coronary heart disease.

Glass' theory of the Type A behavior pattern as a coping strategy has received quite a bit of attention lately because it is an attempt to conceptualize the personality and to provide a framework for its understanding. Since the time of its proposal, numerous experiments have been designed to test the theory of control.

Important to all of this research, is the fact that the Type A behavior is exhibited only when elicited by certain environmental conditions as noted before. In addition, Goldband (1980) has found that Type As respond with autonomic nervous system hyperactivity only to particular stressors. A pathophysiological reaction took place only when a reaction time task contained a component of competition, time urgency, or loss of control. Type Bs were found to have consistent responses regardless of the components of the task. When either psychological or physical stressors contained no competitive, time urgent or loss of control components, As and Bs exhibited no differential response patterns. Type As, then, seem to respond differently to Type A relevant stimulation.

Dembroski and MacDougall (1979) studied the comparative effects of the types and levels of challenge that can evoke Type A responses. This study used
low and high challenges with two different tasks. On both tasks, As had higher systolic blood pressure and heart rate elevation. Differences were larger in the high challenge situation, but were also noted in low challenges. An analysis of personality components showed that high hostile/competitive As were the ones that responded to both low and high challenges in both tasks with corresponding physiologic elevations that compare to the overall response of As to high challenge. This suggests that high hostile/competitive As will respond even to low environmental challenge with a physiological response and that global As will respond with a physiological response when specifically challenged with a challenge of intermediate level. Therefore, challenge is an important factor in evoking a physiological response in As. High levels of challenge are necessary to evoke responses in Bs. Differences in physiological responses of the types is due to the lower threshold in As for perception of a challenge. The authors also concluded that for those with such a low threshold, the environment may not be such a large factor in determining challenge challenges since numerous events are perceived as challenging. These factors suggested that if all others factors were held constant, individuals who are prone to respond to even mild physical and social challenges with an elevated autonomic response are at a high risk for coronary heart disease. If not, they are at a lower risk (see Figure I.). The authors speculate that a measure of challenge-induced physiologic response would be a beneficial measure to be included in subject typing methods.

Results from the previous study showed that Type A men responded to challenging cognitive, psychomotor and physical performance tasks with greater heart rates and systolic blood pressures. The Goldband (1980) studies also indicated that saliency was an important factor in influencing responses for As, but not for Bs. MacDougall, Dembroski and Krantz (1981) did a study to
see if women's responses were similar. It was found that Type A women do not show an elevated heart rate or blood pressure in reaction to a psychomotor performance task. They do, however, show a greater systolic blood pressure when meeting with a challenging interpersonal task. The authors concluded that these results were consistent with the fact that women are usually more concerned with interpersonal than psychomotor skills. The interpersonal challenge was more salient to women and was seen as more challenging and therefore resulted in a greater physiologic response. This is in accordance with the hypothesis that Type A individuals tend to show greater sympathetic responses to environmental challenges.

Additional studies by Blumenthal, McKee, Haney and Williams (1980) also suggest that saliency of cues may be an important determinant of the way situational elements are perceived. This study found that As respond with hyperresponsivity (greater quickness and frequency) to situations that included challenging instructions or a monetary reward. While As were found to respond quickly and were, therefore, fast thinkers, their performance was not more competent than Bs. Being faster was not necessarily better. The authors felt that these results suggested that the interaction between the personality and the situation, and the saliency of the situation needs to be considered when assessing differences in behavioral responses of As and Bs. This is quite similar to the conclusions of Dembroski et al. (1980). Further observations suggested that future research should consider situational variables and not focus only on the individual.

Studies by Carver (1980) focused on the way As perceive coercion. Reactance is a state which results if a person's freedom is threatened. The goal of this state is to restore the freedom. If an environmental event is a threat to freedom than typically As would be expected to assert efforts to
gain control. Because As have the tendency to respond with increased efforts, this may indicate a higher susceptibility to the reactance state. Results showed that coercive attempts made in persuasive communication were salient to As. As were more sensitive to the parts of the persuasive communication that could be taken as freedom-threatening and they made attempts to resist the persuasion. Conclusions indicated that there is a difference in their susceptibility to reactance as expressed by their resistance.

A differential response between As and Bs was found in a simple experiment that tested the saliency of the time urgent component of Type As. Based on the assumption that As have a preoccupation with time and deadlines that Bs do not possess, this study used arrival time for a meeting as an index of time urgency. All subjects were given an exact arrival time, but Type As were found to arrive significantly earlier for the experiment than did Bs. Further analysis showed that no significant differences were found by sex or a sex x type interaction. The time urgent component of this task proved salient to Type As and they responded with characteristically A behavior. Gastorf suggests that this idea of early arrival fits easily into the stylistic concept of a Type A which includes rapid speech, brisk walking pace and sitting on the edge of a chair.

However, in a critique of this research, Strahan (1981) suggests that Gastorf's data may not be as powerful as it seems. While a relationship was shown between arrival time and Type As, Gastorf made no mention of effect strength. Strahan contends that his statistical analysis indicated that the effect strength of the relationship was low.

There is also evidence to suggest that denial may be a part of the coping mechanism. Carver, Coleman and Glass (1976) hypothesized that during a treadmill task, As would show more suppression of subjective fatigue than Bs, and would
continue to work at a tiring but challenging task. It was expected that the hard-driving and competitive aspects of the Type A personality would lead to suppression of fatigue. Because suppression allowed As to continue to perform at high levels, they had additional time to attempt to master the demands of the task. Results supported both hypotheses. As were found to suppress their feelings of fatigue to a greater degree than Bs and to perform at a level closer to their limits of endurance than did Bs. These findings were explained in terms of environmental control. Suppression of fatigue should be advantageous for the maintenance of control. Acknowledgement of fatigue would interfere with the mastery or control of the tasks. It was concluded that suppression may represent the defense mechanisms of denial.

Pittner and Houston (1980) conducted further research on the hypothesis that As use denial as a coping mechanism more often than Bs. As responded to a task that was presented as important with a greater degree of physiological arousal, as measured by pulse rate, than Bs. Pulse rate increases are evidence of an increase in sympathetic arousal which, as noted earlier, is known to be a contributing factor of coronary heart disease. The A-B differences in these psychophysiological arousals were more evident under a high-stress condition than a low-stress condition. This agrees with previous findings that arousals are most prominent in stressful and demanding situations. Conclusions from this study were that As and Bs cope differently. As use more suppression in both physical and psychological threat conditions. As also use more denial in the psychological stress condition where there is a threat to self-esteem. When Type As experienced subjectively distressing experiences, they were more likely to consciously try to suppress thinking about the aversive aspects of situations.

The implication of these studies is that the tendency of As to use denial may lead them to endure stress longer, or to endure a higher level of stress than Bs. These longer and/or higher levels could adversely affect the cardio-
vascular system. As could also possibly have a tendency to use denial in the acknowledgement of heart disease symptoms. A delay in the reporting of symptoms could lead to a worsening of the physical condition (Garver et al., 1976).

A study of symptom reporting was based on the hypothesis that unpredictable aversive events will lead to more reported physical symptoms than predictable events (Weidner and Matthews, 1978). The Type A behavior was also expected to affect symptom reporting. Results showed that more symptom reporting occurred after unpredictable noise. As reported fewer symptoms in the middle of the task than at the end. No difference was found among Bs.

A further study suggests that the individual's focus of attention is the critical factor that may account for the differential effects of attention (Matthews, Scheier, Brunson and Carducci, 1980). Predictable stress can facilitate physiological adaptation and habituation. When confronted with a stressor, one attends to it with the same amount of attention regardless of its predictability. The attention becomes withdrawn if the stressor is then presented regularly. In this study, which used noise during a task as a stressor, it was found that subjects who were exposed to predictable noise were able to withdraw their attention from the stressor, whereas the subjects who were exposed to unpredictable noise either did not, or were not, able to withdraw their attention. Subjects who were forced to listen to predictable noise experienced the same symptoms as those listening to unpredictable noise because they were not able to withdraw their attention. The authors concluded that the difference in symptom reporting during predictable and unpredictable events (Weidner and Matthews, 1978) was caused by the differences in attention. They suggest that attention is heightened to an unpredictable stressor so a person habituates to it more slowly. The extra attention may cause more severe negative consequences which may be related to heart disease.
Uncontrollable events, as well as unpredictable events, seem to effect subject responses. The Glass studies (1977a) indicated that when confronted with uncontrollable stress, As respond initially with increased efforts to control the event, with a decrement of efforts occurring after extended exposure. These results were explained using the learned helplessness paradigm. Further studies of uncontrollable stress lead Brunson and Matthews (1981) to believe that the learned helplessness paradigm could not fully explain the A and B reactions to uncontrollable events for several reasons. The model does not explain why Bs sometimes respond like As. The analyzed data had been collected after the task. To understand the reactions, data should have been collected during the task. Thirdly, the outcomes could be a result of a set of feelings, beliefs, or problem-solving strategies. Brunson and Matthews felt that it was important to understand a subject's performance strategies, affect and attributions during the stressing uncontrollable task. In their study, subjects were asked to verbalize thoughts while working on tasks. These statements were than characterized. The findings indicated that there are substantial and reliable differences in the ways As and Bs understand, cope with and later describe uncontrollable events. The differences are also seen to vary systematically with the saliency of the feedback. When confronted with task failure, As receiving high-salience feedback began to use ineffectual coping strategies as evidenced by their statements. Subjects stated that they thought the difficulty of the task increased progressively, but that their failure was attributable to their stupidity and lack of abilities. They also believed at the conclusion of the task that they had not tried hard enough. Subjects became increasingly annoyed and frustrated with themselves, but not with the difficulty of the task. These responses led to giving up and actions of helplessness. These results support Glass' theory of why performance of As deteriorates after salient failure - their efforts to
control uncontrollable events can lead to subsequent failures to control events that, in actuality, are controllable.

The actions of the B subjects were characterized as "pseudohelpless". B subjects felt that task difficulty and chance were the critical factors in their failure, not their own inability. Their statements indicated that they were not using inappropriate coping strategies. From this, the authors concluded that it would be unlikely that Bs would have subsequent helplessness after an exposure to uncontrollable stress. The name pseudohelpless was given because chance might play a role, and their task performance may have been as a result of a change in individual expectations or their mode of adaptation.

Also noted in the conclusions of this study was the fact that Pattern A is not always a maladaptive coping style, for efforts to excel and control are often appropriate. The behavior exhibited in this study did not appear to be adaptive. A subjects repeatedly tried hypotheses that were known to be incorrect and noneffective. As became upset about their ineffectiveness and blamed themselves. The authors felt, that in this experiment, the coping strategy was costly.

Another study evaluated Glass' hypothesis based on the learned helplessness paradigm (Lovallo and Pishkin, 1980a). Their data showed no support for either hypothesis. In testing the first hypothesis that As try to maintain control by exerting increased initial coping efforts to overcome uncontrollable events, results showed that Bs exposed to the least controllable condition of the study exerted the greatest initial coping efforts. A study of the second hypothesis that As eventually show a breakdown in their coping efforts indicated that Bs with the strongest initial efforts showed the poorest performance.

Noted was the fact that these results may have been affected by the method of typing A-B subjects. This study used the Jenkins Activity Survey rather than
sympathetic arousal than Bs. Here again differences in the method of classifying subjects could cause variations.

There is evidence to support the theory that there are increased physiological reactions to stress. Studies by Manuck, Craft and Gold (1978) indicated that the mean elevations of systolic blood pressure were significantly higher for As when exposed to a stressful task. This demonstrates a typical sympathetic nervous system response to stress. Also done was a second experiment which looked at a possible relationship between the coronary-prone behavior pattern and the Rottiers Internal-External locus of control. Locus of control is a measure of where individuals place the responsibility for events that happen to them. For those who believe their consequences are a result of actions they have taken, their locus is internal, while those feeling that what happens to them is a result of events they cannot control have an external locus of control. Because an internal believes that he is in control of what happens to him, these individuals would seem to have characteristics similar to As. Actually little experimental evidence has been found for correlations between the two.

Results of the second experiment, which also included physiological measurements, found greater systolic blood pressures among As, although it was concluded that this may not support a behaviorally specific interpretation of the relationship. Type A behavior was found to be a better predictor of high systolic blood pressure than an internal locus of control. The authors concluded that each factor may be a component or an attribute of a personality. An internal locus of control may be the generalized expectancy that one's actions will determine life's occurances. The Type A behavior may signify the need or motive for control and give reason for the achievement orientation, sense of time urgency and undue pressures. The authors suggest that a response may reflect both Type A and the locus of control independently: 1) a motivation to
achieve control (Type A) and, 2) a belief that control can be gained effectively (locus of control).

Manuck and Garland (1979) also examined the effects of the situational variable of incentive or no incentive on cardiovascular and behavioral responses to a frustrating cognitive task. The hypothesis suggested that both As and Bs would perform the same on a task with incentive. On a task with no incentive, Bs were expected to respond with less effort resulting in poorer performances. As should show more arousal due to the challenge of the incentive. Results showed that As and Bs did not differ in performance under the incentive condition, but in the no incentive condition Bs did solve fewer test items correctly. Physiological measurements indicated that As exhibited higher systolic blood pressures and pulse pressures. The authors noted that As perception of the task was typical of the A prototype. As showed greater task involvement and less satisfaction with their performance even though As and Bs reported being equally challenged and both felt they had performed equally as well. Even though the task was difficult, As were less willing to believe that they could not have solved all the problems had they been given enough time. Conclusions from this study suggest that As respond to challenge in a more active or involved manner and that they resist feelings of helplessness to a greater extent. As in the treadmill study (Carver et al., 1976), Type As showed greater physiological arousal, and reported smaller increases in state anxiety during the no incentive task. The incentive task does not support the suppression theory of Carver et al. (1976). As in the Manuck (1978) study, the reports of anxiety were no different for As and Bs indicating that As had not suppressed their anxiety. The authors speculated that As may have less need to suppress anxiety if external conditions, such as striving for an award, produce legitimate tensions.

Knowing that Type A behavior was the result of being exposed to an
appropriate eliciting situation, Glass, Krakoff, Contrada, Hilton, Kehoe, Marnucci, Collins, Snowand and Elting (1980) studied the effects of competition on physiological responses. The study used simple competition in a game and the hostile competition of a harassing opponent. Competition and hostility were used because both variables are components of the A behavior pattern. The physiological variables were arterial pressure and plasma epinephrine and norepinephrine levels. It was found that harassing competition produced greater increases in systolic blood pressure, heart rate and plasma epinephrine in As, but no significant increases were seen with the nonhostile competition. These results support the study’s hypothesis that greater physiological arousal would occur in the harassment condition. The authors suggested that the fact that no differences were found in the no-harass condition may be explained by the responsiveness of Bs to the challenge of active competition. While As showed the same level of physiological arousal in both conditions Bs did not. Bs reacted to the challenge of the competition, but were less physiologically aroused by challenge of task performance produced by an harassing opponent. The conclusions were that the A behavior pattern predisposed an individual to have an elevated reaction to hostile situations. The competition factor alone does not distinguish between As and Bs. The A behavior was thought to be the outcome of an interaction between an individual and his environment. A predisposing personality as well as an eliciting situation are necessary for an elevated physiological response which may lead to an elevated risk of cardiovascular problems.

As previously cited, there is a great deal of evidence to suggest that a predisposing personality type may be a contributing factor in the prevalence of coronary heart disease. As a result of their studies on the relationship between personality characteristics and the incidence of coronary heart disease, Friedman and Rosenman characterized a Type A coronary-prone personality. The
Type A personality has come to be generally described by its three most distinctive characteristics - time urgency, competitiveness and aggressiveness - as described by Manuck et al. (1978):

"Type As tend to act with haste and impatience and are often depicted as volatile or aggressive. Concerned that there exist insufficient hours to meet the accumulating demands of occupational and other achievement-related deadlines, the prototypic Type A will frequently attempt to further increase his pace of activities in order to compensate for the passage of time."

It was also noted that the physiological response to stress is a general one and is often not appropriate for the types of stresses often faced in modern societies. Under frequent stresses, the body responds with increased catecholamine levels, higher blood pressures and elevated serum lipid, cholesterol and triglyceride levels which can lead to cardiovascular damage. It is through this physiologic response that stressful situations may be translated into heart disease. The perception of a stressful situation and the saliency of the event are important factors in responses. A predisposing Type A behavior pattern and an eliciting situation seem to be necessary to produce A behaviors.

Just as As perceive stress differently they also cope with it differently. Glass (1977a) has suggested that the Type A behavior pattern is a coping strategy to maintain control over situations perceived as uncontrollable. This theory is easily incorporated into the existing facts about stress and coronary heart disease and supplies an explanation for the motivation of As perceptions of situations and for the actions of Type As.

The results of the studies cited in this paper would seem to suggest that treatment of coronary heart disease should, in some cases, include a behavioral aspect. Because the disease seems to be closely related to a behavioral problem, the treatment should be directed at the causative factor and not just the physical symptoms. If Type A behavior was a contributing
factor in the onset of cardiovascular problems, it would seem to be necessary to alter those behaviors in order to completely treat the disease. If a person should go out into the same stress-evoking situations, once the medical aspects of heart disease are treated, chances are that the heart problem will be aggravated.

Future research should seek to further define the relationship between the psychological and resultant physiological variables. This knowledge will increase the understanding of how a behavior pattern can be translated into a physical disease.

Just as the behavioral factor is seen in association with other factors known to related to coronary disease, behavioral treatments will also be more effective in conjunction with other often prescribed treatments such as reduced salt intake and altered smoking and dietary habits. The treatment should be directed toward a change in the life style of Type A individuals. Because it is unlikely that all aversive, stressful events can be eliminated, the focus should probably be upon how the individual deals with the stress and threats to control (1977b).

Suggestions for the treatment of the Type A behavior pattern have included drugs, relaxation techniques, biofeedback, behavior modification and group therapy, although these methods have not been studied extensively (Glass, 1977b). Because the behavior pattern seems to be so closely related to stress, stress reduction techniques may also prove useful in the treatment of coronary diseases. These treatments could be both preventative and/or rehabilitative.

Due to the high relevance of coronary heart disease in this country, business and industry will soon find it beneficial to realize what the contributing behavioral characteristics are and what type of situations
elicit them. This type of recognition would almost certainly bring about a decrease in the rate of coronary heart disease.
Fig. 2. Schematic representation of the hypothesized relationship between physiological reactivity and environmental demand in the production of CHD risk. Arrows represent the level of hypothesized risk inherent in each combination of person and environmental variables.

FIGURE I

(From Dembroski and MacDougall, 1979)
REFERENCES


