ANXIETY-MANAGEMENT TRAINING FOR THE REDUCTION OF TYPE A CORONARY-PRONE BEHAVIOR

DISSERTATION

Presented to the Graduate Council of the North Texas State University in Partial Fulfillment of the Requirements

For the Degree of

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By

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Research generated over the last decade and a half has confirmed a relationship between coronary disease and what have been termed by Friedman and Rosenman (1959) as Type A behaviors which include competitive achievement striving, self-imposed deadlines, a sense of time urgency, impatience, intense commitment to vocational goals, inability to relax, and hostility. Anxiety-management training is a coping-skill treatment approach that has previously been successful in modifying self-reports of Type A behavior.

The present study investigated the effects of anxiety-management training on the reduction of Type A coronary-prone behavior in a college student population and utilized behavioral measures as well as self-report indices of change. The subjects were 20 Type A college student volunteers recruited from an introductory psychology course who were available for 3 weeks of training. The age range of the subjects was 17-21 years and the mean age was 18.8. Subjects were randomly assigned to either the treatment or the no-treatment (waiting list) control condition. Anxiety-management training was conducted in six 1-hour group sessions with meetings scheduled twice weekly. The treatment procedure emphasized relaxation
as an active coping skill and the subjects were trained to respond to physiological cues that indicated anxiety-arousal with relaxation behaviors.

Evaluations pre- and posttreatment included self-report measures of Type A behavior, empirically validated performance measures of the achievement-striving and time-urgency components of coronary-prone behavior, and a learned helplessness manipulation that has been associated with this behavior pattern. Analysis of covariance indicated that the treatment group changed in the desired direction on all self-report indices, and on most of the performance measures and helplessness scores that were used as dependent variables. Discussion centered on the implications of these data to theoretical and practical conceptualizations of coping behavior and coronary disease and cautions were expressed concerning clinical significance, maintenance, and generalization of results.
TABLE OF CONTENTS

List of Tables

LIST OF TABLES ................................................. v

Dissertation

Introduction .................................................. 1

Effects of Psychological Stress on Coronary Heart Disease

Stress as Life Dissatisfaction
Chronic Stress
Acute Stress
Physiological Stress Studies

Coronary-Prone Behavior Pattern

Assessment of Type A Behavior
Influence of Type A Behavior on Coronary Disease

Interplay of Stress and Type A
Intervention Strategies
Purpose of the Study

Method ......................................................... 37

Subjects

Instruments

Jenkins Activity Survey, Student Form
Time Estimation Task
Writing Speed Task
Problem-Solving Test
Learned Helplessness Paradigm

Procedure

Pretraining Period
Anxiety-Management Training
Posttraining Period
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Results</td>
<td>48</td>
</tr>
<tr>
<td>Jenkins Activity Survey Scores</td>
<td></td>
</tr>
<tr>
<td>Performance Measures</td>
<td></td>
</tr>
<tr>
<td>Learned Helplessness Paradigm</td>
<td></td>
</tr>
<tr>
<td>Manipulation Check</td>
<td></td>
</tr>
<tr>
<td>Discussion</td>
<td>53</td>
</tr>
<tr>
<td>Appendices</td>
<td>62</td>
</tr>
<tr>
<td>References</td>
<td>72</td>
</tr>
<tr>
<td>Table</td>
<td>Description</td>
</tr>
<tr>
<td>-------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>1.</td>
<td>Means and Standard Deviations of Jenkins Activity Survey Scores for Treated and Control Subjects</td>
</tr>
<tr>
<td>2.</td>
<td>Means and Standard Deviations of Scores on the Time Estimation Task, Writing Speed Task, and Problem-Solving Test for Treated and Control Subjects</td>
</tr>
<tr>
<td>3.</td>
<td>Means and Standard Deviations of Anagram Solution Scores</td>
</tr>
<tr>
<td>4.</td>
<td>Means and Standard Deviations for All Pretest Dependent Variables for Type A and Type B Subjects</td>
</tr>
</tbody>
</table>
Coronary heart disease is a clinical disorder that results from lesions of the coronary arteries, a condition known as coronary artery disease or atherosclerosis. Atherosclerosis is a symptomless disorder characterized by thickening of the coronary arteries. The cells that compose the thickened arterial walls consist mostly of lipids and are often referred to as "fatty streaks" (Friedberg, 1966; Glass, 1977a). Many of the fatty streaks accumulate an excess amount of lipids and cholesterol and these deposits are considered the core of coronary artery disease. Most plaques are small and do not seriously decrease the diameter of the lumen or central channel of the coronary artery. However, when substantial occlusion occurs, the blood flow is impeded with a resulting disturbance in cardiac functioning. If the plaque accumulates at a rate exceeding the available blood supply for cellular nutrition, it will often decay and rupture. Thrombi may occur at this time and close off the already severely narrowed lumens. When this obstruction occurs, myocardial necrosis often develops and coronary artery disease has evolved into coronary heart disease (Friedman & Byers, 1967; Glass, 1977a).
Angina pectoris and myocardial infarction are the two major manifestations of coronary heart disease. Angina pectoris is a clinical syndrome involving intermittent chest pain which arises when occlusion of one or more of the coronary arteries results in an inadequate blood supply and a concomitant anoxia of the cardiac muscle (Friedberg, 1966). Angina episodes are most often precipitated by psychological stress or physical exertion and rarely involve permanent and substantial tissue damage (Friedman, 1969; Glass, 1977a).

Myocardial infarction is the disorder commonly referred to as a heart attack and signifies necrosis of part of the heart muscle due to an inadequate blood or oxygen supply over a relatively long period of time. Many times this is the result of thrombi obstructing a coronary artery with a resulting diminution of blood supply to a portion of the left heart ventricle (Glass, 1977a).

Since the 1920s, the mortality rate due to cardiovascular disease has increased dramatically, striking more and more at younger subjects (Anderson, 1973). Felton and Cole (1963) estimated that cardiovascular disease accounted for approximately 12% of the working time lost in the United States at an economic loss of about four million dollars per fiscal year. It affects 13 million Americans annually and is the major cause of death in this country with an annual mortality rate of approximately 675,000 (Glass, 1977b).
Data collected from various epidemiological studies (Brand, Rosenman, Sholtz, & Friedman, 1976; Dawber & Kennel, 1961; Medalie, Snyder, Groen, Neufeld, Goldbourt, & Riss, 1973) suggested many factors associated with high risk for coronary heart disease. These factors included aging, gender, elevated serum cholesterol, hypertension, heavy cigarette smoking, elevated serum lipoproteins, diabetus mellitus, parental history of heart disease, obesity, and physical inactivity. However, the best combinations of these traditional risk factors failed to identify most new cases of this disease (Jenkins, 1971). Most heart patients did not have an elevated cholesterol level, only a fraction were hypertensive, and even fewer were diabetic. Keys (1972) reported that the standard risk factors accounted for only about half of the coronary heart disease incidence in middle-aged American men. Moreover, there is uncertainty surrounding the predictive abilities of some of the most widely accepted risk factors and about the mechanisms mediating their influence (Friedman, 1969).

The status of current epidemiologic knowledge suggests a broadening of scope beyond traditional risk factors in the search for contributing causes of cardiovascular disease. There is, in fact, a sizeable body of recent research (Jenkins, 1971, 1976; Keith, 1966; Mai, 1968) designed to elucidate the social and psychological precursors of coronary disease.
Sociologic indices such as religion, marital status, occupation, and income level have shown inconsistent relationships to coronary disease (Jenkins, 1976). Educational level has most often shown an inverse relationship with coronary heart disease (Rosenman, Brand, Jenkins, Friedman, Straus, & Wurm, 1975), although Shekelle (1969) reported that angina pectoris was more common in the better educated while myocardial infarction occurred more often in the groups with less education. Social mobility and status incongruity (a condition where different characteristics of a person simultaneously place him/her at different social class levels) appeared to raise the risk of coronary disease (Jenkins, 1971), although later evidence suggested a secondary association found only in combination with other psychosocial risk factors (Cohen, 1974; Jenkins, 1976).

Personality studies, mostly retrospective in nature, indicated that sustained intense emotional reactions such as anxiety, depression, and psychophysiological complaints were associated with coronary heart disease. The few prospective studies on this topic showed equivocal results, although the general thrust of the findings suggested that anxiety-related variables were often prospectively related to the development of angina pectoris but were not evident prior to myocardial infarction (Lebovits, Shekelle, Ostfeld, & Paul, 1967; Medalie, Kahn, Neufeld, Goldbourt, Perlstein, & Oron, 1973;
Comprehensive reviews of the literature (Glass, 1977a; Jenkins, 1971, 1976; Mai, 1968) suggested that the two most promising psychological variables that have been identified in recent years are psychological stress and the Type A coronary-prone behavior pattern. Both of these factors have been associated with both atherosclerosis and the onset of clinical coronary heart disease in both epidemiological research and more direct studies relating stressors and stress responses to actual cardiovascular pathology (Glass, 1977a; Jenkins, 1971, 1976).

**Effects of Psychological Stress on Coronary Heart Disease**

Psychological stress refers to behavioral, physiological, and affective responses to aversive stimuli in the environment (Appley & Trumbull, 1967). Traditionally, stress has been viewed as an emergency state in contrast to the smooth flow of everyday adaptation—an aversive situation in which routine responses are inadequate (Selye, 1956; White, 1974). A great variety of external conditions or stressors are capable of producing stress responses. Early stress models posited a linear cause-effect relationship between the external stressor and the stress response (Lazarus, 1966). Newer empirical models (Glass & Singer, 1972; Lazarus, 1966) have postulated that the relationship between stimulus and response varies considerably between subjects and depends
upon cognitive mediators. Lazarus (1966; Lazarus, Averill, & Opton, 1970; Lazarus & Launier, in press) developed a transactional model of stress which conceptualized the person as an active shaper of the stress experience as well as a responder to a demanding environment. Lazarus operationalized stress as the threat or anticipation of future harm whether that harm was physical or psychological. Thus, psychological stress was defined with respect to both stimulus conditions, response variables, and cognitive appraisals. Further, stress can be inferred from physiological measurements, self-report data, cognitions, or behaviors.

**Stress as life dissatisfaction.** Reviews of the literature (Jenkins, 1971, 1976) have suggested that coronary disease may be related to general dissatisfaction with various aspects of life. Bruhn, McGrady, and duPlessis (1968) found more frequent job problems and greater reported lack of recognition by superiors among workers with coronary disease than among matched controls. Kits von Heijningen and Treurniet (1966) found that an infarction was often preceded by a setback in work involving a loss of prestige. In an Israeli study, Groen and Drory (1967) interviewed next of kin of autopsied persons and found that those with severe atherosclerosis were more likely to be described as having had job frustrations. Using an ecologic approach, Sales and House (1971) found that occupational groups with higher job dissatisfaction in sociological surveys had consistently
higher coronary disease mortality rates, independent of social class.

Other kinds of life problems were also reported more frequently by patients with coronary disease including marital stress, unhappiness over educational level, and unhappy childhood and adult interpersonal relations (Kits von Heijningen & Treurniet, 1966; Liljefors & Rahe, 1970). The only prospective studies in this area (Floderus, 1974; Medalie, Snyder et al., 1973) have reported that conflicts in the areas of finance, family, and work were prospectively associated with the development of angina pectoris, but not with myocardial infarction.

Chronic stress. Excessive overtime work, when it approaches the limits of the individual's capacity to control the work, has been associated with increased risk for coronary disease (House, 1975; Sales, 1969; Theorell & Rahe, 1972). Russek (1965) found that prolonged emotional stress associated with job responsibility preceded the attack of coronary disease in approximately 90% of his patients under age 40. He also compared the within-group incidence of coronary heart disease among physicians and reported that medical personnel considered to be in more stressful specialties had a significantly higher incidence of heart disease than those in a less stressful medical specialty (Russek, 1962, 1965). French and his colleagues (French & Caplan, 1972; French, Rodgers, & Cobb, 1974) found that work overload
or feelings that the demands of the job were beyond the individual's control were related to elevated serum cholesterol.

Many retrospective reports based on physicians' judgments of chronic stress and/or patient self-ratings have implicated chronic life stress with coronary disease (Pearson & Joseph, 1963; Wynn, 1967). Dreyfuss, Shanan, and Sharon (1966) reported that men with coronary disease viewed their environment as more chronically conflict-laden, the outcome of their actions as more unclear, and their achievements as having lower probability of success than did noncoronary controls.

Acute stress. There have been a number of case studies that have described the onset of myocardial infarction soon after a severe emotional stress (Jarvinem, 1955; Pinckney, 1961; Sigler, 1960). Many recently published studies have used objective measures of life change (Hawkins, Davies, & Holmes, 1957; Holmes & Rahe, 1967) to assess stressful life events in an individual's immediate and past environment. Of particular relevance to the present discussion is the application of life change measures investigating the antecedents of coronary disease. Rahe and Lind (1971) interviewed next of kin of persons who experienced sudden cardiac death and found that the deceased had experienced three times the magnitude of life change scores in their final six months of life as compared to earlier periods. Other more recent retrospective studies, involving both male and female subjects,
have also shown a crescendo of life-change scores in the six months prior to infarction (Bengtsson, Hallstrom, & Tibblin, 1973; Rahe, Romo, Bennett, & Siltanen, 1974; Theorell & Rahe, 1972). The only prospective study in testing the life-change hypothesis found no association between elevated life change scores and incidence of acute myocardial infarction 12 to 15 months postassessment (Theorell, Lind, & Floderus, 1975).

There are also indications in the literature that helplessness inducing events which are prominent in an individual's life precede the onset of coronary heart disease. An individual experiencing helplessness perceives a noncontingency between responding and reinforcement or outcome (Seligman, 1975). Death of a close relative raised the likelihood of death in next of kin, particularly due to some form of cardiovascular disease (Parkes, Benjamin, & Fitzgerald, 1969). Rejection by a loved one or a sudden loss in self-esteem sometimes preceded an acute myocardial infarction (Engel, 1970). Additional support for the helplessness-coronary heart disease relationship came from the research of Greene and his colleagues (Greene, Goldstein, & Moss, 1972) and Kavanaugh and Shephard (1973) which pointed to helplessness, in the forms of increased fatigue and clinical depression, as a precursor of sudden death from coronary disease. Along this line, Glass (1977a) concluded from his review of the literature that uncontrollable life events are more important than comparable unpleasant events without loss of control in the
etiology of heart disease. A recent study (Lundberg, Theorell, & Lind, 1975) reported no significant differences between infarction patients and controls when calculating total life-change units. However, when each person assigned weights reflecting their perceptions of the influence of these events, the infarction patients differed from the controls.

**Physiological stress studies.** Research has shown that affect-releasing events can also provoke changes in cardiovascular functioning (Jenkins, 1971). It has been suggested that stress experiences produced certain physiological changes, which in turn may be associated with coronary disease. These included increases in traditional risk factors such as serum cholesterol and blood pressure, accelerated rate of damage to the inner layer of the coronary arteries over time, and increases in the aggregation of blood platelets which are then incorporated into arterial plaques (Clark, Arnold, Poulds, Brown, Eastmead, & Perry, 1975; Eliot, 1974; Friedman, 1969; Friedman, Rosenman, & Carroll, 1958). There have also been a series of studies that demonstrated that "active" psychological states, such as motivation to perform well or master events, accompany low levels of serum cholesterol (Brooks & Mueller, 1966; Rahe, Rubin, Arthur, & Clark, 1968).

Stress can also contribute to coronary disease through the body's general reaction to aversive stimulation. The best known hormones secreted by the adrenal medulla are epinephrine and norepinephrine. These catecholamines are
related to sympathetic nervous system activity which in turn is responsive to psychological stressors (Greenfield & Sternbach, 1972). These catecholamines can contribute to an infarction by increasing the aggregation of blood platelets which may then lead to thrombosis (Theorell, 1974). Norepinephrine levels were increased during active efforts to cope with a stressor (Elmadjian, 1963; Frankenhaeuser, 1971) whereas they were depleted when subjects reacted to uncontrollable stressors with helplessness (Weiss, Glazer, & Pohorecky, 1977).

Coronary-Prone Behavior Pattern

The concept of a coronary-prone behavior pattern has appeared in the literature for a good many years. Descriptions of patients with angina pectoris by Osler (1892) and later descriptions of survivors of myocardial infarction by Dunbar (1943) are the best known early examples of this type of study. Osler (1892) characterized the typical coronary patient as one who devoted tremendous energies to work, always proceeding "full speed ahead," and having numerous interpersonal worries. Dunbar (1943) conceptualized the coronary patient as a compulsive striver, an individual who disliked sharing responsibility and who had a strong urge to succeed through self-discipline, hard work, and mastery of others. Arlow (1945), Dunbar (1943), and Kemple (1945) suggested that these personality characteristics were efforts to compensate for unresolved Oedipal conflicts and stated
that these patients utilized denial and repression as key coping mechanisms. Wolf (1969) suggested the term "Sisyphus reaction" to describe the coronary-prone individual. The pattern is that of an individual who is a relentless striver, but experiences little sense of accomplishment or satisfaction.

Over a decade and a half ago, preliminary research designed to elucidate an integrated description of the Type A coronary-prone behavior pattern suggested a relationship between specific patterns of behavior and coronary disease (Friedman & Rosenman, 1959). Since that time, an ongoing 8½-year prospective study known as the Western Collaborative Group Study, has confirmed the association between coronary disease and what were termed Type A behaviors (Brand, Rosenman, Sholtz, & Friedman, 1976; Rosenman, Brand, Jenkins, Friedman, Straus, & Wurm, 1975; Rosenman, Brand, Sholtz, & Friedman, 1976; Rosenman, Friedman, Straus, Jenkins, Zyzanski, & Wurm, 1970; Rosenman, Friedman, Straus, Wurm, Jenkins, & Messinger, 1966; Rosenman, Friedman, Straus, Wurm, Kositchek, Hahn, & Werthessen, 1964). The Type A behavior pattern was described by Friedman (1969) as

a characteristic action-emotion complex which is exhibited by those individuals who are engaged in a relatively chronic struggle to obtain an unlimited number of poorly defined things from their environment in the shortest period of time, and if
necessary, against the opposing effects of other
things of persons in this same environment. (p. 84)
Type A behaviors include self-imposed deadlines, competitive
achievement striving, exaggerated sense of time urgency,
intense commitment to vocational goals, quickness of physi-
cal and mental functioning, unease at relaxing, and hostility.
The Type B pattern is relatively free of such characteristics
(Friedman, 1969; Rosenman & Friedman, 1974).

Assessment of Type A behavior. Although a number of
different procedures have been used in various studies to
assess Type A behavior, only the Structured Interview devel-
oped by Friedman and Rosenman (Rosenman et al., 1964) and
the Jenkins Activity Survey (Jenkins, Rosenman, & Friedman,
1967) have been utilized in a variety of retrospective and
prospective validity studies.

The Structured Interview was developed on the basis of
clinical observation. This interview is less a method for
gathering data than it is a challenge situation and a sample
of behavior where the assessment is mainly based on the voice
stylistics and the psychomotor mannerisms of the respondent
(Rosenman et al., 1964). The interviewer deliberately
phrases his questions to stress the subject in order to eli-
cit signs of impatience, hostility, competitiveness, and
other Type A characteristics. Diagnoses based on this inter-
view are typically made on a 4-point scale—fully developed
A, incompletely developed A, incompletely developed B, and fully developed B (Rosenman, 1977).

Ratings based on this interview have shown highly significant stability over time (Jenkins, Rosenman, & Friedman, 1968) and moderate to high interjudge reliability with trained raters (Caffrey, 1968; Jenkins et al., 1968). This method is time-consuming and requires extensive training in order to achieve reliable ratings (Bortner & Rosenman, 1967).

The Jenkins Activity Survey was developed in an effort to duplicate by a psychometric method the assessment of Type A behavior achieved by the Structured Interview (Jenkins, Rosenman, & Friedman, 1967). It is a self-administered multiple-choice questionnaire that provides continuous scores of the A-B dimension. Recent forms of the questionnaire (Jenkins, Rosenman, & Zyzanski, 1972) were designed for working adult males and females, much as the interview procedure was developed for this particular population. Acceptable test-retest reliabilities have been reported (Jenkins et al., 1968; Jenkins, Rosenman, & Zyzanski, 1974). The Jenkins Activity Survey agreed about 73% of the time with judgments made by the stress interview, while extreme scores exhibited approximately 90% agreement (Jenkins, Zyzanski, & Rosenman, 1971). When used to predict risk of coronary disease, in prospective studies, both measures appeared to be similar in predictive validity (Zyzanski, 1977).
In addition to the A-B scale, the Jenkins Activity Survey can be scored for three factors which are independent of each other but are correlated with the overall A-B score. Zyzanski and Jenkins (1970) derived these dimensions from a series of factor analyses and named the three factor scales Speed and Impatience (S), Hard Driving (H), and Job Involvement (J).

Glass (1977a) has recently modified the Jenkins Activity Survey for use with college students. The A-B scale of the student Jenkins Activity Survey contains 21 scorable items, just as the original, and the differences between versions are minimal with the only modifications related to items referring to income, job involvement, and job responsibility. Factor analysis of the student version yielded factor scores which closely resemble the H and S dimensions extracted from adult samples (Glass, 1977a).

A third technique for measuring Type A behavior consists of 11 cognitive and psychomotor tasks yielding 21 different scores. Step-wise regression analysis found nine scores which made significant contributions to the prediction of Type A behavior as assessed by the Structured Interview (Bortner & Rosenman, 1967). This performance battery includes a writing speed task, the Thurstone (1944) Embedded Figures Test, a flicker-fusion task, the Arrow Dot test (Dombrose & Slobin, 1958), and a general measure of the motor activity of the subject. These tasks were chosen in order to simulate
miniature performance situations which should elicit Type A behavior.

A number of psychological tests have been administered to various samples in order to ascertain whether the Type A pattern in related to standard measures of personality (Caffrey, 1968; Glass, 1977a). Results indicated that the Type A pattern, in general, reflected characteristics independent of those measured by traditional personality assessment instruments. It appears that traditional psychological inventories are unlikely to be useful measures of Type A behavior and that the Type A pattern does not reflect any distinguishing personality or psychopathologic characteristics as measured by traditional personality tests (Dembroski, 1977).

Glass and his colleagues, in a series of construct validity studies with the student Jenkins Activity Survey, have recently provided empirical documentation to clinical impressions that Type A's compared to Type B's exhibited excessive achievement striving, time urgency, and hostility.

Burnham, Pennebacker, and Glass (1975) found that college age Type A's attempted more simple arithmetic problems than their Type B counterparts when told that there was no completion deadline. However, these differences became insignificant because of increased performance of Type B's when an explicit 5-minute deadline was administered. Type A subjects worked at the same high level regardless of the involvement
of a deadline. A later study (Glass, 1977b) showed that Type A's remembered more verbal and pictoral items than Type B's on a test of immediate recall where measures of IQ were equivalent for both groups. Type A subjects also suppressed feelings of fatigue on a treadmill procedure and worked at a level closer to the limits of their endurance than did Type B subjects (Carver, Coleman, & Glass, 1976). The authors suggested that fatigue suppression or denial of fatigue had instrumental value for Type A's because it helped them attain achievement-related goals. Glass' studies provided behavioral validation for the achievement-striving component of Type A behavior.

Another area where performance differences emerged between Type A's and B's is a sense of time urgency. Experimentation demonstrated a relationship between the alleged time-urgent features of Type A and a tendency to perceive time as passing slowly (Burnham et al., 1975). Type A's also did more poorly than Type B's on a task involving differential reinforcement of low rates of responding (DRL). To obtain reinforcement on a DRL schedule, the subject must wait during fixed time intervals before making a response; any premature response resets the time contingency and no reinforcement is given. Type A subjects were unable to wait long enough after prior reinforcement and also showed significantly more tense and hyperactive movements during a DRL session.
Reaction time studies showed that Type A's exhibited significantly longer response latencies than Type B's on a choice reaction time (RT) task involving relatively long preparatory and intertrial intervals, whereas A's reacted slightly more quickly than B's when the intervals were short (Abrahams & Birren, 1973; Glass, 1977a). The investigators concluded that impatience interferes with choice RT responses in Type A subjects. Type A subjects who scored high on the speed and impatience factor of the Jenkins Activity Survey demonstrated more behavioral signs of impatience and irritability than Type B subjects when forced to slow down task-relevant activities (Glass, Snyder, & Hollis, 1974). The experimental results on the time-urgency component also underscore the importance of eliciting conditions in the emergence of Type A behavior.

A third factor of Type A behavior that has been investigated in the experimental laboratory is hostility and aggressiveness. Glass and his colleagues (Glass, 1977b) performed an aggression experiment which demonstrated that Type A's reacted with enhanced aggression (using ostensibly administered electric shocks) toward the instigator who denigrated their efforts to perform a difficult task. Since there was no difference between A's and B's in the no instigation condition, the authors concluded that the potential for hostility and aggression in Type A's is elicited in response to a
specific set of arousing circumstances which threaten their task mastery.

**Influence of Type A behavior on coronary disease.** A recent review of the literature (Jenkins, 1976) cited more than 20 recently published retrospective and prospective studies in which Type A behavior has been associated with the major manifestations of coronary heart disease. In a major study of Trappist and Benedictine monasteries, Caffrey (1969) found the highest prevalence rates of coronary heart disease in monasteries having a higher proportion of Type A's (as assessed by the Stress Interview), living in Type A environments, and consuming a high-fat diet. When any of these three factors was missing, the groups had low and comparable rates. Quinlan (1969) evaluated the monastery study data and reported that the Type A behavior pattern was one of the few risk factors to be strongly associated with both angina pectoris and myocardial infarction. Monks "blindly" judged to have the Type A pattern had 2.3 times the prevalence of angina pectoris and 4.3 times the prevalence of infarction as compared to Type B's.

In another retrospective study (Jenkins et al., 1971), 83 men under the age of 60 who had sustained a first attack of coronary heart disease before taking the Jenkins Activity Survey were compared with 468 random control subjects. The mean Type A scores were significantly higher for the cases than for the controls. In The Connecticut Study (Kenigsberg,
Zyzanski, Jenkins, Wardwell, & Licciardello, 1974), 40 patients with coronary disease scored significantly higher on the Jenkins Activity Survey than hospitalized controls. Shekelle, Schoenberger, and Stamler (1976) studied the prevalence of myocardial infarction in 1,209 middle-aged white males entering a screening program of the Chicago Heart Association. They found a significant association between Type A scores on the Jenkins Activity Survey and prevalence of coronary heart disease after age, cholesterol level, diastolic blood pressure, and cigarette smoking were statistically controlled by a multiple logistic regression analysis. Since 1970, at least seven independent studies have found Type A, as measured by the Jenkins Activity Survey, to be consistently related retrospectively, to coronary disease in both male and female populations (Zyzanski, 1977).

In order to determine if Type A behavior bears a prospective relationship to coronary heart disease, Friedman and Rosenman (1974) began the Western Collaborative Group Study. This study included, at intake, a stress interview of 3,524 men. Reports of the incidence of clinical coronary disease after 4½, 6½, and 8½ years indicated that Type A men had 1.7 to 4.5 times the rate of new disease as compared to Type B men. Of the 1,589 Type A men, 178 developed coronary disease as compared with 79 of the 1,565 Type B men. Younger Type A men (39-49 year-old group) generated higher relative risk factors than older men (Rosenman et al., 1970; Rosenman
1970; Rosenman et al., 1975). Furthermore, the association of Type A behavior with coronary disease added appreciably and independently to coronary risk and could not be "explained away" by other factors. The Western Collaborative Group Study results also showed that Type A subjects with coronary disease were five times more likely to have a second infarction than were Type B subjects with heart disease (Rosenman et al., 1975). Haynes, Levine, Scotch, Feinleib, & Kannel (1978) also found a prospective relationship between Type A behavior in women and coronary heart disease. Type A women had 2 to 2.5 times the rate of new disease after an 8-year follow-up than did Type B women.

The Jenkins Activity Survey was also found to be predictive of risk of new coronary disease in a prospective study conducted as part of the Western Collaborative Group Study (Jenkins et al., 1974). Men scoring in the top third of the Type A distribution incurred nearly twice the incidence of coronary disease over a 4-year period as compared to the bottom third Type B subjects. Type A scores on this test were also associated with higher risk of reinfarction among persons already having clinical coronary disease. Multiple variable discriminant function equations showed the Type A score to be the single strongest predictor of recurrent disease among the three risk factors studied: Type A score, daily cigarette consumption, and serum cholesterol level. Type A scores significantly discriminated recurrent from
single event cases, even after the factors of age, diastolic blood pressure, serum cholesterol, and daily number of cigarettes smoked were controlled statistically in a step-wise regression analysis (Jenkins, Zyzanski, Rosenman, & Cleveland, 1971; Jenkins, Zyzanski, & Rosenman, 1976).

There is evidence indicating an association between atherosclerosis and the Type A behavior pattern. Type A patients exhibited a greater degree of occlusion than Type B in two double-blind studies conducted at separate institutions (Blumenthal, Williams, Kong, Thompson, Jenkins, & Rosenman, 1975; Zyzanski, Jenkins, Ryan, Flessis, & Everist, 1976). This association suggests that one way Type A behavior raises the risk of coronary disease may be through its association with the increased development of atherosclerotic plaques.

Another body of research evidence suggests that Type A behavior may exert influence, in part, through certain of the traditional risk factors. For example, extreme Type A subjects as a group exhibited higher levels of serum cholesterol (Friedman, 1969; Friedman & Rosenman, 1959), an elevated pre- and postprandial serum triglyceride level (Friedman, Rosenman, & Byers, 1964; Rosenman et al., 1966; Jenkins, Hames, Zyzanski, Rosenman, & Friedman, 1969), increased sludging (Friedman et al., 1964), and a faster clotting time (Friedman & Rosenman, 1959).
There is inconsistent evidence of a relationship between hypertension and Type A behavior. One study (Shekelle et al., 1976) concluded that prevalence of hypertension is unrelated to Type A behavior in men. Another study identified elevated diastolic blood pressure among Type A men at intake in the Western Collaborative Group Study and more importantly indicated that this elevation enhanced the risk of coronary disease only when this factor occurred in Type A subjects (Rosenman et al., 1966). One study challenged subjects to perform well in a reaction-time task and found that Type A's compared to B's responded with significantly greater increases in both heart rate and systolic blood pressure (Dembroski, MacDougall, & Shields, 1977).

There appear to be approximately equal amounts of cigarette smokers in Type A and Type B populations (Rosenman et al., 1966). However, an intensive study (Jenkins, Rosenman, & Zyzanski, 1968) of the smoking habits of these men indicated that Type A subjects were significantly more likely to smoke 26 or more cigarettes per day and were less likely to be in the never-smoked subgroup. These researchers revealed that for men in the smoking categories of 16-25 cigarettes per day and 26 or more per day, the coronary disease rate was from 2.7 to 5.1 times more prevalent in Type A subjects than in Type B individuals.

As in the case of stress, the relationship of Type A to coronary disease may be mediated, in part, by the sympathetic
adrenal medullary system. Extreme Type A individuals excreted more norepinephrine in their urine than did Type B's during active working hours (Friedman, St. George, Byers, & Rosenman, 1966) and they exhibited a higher serum level of this hormone during an emotional challenge (Simpson, Olewine, Jenkins, Ramsey, Zyzanski, Thomas, & Hames, 1974), and before, during, and after a stressful competitive situation (Friedman, Byers, Diamant, & Rosenman, 1975).

**Interplay of Stress and Type A**

Recent evidence suggests possible interactions between stress, Type A behavior, and heart disease. Both Suinn (1977a) and Glass (1977a, 1977b) viewed stress as a key explanatory construct in Type A behavior. Glass conceptualized the Type A behavior pattern as a characteristic style of responding to environmental stress which is appraised as threatening to the individual's sense of control. He theorized that Type A's work initially harder than Type B's to assert control over their environment. However, after extended experience with uncontrollability, Type A's because of their heightened concern with control, realize the futility of their efforts at control and show greater behavioral signs of helplessness. Thus, Glass hypothesized the Type A's exhibit initial hyper-responsiveness followed by a later hyporesponsiveness to uncontrollable stress as compared to his Type B counterpart. This line of thought received support in a series of laboratory experiments on the reaction of Type A and Type B students
to controllable and uncontrollable stressful events (Glass, 1977a, 1977b). His first group of studies were designed to test the hyperresponsiveness aspect of this model.

Glass (1977b) used an experimental paradigm similar to that customarily used in learned helplessness research (Seligman, 1975) where subjects were briefly exposed to a pretreatment of either an escapable or inescapable stressor and then later tested on a psychomotor task. It was assumed that after a few trials of inescapable stimulation, for instance, 12 bursts of 100-decibel noise, A's should exert greater efforts to reestablish their sense of control by showing enhanced motivation to master a subsequent task rather than helplessness and impaired performance. Two experiments were conducted using this paradigm, one using inescapable noise as pretreatment, and the other inducing perceived lack of control by random positive and negative reinforcements on a pair of cognitive problems (Hiroto & Seligman, 1975). Both studies showed almost identical curves exhibiting the hypothesized interaction between the A-B variable and the escape/no escape pretreatment manipulation. The dependent measure in each study was performance on a choice RT or DRL task on which B's normally do better than A's. Pretreatment with an uncontrollable stressor increased the performance of A's such that A's responded more rapidly than B's to the RT task and received a greater percentage of reinforcement on the DRL task. Glass interpreted these
findings by suggesting that A's react to stressors that threaten their sense of control by containing their characteristic impatience and attempting to assert and maintain control after its loss has been threatened. This interpretation received further support from experimentation using other procedures for inducing lack of control, including schedules of partial reinforcement that were manipulated in order to vary in perceived uncontrollability. The results of these experiments indicated that Type A subjects reached an acquisition criterion more quickly than B's when both groups were trained on a variable-ratio schedule. These A-B differences were not significant when training was done on a fixed-ratio schedule.

Subsequent experimentation revealed a more complex response pattern. It appears that A's show initial hyperresponsiveness only when the uncontrollable stimulus is prominent or high in salience—for example, under high levels of inescapable noise or under conditions where task failure is made prominent. This uncontrollability-salience hypothesis was supported in studies on hyporesponsiveness or learned helplessness following extended stress exposure. Glass theorized that the initial hyperresponsiveness must prove ineffective in the long run, for extended exposure to uncontrollability should eventually lead to the perception of a noncontingency between responses and outcomes. The Type A individual should then give up efforts at control and
exhibit learned helplessness or hyporesponsiveness at greater levels than Type B individuals. The learned helplessness paradigm (Seligman, 1975) was used to test these assumptions. Krantz, Glass, & Snyder (1974) reported that Type A's showed greater evidence of depressed response initiation, relative to B's, when they became convinced that a salient stressor was in fact uncontrollable. The amount of exposure to uncontrollability (for example, 12 versus 35 inescapable noise bursts) seems to determine whether facilitation or helplessness responses occur in Type A individuals.

Glass (1977b) proposed a cognitive interpretation of these results. He hypothesized that since Type A individuals are presumably more concerned about maintaining environmental control than their Type B counterparts, they distort cues signifying lack of control. When uncontrollability cues are not prominent, in the case of soft inescapable noise or failure on a task that might easily be attributed to chance, A's exert less effort than B's at achieving control, less effectively encode the fact of noncontingency, and thus fail to show helplessness. If, on the other hand, uncontrollability is a prominent feature of the environment, A's experience a greater threat to their sense of control and work harder at locating control-relevant cues. These efforts will eventually result in a stronger certainty that a noncontingency exists between responses and outcomes. Such experiences should lead to a decrement in efforts at environmental mastery.
Recent research has been conducted that provides some support for this interpretation using a nonnoise manipulation of salience and an independent variation of uncontrollability based on contingent and noncontingent reinforcements for performance on four cognitive tasks (Glass, 1977a). Salience was manipulated by systematically varying the prominence of reinforcement. Thus, subjects in the high salience condition were required to keep a detailed record of whether their responses were correct or incorrect. The effects of these manipulations were assessed by performance on an anagram task previously used in learned helplessness research (Hiroto & Seligman, 1975). Results confirmed the previously mentioned noise study. The enhanced controlling behavior of A's after brief exposure (two cognitive tasks) to uncontrollable stress of high salience changed to a decrement in performance after prolonged (four cognitive tasks) exposure.

Glass (1977a, 1977b) reported that both Type A and Type B subjects tended to describe the experimental situations in similar fashion with no differences in perceived controllability. He therefore concluded that Type A behavior involved a prepotent set of coping responses which were elicited by stressful stimuli that threaten an individual's sense of control.

An attempt was made to test the relevance of this line of thought to the actual occurrence of coronary disease (Glass, 1977a). Hospitalized coronary patients, hospitalized controls, and "healthy" nonhospitalized controls were compared
on the Jenkins Activity Survey, a Loss Index reflecting stressful life events over which minimal control could be exerted, and a Negative Events Index comprised of life events that would be experienced by most individuals as stressful but not necessarily as uncontrollable or helplessness-inducing losses. Results indicated that coronary patients had significantly higher Type A scores than either the hospitalized or nonhospitalized controls. On the Loss Index, both the coronary patients and the hospitalized controls had significantly more losses in the 1-year prodromal period than the "healthy" controls. Comparisons on the Negative Events Index were not significant. Glass speculated that since extended experience with salient uncontrollable stress resulted in greater vulnerability to helplessness among Type A's, it may be that the specific interaction of Type A behavior and helplessness-inducing life events, not just negative events, is a precursor to coronary disease.

Glass (1977a, 1977b) proposed a biobehavioral model integrating biochemical data involving the relationship between stressful stimulation and catecholamine discharge with his behavioral data. He hypothesized that since norepinephrine levels are increased with active efforts to cope with a stressor (Elmadjian, 1963; Frankenhauser, 1971) and severely depleted in helplessness responses (Weiss et al., 1977), Type A subjects, because of their characteristic response style, should experience this excessive rise and fall of
catecholamines more frequently than Type B subjects. Glass suggested that the more frequently the cycle occurs, the more the coronary arteries are likely to be affected by atherosclerosis (Engel, 1970; Raab, Chaplin, & Bajusz, 1964; Richter, 1957; Rosenman & Friedman, 1974).

Suinn (1977a) did an operant analysis of the relationship between stress and Type A behavior. He postulated that Type A individuals respond to environmental stressors by automatically displaying Type A behaviors which are their strongest habits. Because these behaviors are valued by western society and also because they tend to get things completed, these behaviors lead to two types of rewards. These behaviors are rewarded because they lead to achievement of a successful product and they also help reduce the original stress situation. However, ultimately the Type A behaviors that have been strengthened by these reinforcements are themselves stress-producing. Thus, Type A individuals place themselves in stressful situations because of their competitiveness, job involvement, time urgency, achievement-striving, and self-imposition of deadlines. The Type A person will then respond to this increased stress by displaying more Type A behavior. He is caught up in a vicious cycle that prevents breaking out of Type A behavior patterns.

Intervention Strategies

Although disorders of the cardiovascular system were among the first to be studied psychosomatically, the only
early clinicians to report therapy case studies for the coronary-prone patient were the analysts Dunbar (1943) and Alexander (1943). They characterized coronary-prone behavior as an effort to compensate for unresolved Oedipal conflicts and recommended that the analysis be concerned with uncovering and "working through" the patient's repressed hostility. Wolberg (1977) reviewed the scant literature on traditional psychotherapy with these individuals and concluded that since they have a difficult time with affective expression, find it hard to think abstractly, and fail to respond well to interpretation, they are poor candidates for traditional psychotherapy. Glass (1977a) reported a significant negative correlation between scores on a measure of emotional counseling readiness and Type A scores from the Jenkins Activity Survey.

Sigg (1974) suggested that the administration of sedative type psychotropic drugs can assist the therapeutic process by reducing the characteristic emotional and muscular tension of Type A's. Sigg also proposed that B-adrenergic blocking agents because of their effects on catecholamines, may be helpful in association with any therapeutic program designed to modify the ways in which Type A individuals cope with environmental stressors. The use of sedatives and blocking agents received support from human and animal studies showing that responses to psychosocial stress, both behavioral
and biochemical, were depressed by diazepam and barbiturates (Sigg, 1974).

Despite some evidence for the value of drug therapy, most researchers remain skeptical of the use of sedatives in reducing coronary-prone behavior. A number of nondrug techniques have recently been proposed. It has been shown that a secularized meditation-like procedure reduced blood pressure and heart rate, but there was not evidence of its effect on Type A behavior (Benson, 1975; Benson, Marzetta, & Rosner, 1974). Along the same line, the use of biofeedback in reducing hypertension and related cardiovascular symptoms has been researched, yielding equivocal results (Blanchard & Epstein, 1978; Blanchard & Young, 1973).

The use of group therapy for changing Type A behavior has been suggested by a number of researchers (Friedman & Rosenman, 1974; Rahe, 1975). Reported research has used a brief group therapy procedure with postmyocardial infarction patients (Rahe, 1975; Rahe, Tuffli, Suchor, & Arthur, 1973). Results indicated reliably fewer rehospitalizations in therapy patients than in similar controls. Although the investigators reported that the therapy patients exhibited behavioral changes, there was no objective measurement of actual behavior change. Friedman and Rosenman (1974) also suggested group therapy for Type A patients where individuals are helped to re-engineer their schedules so that positive reinforcement follows nonpathogenic behavior and
they learn to avoid situations that elicit feelings of time pressure and hostility. Only anecdotal reports have been cited indicating that this procedure actually changes behavior.

Recently, the psychological literature has evidenced a shift in emphasis from stress to coping. The value of effective coping skills has been stressed by contemporary researchers and clinical workers (Goldfried, 1977; Goldfried & Goldfried, 1975; Mahoney, 1974; Meichenbaum, 1977). Goldfried (1971, 1977) suggested that systematic desensitization be reconceptualized as a general self-relaxation skill rather than a passive counter-conditioning procedure. In the coping skills version of desensitization, Goldfried emphasized four components: (a) describing the treatment rationale as a general skill training approach; (b) the use of relaxation as a strategy for coping with stress in general, (c) the use of multiple theme hierarchies using proprioceptive feedback associated with anxiety as opposed to the external situation that originally created the anxiety, and (d) training in "relaxing-away" a scene-induced anxiety-arousing image in order to emphasize an active coping orientation to stress. Empirical support for this coping-skills package has been demonstrated with speech-anxious subjects (Goldfried & Trier, 1974), in reducing test anxiety (Denney & Rupert, 1975; Spiegler, Cooley, Marshall, Prince, Puckett, & Skenazy, 1976), and with acrophobics (Jacks, 1974). Recent
studies (Meichenbaum & Turk, 1976; Goldfried & Goldfried, 1977) have supported the contention that a carefully delineated target-relevant hierarchy may not be required when teaching anxiety-reduction within a self-control framework.

A similar approach to the training of coping skills, called anxiety-management training, was developed by Suinn (1975a; Suinn & Richard, 1971). This procedure also emphasized relaxation as an active coping skill in which the client is trained to emit coping responses to a wide array of anxiety-engendering events. In anxiety-management training, the client (thru imagery) learns to identify muscular or physiological cues that signal the onset of the stress experience, such as dryness of the throat, increased heart rate, or neck muscle tension. The client then is taught a muscle-relaxation procedure and is trained to respond to bodily cues that indicate anxiety-arousal with the relaxation skill that reduces the anxiety. Anxiety-management training is based on the concept that the anxiety response is converted into a discriminative stimulus for coping (relaxation) behaviors. Empirical support for this procedure has been demonstrated with mathematics and test anxiety (Suinn & Richardson, 1971; Richardson & Suinn, 1973), general anxiety (Suinn, 1976), and Type A behavior (Suinn, 1975b; Suinn & Bloom, 1978; Suinn, Brock, & Edie, 1975).

Suinn, Brock, and Edie (1975) used a combination of anxiety-management training and visuomotor behavior rehearsal
(Suinn, 1972) in a program called Cardiac Stress Management Training. Visuo-motor behavior rehearsal is a method that enables a patient, thru controlled imagery, to acquire new adaptive behaviors as a substitute for Type A characteristics. Cardiac Stress Management Training was provided to Type A heart disease patients undergoing rehabilitation in a brief five-session treatment program. The experimental group showed a reduction in serum cholesterol and triglyceride levels as compared to a control group and anecdotally reported behavior change. These results were replicated with a different set of patients from the same hospital (Suinn, 1975b). Suinn hypothesized that anxiety-management training was the crucial factor in the apparent success of the program.

Suinn and Bloom (1978) conducted a study using only anxiety-management training in a sample of healthy Type A persons. Results indicated reductions in Type A characteristics on the dimensions of Hard-Driving and Speed and Impatience scores on the Jenkins Activity Survey, as well as reductions in state and trait anxiety for the treatment group. Treated subjects also showed greater reductions in systolic and diastolic blood pressure, but differed little in triglyceride and cholesterol levels.

In a similar study, Roskies, Spevack, Surkis, Cohen, and Gilman (1978) attempted to modify Type A behavior in a group of healthy volunteers comparing behavioral stress
management with a traditional group psychotherapy approach. The behavioral procedure focused on the use of progressive muscle relaxation to cope with stressful situations. The traditional approach centered around the theme that coronary-prone behavior emerged from a family constellation of a demanding mother and a passive, ineffective father. The results indicated that both treatment approaches were effective in reducing serum cholesterol levels and systolic blood pressure. Although not reaching significance, serum cholesterol levels for the behaviorally treated group appeared to drop to a much greater degree (40.7 mg per 100 ml) than that of the traditional psychotherapy group (16.1 mg per 100 ml). A health questionnaire revealed lower somatic concerns for both groups, and both groups showed a significant increase in life satisfaction ratings. Subjects in both groups also reported less overtime work, and reduced feelings of time pressure. No change was noted for diastolic blood pressure, serum triglyceride levels, or state/trait anxiety scores.

Purpose of the Study

The purpose of this study was to investigate the efficacy of anxiety-management training with Type A college students. Because previous research involving Type A behavior modification has used self-report indices of behavior change, this study utilized performance measures that have been empirically documented as behavioral validation for the achievement-striving and time-urgency components of this

behavior pattern. A learned helplessness manipulation associated with Type A behavior was also used to assess the results of the intervention. The importance of behavioral measures wasunderscored by Glass's (1977a, 1977b) previously mentioned work that suggested that although Type A subjects may report greater amounts of time urgency, impatience, achievement striving, and the like, than Type B subjects, actual behavior indicative of these attributes are displayed by Type A's primarily under eliciting environmental conditions.

Method

Subjects

The student form of the Jenkins Activity Survey was initially administered to 72 college students enrolled in an introductory psychology course. The 20 subjects who scored highest on the Type A dimension (above 9) and were available for 3 weeks of training were selected for participation. Subjects were randomly assigned to either the treatment or the control group condition. The age range of the participating subjects was 17-21 years, with a mean age of 18.8 years.

Instruments

Jenkins Activity Survey, Student Form. The student Jenkins Activity Survey (Appendix A) was used both in the selection process and as a dependent variable. The student Jenkins Activity Survey was used here instead of the Structured Interview because it is self-administering, has data
on factored scores, and was validated on a college student sample. All results were hand-scored by an individual blind to the subject's status in the experiment. Factor scores involve the A-B total score, a Speed and Impatience score, and a Hard-Driving score.

**Time estimation task.** Time consciousness is an important aspect of Type A behavior. Studies have used subjective time estimates in order to validate this time urgency component (Bortner & Rosenman, 1967; Glass, 1977a). This task involved five estimates of a fixed 1-minute time interval.

**Writing speed task.** Previous work (Bortner & Rosenman, 1967; Glass, 1977a) has demonstrated that time-conscious individuals work near maximum speed and have difficulty slowing down on a writing-speed task. This task involved the subject writing the phrase, "United States of America," at regular writing speed, very rapidly, slowly, and very slowly.

**Problem-solving test.** The achievement-striving component of Type A behavior was assessed by a task consisting of 240 simple arithmetic problems (for instance, 5 + 6 - 3) adapted from Glass (1977a). The problems were administered in two equivalent forms of 120 problems at each testing. For half of the problems there was an explicit 5-minute deadline, while for the other half there was no time limit.

**Learned helplessness paradigm.** A learned helplessness manipulation previously shown to be associated with Type A behavior (Glass, 1977a) was also used to assess the effects
of the intervention. A series of four-dimensional stimulus patterns previously used in discrimination learning studies (Levine, 1971) and learned helplessness research (Hiroto & Seligman, 1975) was the cognitive pretreatment task. Each of the four dimensions had two associated values: (a) letter (A or T); (b) letter size (large or small); (c) border shape surrounding the letter (circle or square); (d) border texture surrounding the letter (dashed or solid). In order to induce a perceived noncontingency between response and outcome, no value was treated as consistently correct. Levine (1971) provided a detailed description of these patterns.

After pretreatment, a series of 20 anagrams taken from a list of five-letter anagrams, judged to be of intermediate to high difficulty (Tresselt & Mayzner, 1966) was used as the cognitive test task. Examples of the anagrams are (a) IARDT, (b) BIATH, (c) ERLKC. The letter order for the anagrams was 3-4-2-5-1 preintervention and 2-5-1-4-3, postintervention.

Procedure

Pretraining period. A total of 20 Type A subjects were admitted to the study and randomly assigned to either the treatment or the no-treatment control group. Subjects were then tested individually by an experimenter blind to the subject assignment. Upon arriving at the research facility, subjects were escorted into the laboratory and seated at a
The experimenter then read the following instructions for the time estimation task.

The first task you will be working on today involves time estimation. After I say "start," I want you to guess when 1 minute has elapsed. During this time you will be reading a passage aloud. When you think a minute has passed, say "stop." Please do not use any objective cues such as heart rate, breathing, or counting.

Subjects who were wearing wristwatches were asked to hand them to the experimenter, after which they were given a technical paper on cognitive psychology to read aloud. The time between their starting to read and saying "stop" was recorded by a stopwatch. The score used for time estimation was the mean of the five estimates, in seconds, of the 1-minute interval.

Immediately after the time-estimation task, the writing speed task was administered. Subjects were timed while writing the phrase "United States of America" at normal writing speed. They were then instructed to write the phrase three more times—as fast as possible, slowly, and very slowly. Because Type A's have difficulty in slowing down, three response latency scores were computed to reflect speed and impatience: (a) slow minus regular writing speed, (b) regular minus fast, (c) very slow divided by regular.
After the writing speed test, the subjects listened to instructions for the problem-solving test, which consisted of 240 simple arithmetic problems, administered in two equivalent forms of 120 problems. Subjects were not allowed to make written computations. They were told to begin with the first problem and work each problem before going on to the next. Only the final answer was to be marked on the test sheets. For half of the problems, there was an explicit 5-minute deadline, while for the other half there was no time limit. All subjects were in the no-time-limit condition first. The ratio of number of problems attempted on the deadline condition to the no-deadline condition was computed.

After this task, the learned helplessness paradigm was conducted. Four sets of dimension problems plus a shorter sample set were then presented to the subjects. Each problem consisted of 10 pairs of stimulus patterns composed of four dimensions. The sample problems were composed of five dimensions, letter color being added to the other dimensions.

The following instructions introduced the cognitive pre-treatment task.

In this experiment you will be looking at cards like this one. Note that each card has two stimulus patterns. The sample patterns are composed of five different dimensions and two values associated with each dimension. The dimensions and their values are
(experimenter described each dimension and value). Each stimulus pattern has one value from each of the five dimensions. I have chosen one of the ten values as correct. The idea is for you to find out this value. Look at each card and choose which side, left or right, you think contains the correct value and I will then tell you if your choice was correct or incorrect. In a few trials you can learn what the correct value is by this feedback. The object is to figure out the correct value so you can choose correctly as often as possible.

Next, five trials of the sample problem were presented. This clarified the task of finding the "correct" value. After completing the sample trials, the experimenter reviewed the instructions.

The experimental stimulus patterns were composed of four dimensions. Four different problems were presented in blocks of 10 trials each. At the end of each trial, the subject was asked for the correct answer. Subjects received a predetermined random order of "correct" (C) and "incorrect" (I) regardless of the particular value that was guessed. The schedules of reinforcement were (a) C-I-I-C-I-I-C-C-I for the first problem; (b) I-C-I-C-I-C-I-C-I-C for the second problem; (c) I-C-I-C-I-C-I-C-I-C for the third problem; (d) C-I-C-I-C-I-C-I-C-I-C for the last problem.
Subjects were told, "that's the wrong answer," when they were asked to identify the correct value after each problem. Instructions to the subjects continued, "We are now starting on a new problem. You do not know at this point if I have chosen a different value for the problem. I will continue telling you if you are correct or incorrect." If a guess was not made voluntarily after 10 seconds, the experimenter asked for the subject's choice.

An effort was made to enhance subjects' awareness of contingency and noncontingency as they were required to keep a written record of "correct" and "incorrect" answers. They were given a tally sheet consisting of 10-line columns headed "correct" and "incorrect" for each of the four sets of dimension problems. The words "right" and "wrong" were also contained on the sheets next to each of the four pairs of columns. Checkmarks were to be placed in one or the other column for each of the 10 trials of a given problem. These checks corresponded to whether the subject's guesses were correct or incorrect according to the experimenter's feedback. Subjects were also told to circle "right" or "wrong" at the end of each pair of columns, depending on whether or not they had finally guessed the correct value.

After completion of the pretreatment task, the materials were collected and the instructions for the cognitive test phase of the helplessness task were delivered. They were adapted from Hiroto and Seligman (1975) as follows:
You will be asked to solve some anagrams. As you may know, anagrams are words with the letters scrambled. The problem for you is to unscramble the letters so that they form a word. Use all the letters to form a word, and as you work through the series of anagrams do not look back through previous words. Immediately after you've formed the word, tell me what it is. Now, there could be a principle or pattern which will enable you to solve the anagrams, but that's up to you to figure out. I can't answer any questions now. I will not be telling you this time whether your solutions are correct or incorrect.

The subject received a stack of 20 index cards on which the anagrams were printed. All anagrams were soluble and had the same letter sequence. Three measures of anagram performance were used: (a) trials to criterion for anagram solution was defined as subject solving three consecutive anagrams in less than 15 seconds each; (b) number of failures to solve the anagram within 100 seconds; (c) mean response latency for the 20 anagrams. These variables were designed to measure interference with learning the anagram task.

After the pretraining period, the subjects in the experimental group were scheduled immediately for anxiety management training, during which period the control group was instructed to wait for later treatment.
Anxiety-management training. Anxiety-management training followed the standard method involving muscle-relaxation training, use of imagery to precipitate stress, identification of muscular and physiological signs of stress onset, and training in stress reduction through the coping (relaxation) skills (Suinn, 1975b, 1977c). Emphasis was placed on practicing stress as aroused by uncontrollable time-urgent events and active coping with the stressors. Anxiety-management training was conducted in six 1-hour group sessions with meetings scheduled twice weekly.

The initial session involved a brief explanation of anxiety management training, with the trainer answering all questions. After this introduction, an abbreviated Jacobsen relaxation procedure was taught using deep breathing and relaxation scenes as cues. Homework practice in the relaxation exercise was assigned.

The second session began with a review of progress and then proceeded to identify an anxiety scene for each subject. Relaxation without muscle tensing was then initiated with subjects using deep breathing and the relaxation scenes as a cue for triggering the relaxation. The anxiety scene was then presented briefly using the following instructions.

In a moment, I'm going to have you turn on the anxiety scene that you identified for yourself. All right, switch on that scene right now, really be there, let the scene develop as realistically
as you can; allow yourself to experience the anxiety again; signal when you've started to become anxious again.

The trainer then instructed the subjects to terminate the anxiety scene, and to turn on the relaxing scene; helping the subjects to develop it clearly and to use deep breathing to further the relaxation. The anxiety scene was then repeated with slightly longer exposure followed by relaxation. This procedure was repeated as time permitted. As the session progressed, emphasis began to shift toward training in self-management, giving subjects more personal responsibility for initiating arousal, deciding when to stop arousal, and for re-establishing control. Homework involved practicing relaxation without using muscle tensing.

Session three began with a review of progress concerning relaxing without tensing. After relaxation was initiated, the anxiety scene was introduced with greater emphasis on letting the anxiety build higher and higher. Subjects were now instructed to pay attention to the muscular or physiological cues that signal anxiety. Relaxation was then established by shifting to the relaxation scene. As time permitted the arousal-relaxation sequence was repeated three-five times. The session ended with a discussion of "early warning" signals or individual physical cues each subject had of anxiety. Homework continued with relaxation practice and self-initiation of relaxation in vivo anytime they felt a physical cue.
The fourth session began by determining progress in self-initiation of relaxation, eliciting information that improved on anxiety scenes, and selection of a different anxiety scene for generalization. Relaxation was subject-initiated and the subjects were given more personal responsibility as follows:

In a minute, I'll have you turn on the anxiety scene; then whenever you wish, terminate that scene and reinitiate relaxation, using whatever works best for you. When you're feeling comfortable again, signal me. Okay, turn on the anxiety scene now, let the anxiety increase, then switch on the relaxation when you're ready. When you feel reasonably comfortable, signal me. (Silence until last subject signals.)

As time permitted, four-five repetitions were used, with a different anxiety scene for approximately half of the trials. At the end of the session, discussion involved examining the methods that appeared to work best in achieving relaxation for each of the subjects.

Session five was essentially equivalent to the fourth session. However, during this session, subjects did not terminate the anxiety scene before beginning relaxation but were told to reinitiate the relaxation while still in the anxiety scene.

The final session was used to further practice skills in anxiety management and to discuss the level of transfer to in vivo events.
Posttraining period. Upon completion of anxiety-management training, both the treated group and the control group were re-evaluated on all the previously mentioned dependent variables. The only procedural change at posttest was that different anagrams, at the same difficulty level, were used with an accompanying change in the letter order for the correct solution.

Results

Jenkins Activity Survey Scores

Means and standard deviations for the A-B total score, and the Speed and Impatience and Hard-Driving factor scores for the ten treated and control subjects are presented in Table 1.

Analysis of covariance reveals a significant reduction on the A-B total score for treated subjects as compared with the control subjects ($F = 11.677$, $df = 1, 17$, $p < .01$). On the Hard-Driving score, analysis of covariance also shows a significant reduction for treated subjects as compared with controls ($F = 7.632$, $df = 1, 17$, $p < .05$). A significant effect is also found on the Speed/Impatience factor score ($F = 8.347$, $df = 1, 17$, $p < .05$).

Performance Measures

Means and standard deviations for subjective time estimates, slow minus regular, regular minus fast and very slow divided by regular writing speed scores and Deadline/No Deadline ratios on the problem-solving test for treatment and
Table 1
Means and Standard Deviations of Jenkins Activity Survey Scores for Treated and Control Subjects

<table>
<thead>
<tr>
<th>Score</th>
<th>Pretest Mean</th>
<th>SD</th>
<th>Posttest Mean</th>
<th>SD</th>
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<tr>
<td>A-B Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treated Subjects</td>
<td>12.1</td>
<td>2.726</td>
<td>7.7</td>
<td>1.889</td>
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<tr>
<td>Control Subjects</td>
<td>10.7</td>
<td>1.947</td>
<td>10.5</td>
<td>1.958</td>
</tr>
<tr>
<td>Hard-Driving Factor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treated Subjects</td>
<td>5.4</td>
<td>2.836</td>
<td>3.5</td>
<td>1.900</td>
</tr>
<tr>
<td>Control Subjects</td>
<td>4.3</td>
<td>2.584</td>
<td>4.7</td>
<td>1.947</td>
</tr>
<tr>
<td>Speed/Impatience Factor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treated Subjects</td>
<td>1.8</td>
<td>1.619</td>
<td>0.7</td>
<td>0.675</td>
</tr>
<tr>
<td>Control Subjects</td>
<td>1.7</td>
<td>1.767</td>
<td>1.7</td>
<td>1.636</td>
</tr>
</tbody>
</table>

Waiting-list control subjects are presented in Table 2. Analysis of covariance does not yield significant results for subjective time estimates, for the slow minus regular writing speed scores, and for the very slow divided by regular writing speed scores. A significant effect is revealed on analysis of covariance for the Deadline/No Deadline ratio scores ($F = 6.31, \ df = 1, 17, p < .05$), as well as for the regular minus fast writing speed scores ($F = 6.356, \ df = 1, 17, p < .05$) in the expected direction. Thus, significance is found on the achievement-striving behavioral measure and on one of the four time-urgency performance measures.
Table 2

Means and Standard Deviations of Scores on the Time Estimation Task, Writing Speed Task, and Problem-Solving Test for Treated and Control Subjects

<table>
<thead>
<tr>
<th>Score</th>
<th>Pretest</th>
<th></th>
<th>Posttest</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
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Learned Helplessness Paradigm

Means and standard deviations for trials to criterion, mean response latency, and number of failures on the anagram solution are presented in Table 3.

Table 3
Means and Standard Deviations of Anagram Solution Scores

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<th>Score</th>
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Analysis of covariance reveals a significant reduction on the number of trials needed to reach criterion ($F = 13.363$, $df = 1, 17, p < .01$) and on mean response latency ($F = 4.538$, $df = 1, 17, p < .05$) for treated as compared with control subjects on the anagram solution. The number of failures to
solve on the anagram solution does not yield a significant difference between groups.

**Manipulation Check**

Eleven t tests were computed comparing combined treatment and control group Type A subjects with a group of ten Type B subjects on all pretest measures. Means and standard deviations are presented in Appendix B.

Nonsignificant t ratios are found on subjective time estimation, slow minus regular writing speed score, and very slow divided by regular writing speed score. Significant differences are exhibited between Type A's and Type B's on the Jenkins Activity Survey A-B total score ($t = 10.2794$, $df = 28$, $p < .001$), the Hard-Driving factor score ($t = 4.0052$, $df = 28$, $p < .01$), and the Speed and Impatience factor score ($t = 3.3582$, $df = 28$, $p < .01$). The t test on the Deadline/No Deadline ratio for the arithmetic problem-solving test also indicates a significant difference between Type A and Type B subjects ($t = 2.2541$, $df = 28$, $p < .05$). A significant effect is also found on the regular minus fast score on the writing speed task ($t = 2.5196$, $df = 28$, $p < .01$). Type A subjects also exhibit a significantly greater degree of helplessness compared to Type B subjects on number of trials needed to reach criterion ($t = 2.7373$, $df = 28$, $p < .01$), on mean response latency ($t = 2.2833$, $df = 28$, $p < .05$), and on number of failures to solve ($t = 2.8481$, $df = 28$, $p < .01$) the anagram solution task.
Discussion

The most important result of this study is that Type A behavior, in the treated group, is reduced significantly as compared to the controls, using behavioral indices of performance as well as self-report evaluations. The results reveal statistically significant reductions on the A-B total score as well as the Hard-Driving and Speed and Impatience factor scores on the Jenkins Activity Survey for the treated as compared with the control subjects. These data suggest that anxiety management training reduced Type A characteristics on all dimensions of the inventory.

Zyzanski (1977) has reported that the Jenkins Activity Survey is consistently related to coronary heart disease in both retrospective and prospective studies and is a strong predictor of recurrent infarction and severity of atherosclerosis. Given the significance of survey scores in predicting the risk of heart disease, a reduction in these scores may reflect a behavioral change away from coronary-prone behavior. The additional collection of behavioral data under eliciting environmental conditions to supplement self-report indices of behavior change was a major purpose of this investigation.

In examining the behavioral data for the achievement-striving and time-urgency component of the Type A behavior pattern, it appears that the stress management approach was effective in directly changing Type A behavior.
The Deadline/No Deadline ratio scores on the arithmetic problem-solving test change for the treated group in the expected direction. This task has been used by Glass and his associates (Burnham et al., 1975; Glass, 1977a, 1977b) to provide behavioral documentation to clinical impressions that Type A individuals are excessive achievement-strivers who arbitrarily impose deadlines. Treated subjects show significantly higher ratios than do the waiting-list controls, suggesting that they performed at a higher level (attempted more problems) when there was an explicit completion deadline which is similar to Type B performance in this experimental situation. These results suggest that treated subjects responded more to the perceived requirements of the situation than did controls and achievement drive decreased for the treated group when task demands were not made explicit.

The data on the behavioral time urgency measures are inconsistent. On the time estimation task, there is no significant difference between treated subjects and controls. However, a manipulation check reveals that the Type A subjects in this study do not differ significantly from a group of Type B's in terms of time consciousness. The Type A subjects in this study do not perceive time as passing slowly in accord with other published research on time perception and Type A behavior (Bortner & Rosenman, 1967; Burnham et al., 1975; Glass, 1977a). However, early psychophysical studies of time estimation (e.g., Woodrow, 1951) have reported much
situational variability in this measure and Glass (1979) reported difficulty in replicating his earlier results.

On the writing-speed task, the only dependent variable to exhibit a significant change is the regular minus fast score. Treated subjects do not appear to work as close to their maximum speed on the task after exposure to anxiety-management training. This result appears related to a slower normal writing speed (mean pretest = 10.3; mean posttest = 11.9) rather than a decrease in their maximum writing speed (mean pretest = 8.3; mean posttest = 8.0). A manipulation check indicates that Type A subjects are significantly different than Type B's on the pretests in the predicted direction on the regular minus fast scores.

The slow minus regular score and the very slow divided by regular score do not yield significant results. However, Type A-Type B comparisons on these measures do not replicate previous work in this area (Bortner & Rosenman, 1967; Glass, 1977a). It appears that in this small sample of college students, Type A subjects did not have difficulty slowing down on the writing speed task. Whether these results are due to the nature of the sample, the size of the sample, or the adequacy of the behavioral measures cannot be ascertained at this time.

In sum, where Type A-Type B differences were found on pretest, anxiety-management training appeared to exert a
significant effect on the treated subjects. These results suggest some generalization to in vivo behavior.

The learned helplessness data replicate Glass's (1977a, 1977b) findings that Type A subjects exhibit greater behavioral signs of helplessness than Type B's after extended exposure to salient uncontrollable stressors. After treatment with anxiety-management training, treated subjects exhibit significant reductions in helplessness, after extended experience with uncontrollability, on two of the three measures of anagram performance. Significant reductions are found in trials to criterion for anagram solution and mean response latency for the 20 anagrams. The treated and control groups do not differ on number of failures to solve the anagrams within 100 seconds.

This differential effect is difficult to interpret but it may be related to the cognitive and motivational deficits in learned helplessness. Seligman (1975) hypothesized that number of failures to solve the anagrams and mean response latency are measures of the motivational deficits in learned helplessness and that trials to criterion is related to the cognitive deficit. Since the most remarkable findings in this study are exhibited in the trials to criterion measure, anxiety-management training may have been more effective in reducing the cognitive deficits Type A subjects exhibit after extended exposure to uncontrollable stress. This hypothesis should be viewed with scientific skepticism as Miller and
Norman (1979) opined in a review of the helplessness literature that no study to date had adequately separated the cognitive and motivational components of learned helplessness.

A more parsimonious explanation for this differential result concerns task familiarity. Both treated and control groups exhibit mean reductions on the number of failures to solve measure of anagram performance. The treated group had a mean of 7.4 failures at pretest and 5.9 failures at posttest, while the controls show a mean of 7.3 failures at pretest and 6.2 posttest failures to solve. Since all subjects were familiar with anagram solution from the pretest, they may have realized that the anagrams were solvable. Therefore, number of failures to solve may have been less affected by the helplessness manipulation than mean response latency, where speed of solution is important, and trials to criterion, where subjects have to quickly perceive the solution pattern.

It is important to examine the mechanisms involved in the reduction of helplessness in the treated group as a result of the treatment procedure. Anxiety-management training involves the learning of an active coping skill where the subject is trained to make an instrumental coping response to physiological cues that indicate anxiety-arousal. One hypothesis is that amelioration of helplessness on anagram performance directly relates to the treated subjects' "success experiences" in controlling what they originally considered to be uncontrollable stress reactions. Since the
subjects presumably were able to use their new coping skill to reduce their Type A responses to stressful stimuli that threatened their sense of control, reduction in performance deficits could be due to exposure to response-dependent success conditions (Klein & Seligman, 1976).

An alternate hypothesis has to do with an attribution theory analysis of learned helplessness in humans (Abramson, Seligman, & Teasdale, 1978; Miller & Norman, 1979). Research has shown (Dweck & Reppucci, 1973; Klein, Fencil-Morse, & Seligman, 1976; Tennen & Eller, 1977) that subjects who make personal competence attributions to uncontrollability cues rather than attributing outcomes to task difficulty or situational factors exhibit more behavioral signs of helplessness. Although subjects in the treated group learned an instrumental coping response, many reported that they were also beginning to accept temporary loss of control ("It's just a tough situation, it will soon pass") rather than attribute it to a personal deficiency ("I just have to prepare better and get a better hold on things"). This suggests a palliative coping response in addition to the rehearsed instrumental action. Future research could be directed at clarifying the relative contributions of specific therapeutic modes of action.

One of the most important lines of research in the helplessness data is whether the statistically significant helplessness reductions are clinically significant and directly affect the physiological substrates associated with coronary
disease. The biobehavioral model proposed by Glass (1977a, 1977b) attempted to integrate behavioral and physiological responses to situational variables. Glass hypothesized that Type A subjects respond to uncontrollable stressful stimulation with norepinephrine fluctuations that directly correspond to their characteristic hyperresponsive/hyporesponsive behavioral shifts. He proposed that the more frequent the cycle, the more damage would accrue to the coronary arteries. A number of recent studies (Dembroski et al., 1977; Friedman et al., 1975; Glass, 1977a; Simpson et al., 1974) have also reported that Type A individuals initially react to a challenge situation by exhibiting sharp rises in autonomic and neuroendocrine responses. It is important that future research investigate the direct effects of therapeutic strategies on autonomic and neuroendocrine changes as therapeutic outcome data can only be speculative until direct physiological measurements are examined. Therefore, it is important to directly verify whether there is a norepinephrine shift associated with responsivity on a helplessness manipulation and whether treatment reduces these fluctuations in Type A subjects.

The overall results suggest that anxiety-management training may be a promising method for increasing effective coping responses among Type A persons. However, even though these results are encouraging, they raise numerous questions and certain cautions need to be expressed regarding clinical
significance, maintenance, and possible confounding variables.

It is important to note that Type A individuals were not transformed into Type B's. Thus, the pathological elements in the behavior pattern were not eradicated but modified. Whether or not this is clinically significant can only be ascertained by longitudinal studies directly assessing treatment effects on clinical coronary disease.

Because it is difficult to change a habitual response style which has proven so successful in the past, future outcome studies should examine follow-up data in order to evaluate whether behavioral change is maintained. It may prove necessary to have longer treatment with periodic "booster sessions" in order to facilitate maintenance. Roskies (in press) pointed out that our modest successes in treating substance abuse should alert researchers to the problem in changing and maintaining change in behaviors that are so much a part of an individual's life style.

Paul (1967) reported that a nonfactorial group design with a no-treatment control group has two confounding possibilities: (a) within treatment, and (b) within client. To ameliorate treatment confounding, future research should utilize an "attention-placebo" group to distinguish between the specific effects of the treatment and the nonspecific effects involved in any therapeutic contact.
Within-client confounding can eventually be reduced by a well-controlled factorial design that examines different treatment possibilities for different homogeneous Type A subgroups. Research into the dynamics of the behavior pattern might eventually lead to within-Type A subgroups that are differentially affected by different treatment strategies. For example, Jenkins, Zyzanski, Ryan, Flessas, and Tannenbaum (1977) reported that some Type A individuals also appeared anxious in interpersonal encounters and felt insecure and awkward in group social situations. This Type A subgroup appeared to receive rewards only from seeking achievement rather than from social contact. Factorial designs could investigate, for example, whether this social insecurity subgroup might respond better to assertiveness training than to an emotional reconditioning approach. Thus, it is important that multidimensional assessment be systematically investigated along with the further exploration of intervention procedures. As Roskies (in press) hypothesized, it is possible that Type A behavior is in actuality a number of independent risk factors. Finally, more divergent outcome criteria need to be developed in order to better evaluate treatment effectiveness.
Appendix A

The Jenkins Activity Survey (Student Form)

Medical research is trying to track down the causes of several diseases which are attacking increasing number of people. This survey is part of such a research effort.

Please answer the questions on the following pages by marking the answers that are true for you. Each person is different, so there are no "right" or "wrong" answers. Of course, all you tell us is strictly confidential—to be seen only by the research team. Do not ask anyone else about how to reply to the items. It is your personal opinion that we want.

Your assistance will be greatly appreciated.

For each of the following items, please circle the number of the ONE best answer:

1. Do you ever have trouble finding time to get your hair cut or styled?
   1. Never  2. Occasionally  3. Almost always

2. Does college "stir you into action"?
   1. Less often than most college students
   2. About average
   3. More often than most college students

3. Is your everyday life filled mostly by
   1. Problems needing solution
   2. Challenges needing to be met
3. A rather predictable routine of events
4. Not enough things to keep me interested or busy

4. Some people live a calm, predictable life. Others find themselves often facing unexpected changes, frequent interruptions, inconveniences, or "things going wrong."

How often are you faced with these minor (or major) annoyances or frustrations?
1. Several times a day  3. A few times a week
2. About once a day  4. Once a week
5. Once a month or less

5. When you are under pressure or stress, do you usually:
1. Do something about it immediately
2. Plan carefully before taking any action

6. Ordinarily, how rapidly do you eat?
1. I'm usually the first one finished
2. I eat a little faster than average
3. I eat at about the same speed as most people
4. I eat more slowly than most people

7. Has your spouse or some friend ever told you that you eat too fast?
1. Yes, often  2. Yes, once or twice
3. No, no one has told me this

8. How often do you find yourself doing more than one thing at a time, such as working while eating, reading while dressing, figuring out problems while driving?
1. I do two things at once whenever practical
2. I do this only when I'm short of time
3. I rarely or never do more than one thing at a time
9. When you listen to someone talking, and this person takes too long to come to the point, do you feel like hurrying him along?
   1. Frequently     2. Occasionally    3. Almost never
10. How often do you actually "put words in his mouth" in order to speed things up?
    1. Frequently     2. Occasionally    3. Almost never
11. If you tell your spouse or a friend that you will meet them somewhere at a definite time, how often do you arrive late?
    1. Once in a while     2. Rarely     3. I am never late
12. Do you find yourself hurrying to get places even when there is plenty of time?
    1. Often             2. Occasionally    3. Rarely or never
13. Suppose you are to meet someone at a public place (street corner, building lobby, restaurant) and the other person is already 10 minutes late. Will you
    1. Sit and wait?
    2. Walk about while waiting?
    3. Usually carry some reading matter or writing paper so you can get something done while waiting?
14. When you have to "wait in line," such as at a restaurant, a store, or the post office, do you
    1. Accept it calmly?
2. Feel impatient but do not show it?
3. Feel so impatient that someone watching could tell you were restless?
4. Refuse to wait in line, and find ways to avoid such delays?

15. When you play games with young children about 10 years old, how often do you purposely let them win?
1. Most of the time  2. Half the time
3. Only occasionally  4. Never

16. Do most people consider you to be?
1. Definitely hard-driving and competitive
2. Probably hard-driving and competitive
3. Probably more relaxed and easy going
4. Definitely more relaxed and easy going

17. Nowadays, do you consider yourself to be?
1. Definitely hard-driving and competitive
2. Probably hard-driving and competitive
3. Probably more relaxed and easy going
4. Definitely more relaxed and easy going

18. How would your spouse (or close friend) rate you?
1. Definitely hard-driving and competitive
2. Probably hard-driving and competitive
3. Probably relaxed and easy going
4. Definitely relaxed and easy going

19. How would your spouse (or best friend) rate your general level of activity?
1. Too slow. Should be more active.
2. About average. Is busy much of the time.
3. Too active. Needs to slow down.

20. Would people who know you well agree that you take your work too seriously?
   1. Definitely Yes  2. Probably Yes
   3. Probably No  4. Definitely No

21. Would people who know you well agree that you have less energy than most people?
   1. Definitely Yes  2. Probably Yes
   3. Probably No  4. Definitely No

22. Would people who know you well agree that you tend to get irritated easily?
   1. Definitely Yes  2. Probably Yes
   3. Probably No  4. Definitely No

23. Would people who know you well agree that you tend to do most things in a hurry?
   1. Definitely Yes  2. Probably Yes
   3. Probably No  4. Definitely No

24. Would people who know you well agree that you enjoy "a contest" (competition) and try hard to win?
   1. Definitely Yes  2. Probably Yes
   3. Probably No  4. Definitely No

25. Would people who know you well agree that you get a lot of fun out of your life?
1. Definitely Yes  
2. Probably Yes  
3. Probably No  
4. Definitely No

26. How was your "temper" when you were younger?  
1. Fiery and hard to control  
2. Strong, but controllable  
3. No problem  
4. I almost never got angry

27. How is your "temper" nowadays?  
1. Fiery and hard to control  
2. Strong, but controllable  
3. No problem  
4. I almost never get angry

28. When you are in the midst of studying and someone interrupts you, how do you usually feel inside?  
1. I feel O.K. because I work better after an occasional break  
2. I feel only mildly annoyed  
3. I really feel irritated because most such interruptions are unnecessary

29. How often are there deadlines in your courses? (If deadlines occur irregularly, please circle the closest answer)  
1. Daily or more often  
2. Weekly  
3. Monthly  
4. Never

30. Do these deadlines usually  
1. Carry minor pressure because of their routine nature?  
2. Carry considerable pressure, since delay would upset things a great deal?
31. Do you ever set deadlines or quotas for yourself in courses or other things?
   1. No
   2. Yes, but only occasionally
   3. Yes, once per week or more often

32. When you have to work against a deadline, is the quality of your work
   1. Better  2. Worse  3. The same (Pressure makes no difference)

33. In school do you ever keep two projects moving forward at the same time by shifting back and forth rapidly from one to the other?
   1. No, never
   2. Yes, but only in emergencies
   3. Yes, regularly

34. Do you maintain a regular study schedule during vacations such as Thanksgiving, Christmas, and Easter?
   1. Yes  2. No  3. Sometimes

35. How often do you bring your work home with you at night or study materials related to your courses?
   1. Rarely or never
   2. Once a week or less often
   3. More than once a week

36. How often do you go to the university when it is officially closed (such as night or weekends)? If this is not possible, circle here: 0
1. Rarely or never
2. Occasionally (less than once a week)
3. Once or more a week

37. When you find yourself getting tired while studying, do you usually
1. Slow down for a while until your strength comes back
2. Keep pushing yourself at the same pace in spite of the tiredness

38. When you are in a group, do the other people tend to look to you to provide leadership?
1. Rarely
2. About as often as they look to others
3. More often than they look to others

39. Do you make yourself lists of "things to do" to help you remember what needs to be done?
1. Never
2. Occasionally
3. Frequently

IN EACH OF THE FOLLOWING QUESTIONS, PLEASE COMPARE YOURSELF WITH THE AVERAGE STUDENT AT YOUR UNIVERSITY. PLEASE CIRCLE THE MOST ACCURATE DESCRIPTION.

40. In amount of effort put forth, I give
- Much more effort
- A little more effort
- A little less effort
- Much less effort

41. In sense of responsibility, I am
- Much more responsible
- A little more responsible
- A little less responsible
- Much less responsible
42. I find it necessary to hurry

Much more  A little more  A little less  Much less
of the time  of the time  of the time  of the time

43. In being precise (careful about detail), I am

Much more  A little more  A little less  Much less
precise  precise  precise  precise

44. I approach life in general

Much more  A little more  A little less  Much less
seriously  seriously  seriously  seriously

Would you please give the following information. (All answers are confidential; information is used for research purposes only.)

Your name________________________ Soc. Sec. No._______

Today's Date________________________

Birthdate_________________________

College Year_______________________

Thank you for your cooperation.
Appendix B

Table 4

Means and Standard Deviations for All Pretest Dependent Variables for Type A and Type B Subjects

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<th>Variable</th>
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<td><strong>Learned Helplessness Manipulation</strong></td>
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References


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