THE TYPE A CORONARY-PRONE BEHAVIOR PATTERN AND THE REPORT
OF PHYSICAL SYMPTOMS ELICITED BY UNPREDICTABLE EVENTS

by

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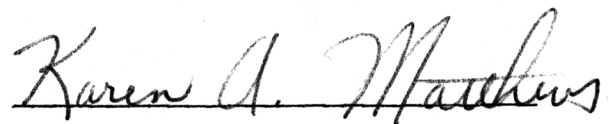
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ABSTRACT

Recent research has suggested that the coronary-prone behavior pattern Type A affects the reporting of one physical state, fatigue. Although Type A men put greater effort into a strenuous physical task, they report less fatigue than Type B men (Carver, Coleman, & Glass, 1976). Type A's also suppress fatigue when they are not near the completion of an arduous task (Snyder & Glass, 1974). It was predicted, therefore, that Type A's who expect to continue working on a task suppress a variety of physical symptoms as well as fatigue relative to Type A's who believe that they have completed their work.

Another factor that might affect symptom reporting in general was investigated: unpredictability vs. predictability of aversive events. Unpredictable and uncontrollable events are associated with a variety of illnesses. Although uncontrollable aversive events are causally linked to the reporting of physical symptoms by humans (Pennebaker, Burnam, Schaeffer, & Harper, 1977), there is no direct evidence that unpredictable events can cause reporting of symptoms. The present research tested the hypothesis that the degree of reported physical symptoms is affected by the unpredictability of an aversive event.

To test these notions, 120 Type A and B undergraduate

women expected to compute simple arithmetic problems for either four or eight minutes while listening to three different levels of noise (ambient noise of the room, loud predictable noise, or loud unpredictable noise). Thus there were a total of 12 experimental groups with 10 subjects per cell. All groups worked for four minutes only and then completed a 14-item symptom checklist. Blood pressure, hand temperature, and fatigue level of the subjects were also measured immediately prior to working and after completing the problems.

The results confirmed the hypotheses. The degree of reported symptoms increased in the following order: no noise, predictable, and unpredictable noise groups. Type A's expecting to continue working on the task reported less subjective fatigue and fewer symptoms than Type A's who completed their work or Type B's in either task duration condition. In addition, Type A's suppressed a subset of symptoms associated with the cardiovascular system.

It was suggested that the Type A's suppression of symptoms may be due to either an intentional strategy to avoid failure or loss of control or to focusing attention on the task at hand with resulting loss of attention to the body. Symptom suppression of Type A's might play a role in the etiology and course of heart disease by not allowing them to use body symptoms as a cue to alter behavior or to seek early intervention treatment. Therapeutic programs

for individuals at high risk for heart disease would profit
by training clients to attend to their body symptoms.

CHAPTER 1

INTRODUCTION AND LITERATURE REVIEW

The introductory section reviews the literature on the Type A behavior pattern. Initially, a brief description of Type A behavior will be presented. The following section discusses the two major assessment techniques of Type A's. In the third section, evidence linking Pattern A and coronary heart disease will be reviewed. Finally, experimental work on Type A and symptom reporting, which have led to the design of the present study, will be presented.

Definition of Type A

The notion that there is a set of behaviors associated with coronary heart disease (CHD), has a long history, but a short scientific past. It was not until the late 1950's that a specific behavior pattern called Type A was systematically investigated by two cardiologists, Meyer Friedman and Ray Rosenman. They described Type A as:

> ... a special well defined pattern marked by a compelling sense of time urgency - "hurry sickness" -, aggressiveness and competitiveness, usually combined with a marked amount of free-floating hostility.
>   Type A's engage in a chronic continuous struggle against circumstances, against others, against themselves. The behavior pattern is common among hard-driving and successful businessmen and executives - but it is just as likely to be found in factory workers, accountants, even housewives. About half of all American males - and a growing percentage of females - are more or less confirmed Type A's. (Friedman & Rosenman, 1974, p.viii)

An opposing Type B behavior pattern is defined by the relative absence of Type A characteristics. For example, the Type B pattern is characterized by easygoingness, lack of competitiveness, and patience (Friedman & Rosenman, 1974).

Measurement

There are two methods for assessing pattern A: a standardized interview developed by Friedman and Rosenman, and the Jenkins Activity Survey, a questionnaire. In the interview the subject is asked questions about his ambition, competitiveness, aggressive and hostile feelings, and time urgency. Both content of the answers and the speech style are important to the final assessment. The final assessment is to one of five categories: fully developed Type A (A 1); partially developed Type A (A 2); partially developed Type B (B 3); fully developed Type B (B 4); and unclassifiable if there are an equal number of Type A and B characteristics (X). This technique requires trained judges, is time consuming and is, like every interview technique, not independent of the interaction of subject and judge. In spite of these deficiencies, the interview has an interrater reliability of 74-84% (Jenkins, Rosenman & Friedman, 1968). Agreement between two interviews done on the same persons at an interval of $1\frac{1}{2}$ years was found to be 80% (Jenkins et al., 1968). Caffrey also obtained high test-retest reliability coefficients (Caffrey, 1968). An image factor analysis of the content and style of interview responses yielded the following five factors: Competitive drive, impatience, speed of behavior, past achievements, and vigor of responses (Matthews, Glass, Rosenman & Bortner, 1977).

The second assessment technique is a self administered questionnaire. It is based primarily on the interview questions. It consists of 54 multiple choice items. Illustrative items are:

1. "Has your spouse or some friend ever told you that you eat too fast?", where the Type A response is "yes, often" and the Type B responses are "yes, once or twice", or "no, no one has told me this".

2. "How would your wife (or closest friend) rate you?", where "definitely hard-driving and competitive" are Type A responses, and "probably relaxed and easy going" and "definitely relaxed and easy going" are Type B responses.

This questionnaire is standardized to have a mean of zero and a standard deviation of ten. Those above the mean are considered Type A's, while those below the mean are considered Type B's. Factor analysis of the JAS yielded three independent factors: H, S, and J (hard-driving competitiveness, speed and impatience, and job involvement, respectively) (Zyzanski & Jenkins, 1970). This questionnaire has undergone a series of validations and crossvalidations, showing that it agrees about 72% of the time with judgments made from the standardized interview (Jenkins, Zyzanski & Rosenman, 1971).

Type A as a Risk Factor for Coronary Heart Diseases mainly based on Four Types of Evidence

(1) The presence of Type A behavior pattern in those already ill with coronary heart disease. Many retrospective studies have shown that individuals with CHD have higher overall A-B and factor H (hard-driving competitiveness) scores than a healthy control group (e.g. Kenigsberg, Zyzanski & Jenkins, 1974). The proper interpretation of data from retrospective studies is unclear. There might have been other factors which caused both the Type A behavior pattern and CHD. To overcome the methodological weakness of retrospective studies, a prospective study has been done, which led to the next finding.

(2) The extreme vulnerability of Type A subjects to this disease. Rosenman, Friedman, Straus, Wurm, Jenkins, Messinger, and Kosicheck (1966) began a prospective study in 1960, called the Western Collaborative Group Study. Over 3,400 men free of CHD at the beginning of the study were classified as Type A's and Type B's by the standardized interview. Independent of the interviewer, an assessment of health of the subject was made by an electrocardiographer and an internist, who were blind to the behavior pattern ratings. Clinical coronary heart disease occured in 257 subjects during eight to nine years follow-up (average, $8\frac{1}{2}$ years. The experience of the first $2\frac{1}{2}$ years

of the study was reported by Rosenman et al. (1966). In the age decades 39 to 49 years and 50 to 59 years respectively, Type A men had 6.5 and 1.9 times the incidence of CHD than Type B men. After $4\frac{1}{2}$ years of follow-up observation in the study, the same pattern of findings was reported (Rosenman, Friedman, Straus, Jenkins, Zyzanski, & Wurm, 1970). In the younger decade Type A's had 2.7 times the rate of B's. In the older decade Type A's had 1.7 times the rate of B's. A final report after $8\frac{1}{2}$ years of the study showed that subjects assessed at intake as Type A's were twice as likely as Type B's to develop clinical heart disease (Rosenman, Brand, Jenkins, Friedman, Straus, & Wurm, 1975). This was true for both age groups. Moreover, Type A subjects were five times more prone to have a second myocardial infarction than were Type B subjects during this $8\frac{1}{2}$ year interval. A series of multivariate analyses demonstrated that the risk-producing effects of behavior type were independent of history of parental CHD, bloodpressure, and three serum lipid levels (Rosenman et al., 1970). Through a multiple regression procedure it was further shown that controlling statistically for a total of 12 risk factors for CHD did not seriously reduce the relationship of behavior pattern to coronary heart disease.

Recent research by Blumenthal, Williams, Kong, Schanberg, and Thompson (1977) suggests that the association between behavior pattern Type A and CHD might be extended beyond

clinical CHD events to include also the coronary athero-
sclerotic process. In addition to usual clinical evaluation,
156 consecutive patients referred for diagnostic coronary
angiography were independently assessed on the basis of a
structured interview and assigned a rating as Type A or
Type B. Traditional physiologic factors -- age, sex, choles-
terol, and cigarette smoking -- were found to correlate with
atherosclerotic disease. An index of the degree of athero-
sclerotic involvement remained significantly higher among
Type A patients even when age, sex, blood pressure, serum
cholesterol, and cigarette smoking history were covaried.
These findings suggest that, independently of traditional
risk factors, behavior pattern Type A may contribute to the
risk of clinical CHD events via effects on the atherosclerotic
process.

(3) <u>Biochemical abnormalities</u>. Type A individuals
exhibit the same physiological characteristics as many heart
disease patients. Type A subjects have a higher serum choles-
terol level (Rosenman & Friedman, 1963; Glass, 1977). This
might be due to the greater amount of stress to which Type
A's expose themselves; for instance, type A's set more dead-
lines for themselves than Type B's, and it seems that
cholesterol level varies with the stress of time deadlines.
In 1958 Friedman, Rosenman, and Carrol determined the average
serum cholesterol and blood clotting times of 42 accountants
biweekly for approximately 6 months, beginning in January.

During the first two weeks of April, for instance, as the incometax deadline approached serum cholesterol levels and blood clotting time of the tax-accountants shot up from normal levels. As the deadline passed, their cholesterol level fell sharply.

Another study by Friedman, Byers, and Rosenman (1970) has shown that the average fasting plasma growth hormone of a group of fully developed Type A subjects was significantly lower than that of fully developed Type B subjects. The proper level of growth hormone appears necessary for the maintenance of a normal plasma cholesterol concentration.

Type A's also showed increased secretion of catecholamines (Rosenman & Friedman, 1974, p.275). Elevated levels of catecholamines are associated with coronary artery disease and increases in diastolic and systolic blood pressures (Frankenhaeuser, 1971). High systolic blood pressure is, of course, an important risk factor associated with coronary heart disease (Insull, 1973).

(4) Success in experimentally inducing a facsimile of Type A behavior pattern in rabbits and rats. Gunn, Friedman, and Byers (1960) have shown that hypothalamic stimulation of cholesterol-fed rabbits significantly elevated plasma choles-terol levels. Friedman and Rosenman (1974) have demonstrated that following deliberate damage of a rat's hypothalamus, the animal became aggressive with a cagemate. If the cage-mate was not aggressive, the aggressive rat eventually sensed

the absence of competition, unmounted and ignored him. But if the second rat was also aggressive, a vicious battle ensued. In addition to enhanced aggressiveness, there was a very distinct rise in the lesioned animal's serum cholesterol. High serum cholesterol level is the one unequivocal laboratory method of inducing chronic coronary artery disease.

Experimental Work on Type A

Contruct validation. A series of experiments, using a
student form of the JAS (Krantz, Glass & Snyder, 1974), have
systematically documented the overt aspects of Type A. The time
urgency component has been demonstrated in several studies.
For example, Type A's performed more poorly than their Type
B counterparts on a task requiring a low rate of responding for
reinforcement (DRL-task) because they responded too quickly to
obtain a sequence of monetary rewards (Glass, Snyder & Hollis,
1974, Exp. 1). The time urgency component has also been
found to result in perceptual distortion with Type A's judging
the lapse of one minute more quickly than Type B's (Burnam,
Pennebaker & Glass, 1975).

Aggressiveness and hostility are believed to constitute
another major component of Type A. Evidence for the presence
of these characteristics comes from two sources. In one ex-
periment, in which a subject's performance was deliberately
slowed down by a confederate, more signs of impatience and
irritation on the part of the subject were systematically
observed among Type A's than among Type B's (Glass, Snyder &
Hollis, 1974, Exp. 2). In a study by Carver and Glass (1977)
subjects were exposed to a confederate who did or did not
threaten their sense of competence and mastery. An oppor-
tunity was then given to shock the confederate under the
guise of a learning experiment. Type A and Type B subjects

in a non-threatening control condition did not differ in the amount of shock delivered to the confederate. By contrast, the instigation procedure aroused substantial aggression among Type A's but not among Type B's. Ratings of the confederate's likeability produced results consistent with the aggression data.

A third component of Type A, excessive achievement striving, has been demonstrated by Burnam et al. (1975). They reported that Type A's tended to work on a task at near maximum capacity, irrespective of the presence or absence of a time deadline. Type B's, in contrast, exerted equivalent effort only when the task had an explicit deadline.

Type A and the Learned Helplessness Paradigm

Seligman (1975) argues that uncontrollable pretreatment results in learning that instrumental responding is independent of outcomes. Extended exposure to uncontrollability should thus lead to the perception of a noncontingency between responses and outcomes. In this case the individual may be expected to give up effort at control and experience learned helplessness.

A series of experiments (Hollis, 1976; Hollis, Glass & Pennebaker, 1977; Krantz, Glass & Snyder, 1974) using the learned helplessness paradigm have shown that Type A's exhibited greater helplessness than Type B's when they were exposed to salient uncontrollable events and failed in their efforts to maintain control.

Showing greater helplessness than their Type B counterpart might play a role in the development of cardiac diseases. Retrospective studies have shown that helplessness inducing life events, such as the death of a close relative, appear to increase the likelihood of death (particularly due to coronary disease) in next of kin (Parkes, Benjamin & Fitzgerald, 1969). Rejection by a loved one or a sudden loss in self esteem sometimes precedes an acute myocardial infarction (Engel, 1970). Holmes and Rahe (1967) have developed an instrument, the Social Readjustment Scale, measuring a variety of stressful life changes in an individual's immediate and past environment.

Results of studies using this scale indicate an increase in total life change during the 6-month period prior to an infarction (Rahe & Lind, 1971; Rahe, Romo, Bennet & Siltanen, 1974).

To investigate the effect of helplessness inducing events on organisms in the laboratory, uncontrollable and unpredictable aversive events such as random electric shocks, loud tones, or insoluble puzzles have been used. For example, Mowrer and Viek (1948) have shown that uncontrollable shocks caused rats to stop eating. In addition, Weiss (1968) demonstrated that rats which could control shock developed less ulcers than rats that were helpless. The same pattern of results holds for unpredictable shocks for rats and dogs (Seligman, 1967; Weiss, 1970).

Laboratory studies with humans have indicated that being exposed to uncontrollable aversive tones results in behavioral aftereffects such as performance decrements on tasks (Glass & Singer, 1972). Subjects also prefer predictable aversive events over unpredictable ones (Maltzman & Wolff, 1970; Pervin, 1963). Somatic consequences of unpredictable aversive events have yet to be demonstrated for humans. One purpose of the present experiment was to examine the effects of exposure to unpredictable vs. predictable aversive events on the number of physical symptoms reported. Symptoms were defined as self-reports of somatic ailments which occur frequently in a normal population (e.g. headache, sweaty hands, racing

heart etc.). Pennebaker, Burnam, Schaeffer, and Harper (1977) have already demonstrated the effect of uncontrollability on the number of reported symptoms. Subjects were exposed to a series of loud noise bursts. They could escape the noise by pressing a button on either a fixed or a variable ratio schedule. A fixed ratio schedule results in perceptions of greater control since the noise cessation is more predictable and directly contingent on an obvious pattern of responding. Thus, subjects in the variable ratio condition should perceive less contingency between responses and outcomes and more stress than subjects in the fixed ratio condition, and therefore, they should report more symptoms. The results confirmed this hypothesis.

Since Type A's are more prone to states of helplessness than Type B's and the degree of helplessness seems to be linked to symptom reporting, we might expect Type A's to report more symptoms than Type B's when being exposed to an uncontrollable aversive situation. However, Pennebaker (1977) did not report differences in symptom reporting between Type A's and B's. Besides helplessness, there might be an additional factor that contributes to the report of physical symptoms. There is some evidence that expectancies about the duration of the aversive stimulation has an effect on symptom reporting.

Type A and the Report of Physical Symptoms

Walster and Aronson (1967) report that expectancies about task duration influence feelings of fatigue, irrespective of individual differences. After performing a series of fatiguing tasks, subjects who believed their work was complete reported greater increments in fatigue than those who expected to continue working for a longer period of time. The ability to suppress fatigue (i.e. not reporting of fatigue) in the Walster and Aronson paradigm might be expected to characterize Type A's to a greater extent than Type B's. To investigate this notion, Snyder and Glass (1974) conducted a study in which subjects worked on a series of fatiguing tasks. After three trials, subjects who were led to believe the task was at an end reported a greater increase in fatigue than those who expected the task to continue for a longer period of time. However, this pattern of results was particularly true for Type A subjects. Unfortunately, the results were inconclusive because the initial ratings of fatigue differed for Type A's and B's. Additionally, the results achieved only marginal significance. For these reasons we decided to replicate the above study, using a modification of the Walster and Aronson paradigm.

A tendency towards fatigue suppression - or at least public admission of fatigue - might be understood in terms of the hard-driving character of Type A's. Glass and his colleagues (1974) suggest that Type A might be conceptualized

as a response style for maintaining and asserting control
over the environment. Suppression of fatigue might thus have
instrumental value for A's, because it aids in their struggle
for attainment of achievement-related goals. The acknowledge-
ment of fatigue, on the other hand, might interfere with
successful task mastery, a situation which Type A's could
not tolerate easily.

The above speculation suggests that Type A's might also
try harder than Type B's to control or master their environment
by doing well on a fatiguing task. A test of this hypothesis
was conducted by Carver, Coleman, and Glass (1976). Subjects
were required to walk continously on a motorized treadmill
while providing self-reports of their fatigue at two-minute
intervals. They were told that they could stop at any time,
but that the experimenter would stop them after a predetermined
length of time. However, the sessions were terminated by
subjects indicating their desire to stop. While walking on
the treadmill the subjects' aerobic performance levels (amount
of oxygen consuption) were measured. Then after 15 minutes
of rest all subjects were administered another test of their
maximum aerobic performance. They had to run on the tread-
mill again until they could not continue. While running, the
expired air of the subjects was measured. The levels of oxygen
consumption achieved during the latter test were considered as
the subjects' aerobic limit. Each subject's performance on
the first test was then compared to his own aerobic limit.

The resulting values expresses the subjects' efforts on the
treadmill during the first test as a proportion of his
maximum aerobic capacity. The results clearly indicated that
Type A subjects showed more effort than Type B's, i.e., their
oxygen consumption while walking on the treadmill approached
their aerobic limit. However, in spite of investing more
effort, Type A's reported less subjective fatigue.

Evidence that suppression of fatigue might play a role
in the development of cardiac disease comes from clinical
data, gathered by Greene, Goldstein, and Moss (1972).
Fatigue (sometimes referred to by the patient as tiredness,
loss of ambition, loss of enthusiasm, or having to push him-
self) is considered to be the most frequent precursor of
myocardial infarction (MCI). In addition to fatigue, there
are other symptoms associated with MCI. Solomon, Edwards,
and Killip (1968) reported that chest pains and arm pains
are also reliable precursors of MCI. Many patients, mani-
festing these heart disease symptoms, delay seeking medical
care. Greene et al. suggested that there are at least three
separate cognitive steps required to make a decision to seek
medical help: (1) the perception of the presenting symptoms;
(2) the appreciation of the meaning and the seriousness of
the symptoms, that is recognition; and (3), realization that
medical care is indicated for the recognized and appropriately
interpreted symptoms. It might be that cardiac patients have
difficulties perceiving and evaluating these physical symptoms

because they could not tolerate the helplessness entailed with interuption of on-going activities and being sick. Thus, symptom suppression might serve an instrumental purpose for cardiac patients.

The above clinical findings have led to the following speculation: since it has been shown experimentally that Type A persons do not report subjective fatigue when they are engaged in a task, it might be that they also suppress other symptoms besides fatigue, particularly those symptoms associated with cardiovascular diseases. The present study was designed to answer this question.

Physiological Correlations of Perceived Symptoms

Pennebaker et al. (1977) report no differences in physio-
logical reactivity between their controllable and uncontrollable
noise conditions. To find out whether there might be physio-
logical correlates of perceived symptoms during unpredictable
and predictable stress, we decided to measure skin temperature
and blood pressure. These were chosen because exposure to a
variety of mental, emotional, and environmental stimuli re-
sults in the autonomic nervous system generating an integrated
response whose cardiovascular components include modifications
in cardiac output, arterial blood pressure, and peripheral
vasomotor activity. This response is primarily initiated
by the sympathetic nervous system and varies with intensity
and nature of the stimulus eliciting the response. In general,
anxiety and emotional stress result in a vasoconstriction of
the peripheral vessels, which can be best observed in the
fingertips (Handbook of Physiological Feedback, 1976). As
the blood flow through the peripheral capillaries and tissues
near the skin surface decreases, the temperature of the skin
decreases. Conversely, an increase in skin temperature is the
product of vasodilation. Vasodilation is usually accompanied
by a relaxation of sympathetic activity. Thus, it was hypo-
thesized that being exposed to an aversive stimulus (noise)
would lead to a decrement in finger temperature and an increment
in blood pressure over baseline measures, irrespective of
subjects' behavior pattern. However, Type A's were expected

to show stronger physiological reactivity to stress induced by
noise than Type B's because extreme Type A men as assessed by
the interview exhibited greater increment in systolic blood
pressure and heart rate than extreme Type B's while engaged
in a competitive task (Dembroski, Mac Dougall & Shields, 1977).
One purpose of the present study was to investigate whether
Type A females in general would respond with greater increase
in blood pressure than Type B females. Females were chosen
because most of the Type A research has been done with males,
and significant findings would thus make an additional contri-
bution to the research area.

In summary, the present experiment attempted to answer
the following questions:

(1) Do unpredictable events lead to symptom reporting?

(2) Will Type A's suppress symptom reporting more than
Type B's?

(3) Will Type A's suppress the report of subjective
fatigue to a greater extent than Type B's?

(4) Are there physiological correlates of symptom repor-
ting?

(5) Will Type A women respond with greater increase in
blood pressure than Type B's while being exposed to an aversive
noise?

CHAPTER II

METHOD

Overview and Design

To test these notions, Type A and B female college students were asked to compute simple arithmetic problems (see Appendix B) while listening to either predictable or unpredictable aversive noise. A control group did not hear any noise. Half of each group expected to work for four minutes, half for eight minutes. Type A's and Type B's were expected to perform equally well on this task because they work at equal rates with a time deadline (Burnam et al., 1975). All subjects were stopped after four minutes to report their physical symptoms (see Appendix B for symptom-checklist). In addition, subjects' hand temperature and blood pressures were measured immediately before and after computing the problems. The design was a 2 x 2 x 3 factorial with 10 subjects per group. The independent variables were Type A - B, expectancy to work four or eight minutes on the task (Task Duration), and a noise background of a fixed interval (predictable) or variable interval (unpredictable) loud noise or the ambient noise level of the experimental room.

Subjects

The subjects of the study were 123 female undergraduate students enrolled in introductory psychology and abnormal psychology classes at Kansas State University. Two subjects declined to participate after hearing a sample noise burst; one additional subject had an ear-ache and did not participate. Classification of the remaining 120 subjects as Type A's or Type B's was based on their scores on the student version of the Jenkins Activity Survey (JAS) (Krantz et al., 1974). The JAS yields an a priori A-B score and two factor scores: Factor S, Speed and Impatience, and Factor H, Hard-driving Competitiveness. Subjects were divided at the median (7.0 and above, 6.0 and below) of this distribution into Type A's and B's respectively. The median was comparable to the median of other samples of female college students (Glass, 1977). Other than the requirement that each experimental condition contained equal numbers of Type A's and B's, subjects were randomly assigned to groups.

Apparatus

Subjects were seated in front of a tape recorder placed on a table. The noise burst, which was delivered over headphones, was a 3000 HZ tone set for 95 db (A) measured at the headphones. The duration of a noise burst was four seconds. In the predictable noise condition, the off-noise duration

was 12 seconds. In the unpredictable noise condition, the off-noise duration averaged 12 seconds but varied randomly from four to 20 seconds. Thus, all subjects heard one minute of noise. Hand temperature was measured by an Echo Instruments digital thermometer taped to the middle finger of the nondominant hand. Systolic and diastolic blood pressures were measured with a Lumisphyg sphygmomanometer.

Procedure

Subjects were escorted individually into the testing room by the first experimenter. Under the guise of a separate experiment they were asked to complete the JAS (see Appendix A for instructions). While the female experimenter was scoring the JAS, subjects completed the Mastery of Environment and Self Scale or MESS (see Appendix B for a copy) by Pennebaker (1977) which was included for exploratory purposes. The MESS includes fifteen statements concerning control of the environment and one's own body symptoms, which are rated on a scale of one (strongly disagree) to five (strongly agree). The MESS yields two scores: Mastery of Environment and Mastery of Self. A high score indicates great control. Rated on the same five point scale, the statement, "I feel physically healthy now," was added to the MESS to check the initial health of subjects. Finally, the first experimenter asked subjects to rate their fatigue on a 7-point scale from 1 = "no fatigue" to 7 = "severe fatigue".

The second female experimenter arrived to escort subjects to another testing room for the second experiment. At this time, the first experimenter informed the second experimenter of the subjects' experimental group assignment, but did not reveal their Type A-B scores. The second experimenter explained to the subjects that the second experiment was designed to study the effect of noise on task performance and physiology (see Appendix A for instruction). They would compute a series of simple arithmetic problems for either four or eight minutes while listening to either a series of noise bursts or the ambient noise of the room. Prior to computing the problems, subjects' digital temperature and systolic and diastolic blood pressures were measured. Then she administered a sample of the noise to the noise group subjects, who were then given the opportunity to withdraw. Subjects were next instructed to begin the computations and the experimenter left the testing room. After four minutes passed, she returned and asked all subjects to stop in order to have their hand temperature and blood pressures measured and to complete a series of questionnaires (see Appendix B). Subjects in the eight-minute expected task duration condition were reminded they would work on the task for another four minutes. The questionnaires included rating of the noise, subjects' mood, and a 14-item symptom checklist (Pennebaker et al., 1977) with fatigue added. The symptom items were headed with the instruction, "Check the extent to which you experienced each of the symptoms <u>during</u>

the experiment -- (while listening to the noise)". Each item was a 7-point scale, in which, for example, 1 = "no racing heart" and 7 = "severe racing heart". Then subjects were asked for the third time to rate their present fatigue on the same 7-point scale. Finally, they were interviewed in regard to their opinions of experimental procedures, fully debriefed, and thanked for their participation (see Appendix A for debriefing sheet).

Dependent Variables

The primary dependent variable was the self report of symptoms. Symptoms were defined as self-reports of somatic ailments which occur frequently in a normal population. An overall symptom index, with higher scores representing a greater degree of reported symptoms, was obtained by summing up the 14 symptoms (excluding fatigue).

An index of fatigue change was determined by subtracting the fatigue ratings after computing the arithmetic problems from the fatigue ratings before the experimental procedure.

A measure of physiological arousal was obtained by recording subjects' diastolic and systolic blood pressures and hand temperature before and after they listened to the noise, and computing a difference score.

Hypotheses

(1) The number of symptoms reported would increase in the following order: no noise condition, - predictable noise condition, - unpredictable noise condition.

(2) Type A's would suppress symptom reporting; that is, Type A's would report fewer symptoms in the eight minute condition than Type A's in the four minute condition and than Type B's in either condition.

(3) Type A's would suppress subjective fatigue; that is, Type A's would report less fatigue in the eight minute condition than Type B's.

(4) Type A's would show greater increment in systolic blood pressure than Type B's.

CHAPTER III

RESULTS

Perceptions of the experiment, subjects' mood, physiological changes, and reported physical symptoms were analyzed by a series of 2 x 2 x 3 analyses of variance. The between variables were Type A-B, Task Duration, and Noise Condition. Analyses of perceptions of the predictability of the noise excluded the control group, which did not hear the noise bursts.

Check on the Manipulation

The differential perception of predictability of the noise bursts between the predictable and the unpredictable schedule was highly significant, F (1, 72) = 113.4, p < .001. Relative to the unpredictable schedule, subjects in the predictable condition reported greater predictability of the noise bursts in response to the item, "To what extent were you able to predict the occurence of the noise bursts?" on a scale of "1 = no predictability at all" and "7 = complete predictability" (M = 3.1 vs. M = 5.4). There were no other significant main effects or interactions, ps > .10. Subjects found the unpredictable and the predictable noise bursts equally

unpleasant, p > .10. There were no differences across con-
ditions in the importance of the research, ps > .10.

Subjects did not differ significantly across conditions
in ratings of present health, initial fatigue, number of
attempted or completed arithmetic problems. However, there
was one marginally significant trend: those randomly assigned
to the four minute task duration reported poorer present
health (M = 2.0) than those assigned to the eight minute
task duration (M = 1.6), F (1, 108) = 3.41, p < .08.

Reported Symptoms and Unpredictable Events

The first hypothesis was that the degree of reported
physical symptoms is effected by the unpredictability of an
aversive event. A significant main effect for Noise Condition
and that the degree of symptoms would increase in the following
order -- control, predictable noise, and unpredictable noise
groups -- was expected. Table 1 reports the mean total
symptoms for the 12 experimental groups. The analysis of
variance revealed a main effect of noise condition, F (2, 108)
= 26.87, p < .001. As predicted, subjects exposed to the
unpredictable noise bursts reported more symptoms than those
exposed to the predictable noise bursts who, in turn, reported
more symptoms than subjects not exposed to noise (Newman-Keuls,
p < .05 and p < .001 respectively).

Table 1

Total Perceived Symptoms by Type A's and B's in the 4 minute
and 8 minute Task Duration Condition.

Noise Condition:	None	Predictable	Unpredictable	Mean
Type A's				
4 minute task	21.3	30.4	33.0	28.2
8 minute task	18.4	23.3	24.6	22.1
Type B's				
4 minute task	21.0	27.8	31.0	26.6
8 minute task	21.8	29.0	35.2	28.7
Mean	20.6	27.6	31.0	

Note: The higher the score, the greater the reported symptoms.

Symptom Suppression and Pattern A

It was hypothesized that Type A's would suppress symptom reporting. That is, Type A's would report fewer symptoms in the eight minute task duration condition than in the four minute task duration condition, but Type B's would not show this differential effect. The appropriate statistical test of this hypothesis is the Type A-B x Expected Task Duration interaction. This term was indeed highly significant, F (1, 108) = 12.20, p < .001 (see Table 1). Subsequent contrasts revealed that Type A's expecting to continue working on the arithmetic problems reported fewer symptoms than Type A's who completed their work or Type B's in either task duration, ts (58) 2.70, ps < .01. The remaining three groups were not significantly different from one another, ps > .20.

Because of the marginally significant main effect for Task Duration on present health of subjects, a 2 x 2 x 3 covariance analysis on symptoms with present health as the covariate was computed. The analysis revealed the following significant results: main effect of noise, F (2, 107) = 28.35, p < .001, and interaction of Task Duration x Type A-B, F (1, 107) = 10.73, p < .001. The main effect for Type A-B approached significance, p = .06, whereas the effect of Task Duration was no longer significant, p > .17. Thus, the covariance analysis revealed essentially the same pattern of results as the analysis of variance. Although the present

health of subjects was different in the four and eight minute
condition, symptom reporting could not be attributed to these
differences.

In order to check whether Type A's would suppress a subset
of symptoms, particularly those associated with the cardio-
vascular system, each symptom was analyzed individually. Two
independent raters, blind to the findings, concurred in nomi-
nating racing heart, cold hands, flushed face, dizziness, and
shortness of breath as associated with the cardiovascular
system as well as the sympathetic nervous system.[1] There were
significant interaction terms, Type A-B x Task Duration, $\underline{F}$s
(1, 108) $>$ 4.20, $\underline{p}$s $<$ .05, for the following symptoms:
racing heart, sweaty hands, flushed face. Type A's reported
less of the above symptoms when they expected to continue
working than when they had completed their work, whereas
Type B's showed the reverse pattern. In addition, Type A's
reported less shortness of breath and upset stomach than
Type B's, $\underline{F}$ (1, 108) $>$ 4.03, $\underline{p}$s $<$ .05. Thus, Type A's sup-
pressed three of these nominated symptoms and reported less
of a fourth symptom (see Table 2). Type B's, on the other hand,
showed either the reverse pattern or no differences. Type B's
reported more shortness of breath than Type A's, $\underline{F}$ (1, 108) $=$
4.03, $\underline{p}$ $<$ .05. This finding clearly suggests a tendency
for Type A's to suppress cardiovascular symptoms.

Table 2

Perceived Cardiovascular Symptoms by Type A's and B's in the
4 minute and 8 minute Task Duration Condition

	Type A		Type B	
Task Duration:	4	8	4	8

Symptoms

racing heart	30.3	23.3	25.3	29.6
sweaty hands	37.3	23.0	32.0	34.3
cold hands	16.3	12.0	16.0	19.0
flushed face	25.6	13.6	20.6	27.6
dizziness	15.6	13.6	12.3	18.3
shortness of breath	15.3	13.0	17.3	18.3

Suppression of Fatigue

It was expected to replicate previous findings that long task duration would suppress fatigue reporting, but the suppression effect would only be exhibited by Type A's. The change scores of fatigue (fatigue ratings before minus fatigue ratings after computing the arithmetic problems) are presented in Table 3 for Type A's and B's in the two task duration groups. The analysis of variance on the change scores revealed a significant main effect of Task Duration, F (1, 108) = 3.85, p = .05. Subjects expecting to continue working were less fatigued (change score = .06) than subjects who had completed their work (change score = .10). Another main effect was found for Type A-B, F (1,108) = 6.18, $p <$ .05. Type A's reported a greater decrement in fatigue (change score = .70) than Type B's (change score = .06). This finding was particularly due to the fact that Type A's were suppressing their fatigue in the 8 minute condition; there was a significant interaction term, Type A-B x Task Duration, F (1, 108) = 6.18, $p <$ .05. Type A's who had completed their work reported a smaller decrement in fatigue (change score = .10) than those who had not (change score = 1.23), Newman-Keuls, $p <$ .001. Type B's reported equal fatigue in the two task duration condition. Thus, previous findings were replicated.

Table 3

Fatigue Changes by Type A's and B's in the 4 minute and 8 minute Task Duration Condition.

Noise Condition:	None	Predictable	Unpredictable	Mean
Type A's				
Task Duration:				
4	.30	-.10	.10	.10
8	.90	1.30	1.50	1.23
Type B's				
Task Duration:				
4	1.10	-.30	-.50	.10
8	-.20	-.20	.30	.03

Note: The change scores are obtained by subtracting the fatigue ratings after computing the arithmetic problems from the fatigue ratings before the experimental procedure; thus, a negative score indicates an increase, a positive score a decrease in fatigue.

Physiological Data

Measures of hand temperature and blood pressures were examined for possible physiological correlates of perceived symptoms. Three-way analyses of variance were computed on the change scores of the physiological measures. There were reliable main effects for noise on hand temperature changes, F (2, 108) = 35.65, $p < .001$, systolic blood pressure changes, F (2, 108) = 17.7, $p < .001$, and diastolic blood pressure changes, F (2, 108) = 3.63, $p < .05$, such that blood pressures increased and hand temperature decreased during the experiment. However, the appropriate internal contrasts revealed that the above findings were restricted to the predictable and unpredictable noise groups, Newman-Keuls, $ps < .001$. In contrast, control subjects' hand temperature increased, Newman-Kreuls, $p < .001$ and blood pressures remained the same (Newman-Kreuls, $ps > .10$) (see Table 4). There were no other significant main effects for Noise Condition, $ps > .50$. Thus, our results indicate a greater physiological arousal in the noise conditions as compared to the no noise condition.

It was hypothesized that Type A's would show greater increment in systolic blood pressure than Type B's. Modest support for this hypothesis was found. There was a significant Type A-B x Noise Condition interaction term, F (2, 108) = 7.34, $p < .001$. Type A's in the predictable noise condition showed a greater increase in systolic blood pressure than Type

Table 4

Hand Temperature and Blood Pressure Changes.

Noise Condition:	None	Predictable	Unpredictable
Temperature	-1.90	1.53	1.43
Blood Pressures			
systolic	.65	-5.58	-5.18
diastolic	.18	-3.10	-2.10

Note: The change scores are obtained by subtracting the measures after computing the arithmetic problems from the measures before the experimental procedure; thus, a negative hand temperature score indicates an increase thus, a negative score indicates an increment of the physiological measure, a positive score a decrement.

Table 5

Systolic Blood Pressure Changes by Type A's and B's.

Noise Condition:	None	Predictable	Unpredictable
Type A's	1.5	-8.6	-4.3
Type B's	- .2	-2.5	-6.0

Note: A negative score indicates an increase in systolic
blood pressure.

B's (Newman-Keuls, p < .05) (see Table 5). Both A's and B's did not change in the control group, and B's did not change in the predictable group (Newman-Keuls, p > .10). Finally, for hand temperature, there was a marginally significant triple interaction term, Type A-B x Noise Condition x Task Duration, F (2, 108) = 2.93, p < .06. The interaction was primarily due to the differential response of Type A's in the noise condition, according to the task duration (see Table 6).

Table 6

Hand Temperature Changes by Type A's and B's in the 4 minute
and 8 minute Task Duration Condition.

Noise Condition:	None	Predictable	Unpredictable
Type A's			
Task Duration:			
4	-1.7	2.5	1.1
8	-2.8	.6	2.4
Type B's			
Task Duration:			
4	-2.2	1.5	1.3
8	- .9	1.5	.9

Note: A negative score indicates an increase in hand tempera-
ture.

Other Relevant Data

Symptom reporting may serve an ego preserving function, i. e., we might expect subjects to attribute poor performance on the task to the disruptive effects of symptoms (c. f. Pennebaker et al., 1977). To test this possibility, subjects rated on a 7-point scale their response to "Did the physical symptoms you experienced disrupt your performance?" Analysis of their responses revealed a marginally significant main effect of Noise, F (2, 108) = 2.94, $p < .06$. Control subjects reported that their symptoms disrupted their performance less than subjects in the predictable noise condition (M = 2.1 and M = 3.0 respectively), Newman-Keuls, $p < .05$. However, they did not differ from subjects in the unpredictable noise condition (M = 2.6), $p > .10$, nor did subjects in the predictable and unpredictable noise condition differ in reporting the disruptive effects of symptoms, $p > .10$. Analyses revealed no other significant results for the three questions. Thus, there is no evidence that an ego preserving mechanism can account for symptom reporting.

Pearson correlation coefficients of the JAS and MESS scores were computed. The Type A-B score correlated significantly with Mastery of Environment, r (120) = .47, $p < .01$, and Mastery of Self, r (120) = .18, $p < .05$. A series of analyses (2 x 2 x 3) of total symptoms were computed with a median split on Factors S (Speed and Impatience) and H (Hard-

Table 7

Total Perceived Symptoms by
Mastery of Environment Scale

Task Duration:	4	8
Mastery of Environment Scale		
above Median	31.66	26.24
below Median	28.18	28.92

driving Competitiveness) of the JAS and on the two MESS scales. The pattern of significant findings paralleled those reported above for Type A-B for Factors S and H of the JAS and the Mastery of Environment Scale of the MESS (see Table 7). The interaction terms, median split on Scale x Task Duration, were F (1, 108) = 3.66, $p < .06$, for factor S, F (1, 108) = 11.76, $p < .001$, for factor H, and F (1, 108) = 3.29, $p < .07$, for Mastery of Environment of the MESS. The equivalent interaction term for Mastery of Self was nonsignificant, $p > .20$.[2]

Analyses of the mood ratings of subjects revealed a significant main effect for Noise Condition on the rating of mellow, F (2, 108) = 5.31, $p < .01$. No noise subjects were mellower than those exposed to noise, but internal contrasts did not reach appropriate significance levels, $ps > .10$. Subjects who had to continue computing arithmetic problems were happier than those who had completed the problems, F (1, 108) = 4.03, $p < .05$. There were no other significant main effects or interactions on either of the above mood ratings or on ratings of frustration and tenseness. Thus, it seems that subjects' mood did not effect their symptom reporting.

CHAPTER IV

DISCUSSION

Aversive Events linked to Symptom Reporting

The findings confirm the prediction that unpredictable
aversive events are causally linked to the reporting of
symptoms; there was an increment of reported symptoms in the
following order: no noise - predictable noise - and unpre-
dictable noise groups. There is no evidence that effort on
the task, initial health, or initial fatigue of subjects, or
induced mood can account for the symptom reporting. Also, the
suggestion that symptom reporting might be due to an "ego-
defensive mechanism", that is, subjects might attribute poor
performance on the task to the disruptive effects of symptoms,
did not receive support. Symptom reporting might have been
due to different physiological reactivity under the different
levels of noises. This hypothesis received support for the
control vs. the noise groups. Subjects in the no noise group
showed less physiological changes than subjects in the noise
groups. However, our measures of arousal did not indicate a
difference between the predictable and unpredictable noise
group. It could be that our measures of arousal were not
sensitive enough to differentiate between the levels of arousal

for the noise groups. Nevertheless, physiological differences do not account for the greater symptom reporting in the unpredictable relative to the predictable noise group.

A possible explanation of our results could be that people perceive unpredictable stressors as different from predictable ones. Lazarus (1966) speaks of psychological stress as the cognitive appraisal of a threat or anticipation of future harm. This cognitive appraisal might be different for unpredictable vs. predictable stressors. Seligman (1975) argues that predictable aversive events provide a safety period for the individual, during which she knows that the threatening event will not occur, and thus does not have to pay continuous attention to a possible stressor. Unpredictable aversive events, on the other hand, might require considerably more attention, because they do not allow a safety period; the individual is prepared to receive the stressor at any time. Tessor and his associates (Sadler & Tessor, 1973) have demonstrated that increased attention will generate more extreme evaluations, either positive or negative. Thus, one might argue that unpredictable stressors are appraised as more threatening than predictable ones because of differences in required attention. However, as yet there is no empirical support of the hypothesis that unpredictable aversive events require more attention and thus are more psychologically straining than predictable ones. Matthews is currently conducting a series of studies investigating this point.

Symptom Suppression and Type A

The present investigation clearly demonstrates that
Type A's suppress a variety of symptoms including those asso-
ciated with sympathetic nervous system activity and with the
cardiovascular system. Recall that the term "suppression" is
used interchangeably with "less reporting of symptoms". The
suppression occured in spite of increased blood pressure and
decreased hand temperature experienced by Type A's exposed to
aversive noise. In addition, the present findings replicate
previous findings that expectations of task duration influence
feelings of fatigue (Walster & Aronson, 1967) and that Type A's
suppress fatigue on fatigue-producing tasks (Carver et al.,
1976; Snyder & Glass, 1974).

The precise reason for symptom suppression by Type A's
is not clear. Perhaps Type A's are generally less sensitive
to subtle body events or are more "macho" than Type B's.
However, the present data argue against these possibilities
because Type A's report as many symptoms as Type B's at the
conclusion of the task. Another possible explanation is that
Type A's are able to control their body reactions to stress.
There was a modest positive correlation between the Type A and
Mastery of Self score, but those with high Mastery of Self
scores did not show the suppression effect. In addition, Type
A's did show increased blood pressures and decreased hand
temperature in response to the noise stress.

A final pair of explanations, which are not incompatible, take into account the evidence that Pattern A is a response style for maintaining control over the environment (Glass, 1977). Type A's chronically work at a maximum level apparently in an effort to avoid failure and loss of control. Symptom suppression can have instrumental value in this connection, for it aids in the struggle for environmental mastery. The acknowledgement of symptoms, on the other hand, would interfere with task mastery, a situation which Type A's would attempt to overcome (see Carver et al., 1976). Recall that there also was a positive correlation between Type A and the Mastery of Environment score, and those with high scores did indeed show the suppression effect. Finally, in an effort to do well, Type A's may devote their full attention to the task at hand and may simply have a higher threshold than Type B's for noticing symptoms while preoccupied. When interrupted, according to this explanation, Type A's would continue to attend to the task. However, as the end of the task arrives, Type A's would no longer find it useful to focus their attention and be able to note their body reaction.

The hypothesis that Type A's might have different attentional processes than Type B's deserves some consideration. Easterbrook (1959) proposes that an increase of arousal causes a restriction of the range of cues that the organism uses in guidance of action. Thus, high arousal should cause attention to be concentrated on the dominant aspects of the situation

at the expense of other aspects. Our measures of arousal
indicated greater increase in systolic blood pressure for
Type A's as compared to Type B's, but only in the predictable
noise group. Perhaps our measures of arousal were not ade-
quate or sensitive enough to detect greater arousal differences
between Type A's and B's; or the fact that our subjects were
females instead of males could have accounted for our findings.
There is other evidence that Type A's show greater increases
in arousal than Type B's in response to a challenge. Using
another technique to assess subjects' behavior pattern (inter-
view) and having male instead of female subjects, Dembroski
et al. (1977) have found that extreme Type A men respond with
a higher increment in systolic blood pressure than Type B's
during a competitive task. Friedman, Byers, Diamant, and
Rosenman (1975), using a different indicator of sympathetic
nervous system arousal, report that under competitive condi-
tions the plasma norepinephrine concentration of coronary-
prone subjects rose an average of 30%, while that of nonco-
ronary-prone subjects remained unchanged. Other physiological
abnormalities of Type A's have already been mentioned in
Chapter 1. Assuming that Type A's are more aroused than Type
B's while being involved in a task, it might be possible that
their allocation of attention and effort is changed so that
they are not able to perceive bodily changes. However, the
above hypothesis has not received support from empirical data
yet.

Regardless of the reason, the finding that Type A's may suppress a variety of symptoms and those associated with the cardiovascular system, while being involved in a stressful task is highly significant. Monat and Lazarus (1977) propose three main ways in which stress might lead to somatic illness. Type A behavior seems to contribute to all of them. The first is by the disruption of tissue function through neurohumoral influences under stress. For example, the greater release of norepinephrine by Type A's under stress (Friedman et al., 1975) can facilitate the aggregation of thrombocytes which may then lead to thrombosis. Other increased endocrinological and cardiovascular responses both to behavioral and to biochemical challenges (Friedman, 1977) exhibited by Type A's might play a role in the development of coronary heart as well as coronary artery disease. A second way is by engaging in coping activities that are damaging to health, for example, by trying to advance occupationally or socially by means of a pressured style of life (e.g. "hurry-sickness' of Type A's). A third way stress might lead to disease is by suppression of symptoms. Symptom suppression is regarded as a palliative mode of coping, because its goal is to relieve the emotional impact of stress without eliminating its source.

Traditionally, palliative modes of coping have been viewed as pathological or maladaptive. For example, Katz, Weiner, Gallagher, and Hellman (1970) report that behaviors, such as denial that a suspicious lump in the breast might be

cancerous, have actually endangered the lives of individuals.
Also, as already mentioned in Chapter 1, Greene et al. (1974)
point out that consequences of symptom suppression, such as
neglecting to seek medical care, can be fatal in certain in-
stances, as in the case of heart attack victims. On the other
hand, it could by argued that palliative modes of coping can
initially serve a positive function (Hamburg & Adams, 1967)
in preventing a person from being overwhelmed by a threatening
situation where the possibilities for direct avoidance reac-
tions are limited (e.g. the person who has suffered polio).
However, Cohen (1975) argues that its usefulness seems most
apparent on a short-term basis. Long-run consequences of
symptom suppression, in general, are regarded as damaging for
the organism.

Since Type A's are involved in a chronic struggle against
time, themselves, and others with somatic consequences pre-
viously discussed, it is plausible to assume that symptom
suppression, especially suppression of cardiovascular symptoms,
may be an important factor in the etiology of coronary heart
and artery disease. In sum, Type A behavior seems to contri-
bute somewhat to all three factors that Monat and Lazarus
associate with somatic illness.

The finding that Type A's do suppress a variety of symp-
toms has some practical application. Although Type A's may
experience physiological reactivity to stressors during a
stressful event, their lack of symptom recognition does not

allow them to use body symptoms as a cue to alter behavior or to seek early intervention treatment. Intervention programs for individuals at high risk for heart disease would profit by training clients to attend to their body symptoms. As a matter of fact, there are some relaxation training programs which are supposed to help cardiac patients developing body awareness (Suinn, 1975). Unfortunately, only anecdotal reports have been published indicating that the technique actually modifies the behavior pattern. Until evidence is presented showing systematic changes in behavior, we can only acknowledge the existence of a promising technique.

FOOTNOTES

1. Dr. Richard Bauer and Dr. James Mitchell, physiological psychologists, kindly made these ratings.

2. A similar series of covariance analyses were computed for the analyses of the scales with present health of the subjects as the covariate. The adjusted interaction terms, Scale x Task Duration, were F (1, 119) = 4.27, $p <$ .04 for Factor S, F (1, 119) = 11.24, $p <$ .001 for Factor H, F (1, 119) = 4.25, $p <$ .04 for Mastery of Environment, and F (1, 119) 1, $p >$ .9 for Mastery of Self.

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APPENDIX A

INSTRUCTIONS

EXPERIMENTER #1 SCRIPT

Hello. Are you here for the Psychology experiment? What's your name? (Check it off on sheet and casually remark...) Well, my name is _____. Since the study you signed up for doesn't take an hour, I would like to ask you to fill out two questionnaires I need for my study. I guess _____ your experimenter will be here in a few minutes. Let's go into a quiet room. (Escort subject to room). First of all I need you to sign a "permission slip" to have you fill out these questionnaires. I'm doing a study on behavior styles of college students and need to have college students to fill out two questionnaires. It will take you about twenty minutes. Just follow the instructions on the forms and signal when you are finished with the first form (JAS). (While subject is answering the MESS, experimenter #1 scores the JAS and assigns the subject to an experimental condition. Experimenter #2 is blind to the subject's JAS score). Thank you very much. I guess ___ will be here pretty soon. Please answer the question on the blackboard. How fatigued do you feel right now? What number on a 7-point scale would you mark? Please write down this number on the bottom of the questionnaire.

EXPERIMENTER #2 SCRIPT

Hi, I'm _____and I'll be your experimenter for the study that you signed up for. What's your name? Let's go into another room. First I need you to sign a permission slip to have you participate in the experiment (sign the sheet).

Noise groups: The experiment is designed to study the effect of noise on task performance and physiology. You will be exposed to a series of noise bursts for four (eight) minutes while you will be solving simple arithmetic problems. Before you start I want to measure your blood pressure and your hand temperature. This thermometer will be taped on a finger of your non-dominant hand until the experiment is over. I would like you not to look at it during the experiment. Now let me give you a sample of noise bursts - if they are too unpleasant for you, you have the opportunity to withdraw from the experiment now. (Experimenter administers noise bursts). Okay, here is the arithmetic problem sheet; please start working on it as soon as I tell you. Work the problems in order and do not skip any. Remember, you have four (eight) minutes to work on them. Ready, go!

Control group: The experiment is designed to study the effect of noise on task performance and physiology. You will be exposed to the ambient noise of the room and work on simple arithmetic problems for four (eight) minutes. Before you start I want to measure your hand temperature and blood pressure. This

thermometer will be taped to a finger of your non-dominant hand until the experiment is over. I would like you not to look at it during the experiment....(as above).

Four minutes task duration condition: The four minutes are over now. Thank you. Let me take your blood pressure and hand temperature again. Now I would like you to fill out the questionnaire. Just follow the instructions on it and signal when you are finished. Okay, you are almost done. I would like you to fill out another questionnaire. (Symptom checklist). Follow the instructions on it again and signal when you are finished. May I ask you an additional question? How fatigued do you feel right now? What number would you mark on this 7-point scale?

Eight minute task duration condition: You are half way through now. I would like you to stop for a while and let me take your blood pressure and your hand temperature again...(as above). Then you will go on with the task for another four minutes.

Debriefing: Four minute condition: Thank you that was all.
           Eight minute condition: Thank you, that was all.
I guess four minutes will be enough. Now I'd like to get your opinions about what we might be investigating. What do you think? To give you some information about what we were investigating you can read this sheet.

DEBRIEFING SHEET

The purpose of this sheet is to give you more information about
this experiment. In this experiment we are looking for dif-
ferent levels of noise and the symptoms they might evoke. Be-
sides that, we manipulated the expectancy of the task duration:
some of you were told that they had four minutes to work on the
task; some of you expected eight minutes. We were interested
in whether people who expected to still work on the task would
report fewer symptoms than those who thought the task was at
an end. This notion was expected to fit Type A people more
than Type B's. Type A's are characterized by competitiveness,
impatience, hard-drivingness. Type A's are prone to coronary
disease (e.g. heart attack). Type B's are characterized by
the relative absence of the characteristics above. Since Type
A people usually are hard-driving, competitive and impatient
and want to do well on a task, paying attention to bodily
changes (symptoms) might interfere with their task performance.
Thus we assume that they would report fewer symptoms relative
to Type B's when they have to continue with the task. The
questionnaire that you filled out first, measured your behavior
pattern. (whether you are more Type A or Type B). The phy-
siological measurements (hand temperature and blood pressure)
were administered to find out whether there are any changes
after being exposed to a stressful situation.

Thank you very much for your participation in this experiment.
We hope we didn't make you feel too uncomfortable. If you
have any questions or feel you would like to talk more about
the experiment, feel free to ask the experimenter. Please
do not discuss this experiment with your friends. They might
participate in it at a later date. Please sign you name here
when you have finished reading this sheet and feel that you
understand its contents.

APPENDIX B

QUESTIONNAIRES

The Mastery of Environment and Self Scale

Social Security Number_____ Sex _____ Age _____

Place a number between 1 and 5 after each of the following, where:

1 - Strongly agree
2 - Slightly agree
3 - Neither agree or disagree
4 - Slightly disagree
5 - Strongly disagree

For example, if you moderately liked beans, you would answer:
I like to eat beans __2__

----

1. I could drive myself to make an A in any course _____

2. My behavior often does not have a significant impact on others _____

3. I can overcome a headache by thinking about it _____

4. I have the ability to exert my influence over other people _____

5. If I really wanted to, I could become president of the U.S. _____

6. I cannot overcome nasal congestion by just thinking about it _____

7. I am able to control pain _____

8. I can vary my heart rate by thinking about it _____

9. I am not able to psychologically overcome muscle soreness _____

10. Others look to me to get things going _____

11. I cannot mentally control the degree to which I perspire _____

12. I can psychologically alter the temperature of my fingers _____

13. I am a person that can make a significant impact on the world _____

14. I am able to overcome major problems confronting me _____

15. I have the mental ability to make my throat sore _____

16. I feel physically healthy now _____

Arithmetic Problems

social security number: _____ age: _____

Please, compute the following problems:

7+4-2 =	(6X3)/2 =	7-3+8 =	9+3-4 =
(2X3)/6 =	5-3+13 =	(4/2)X7 =	(5X4)/10=
(10X3)/5=	(12/3)X4=	(12/6)X3=	6+3-7 =
5-3+9 =	9+6-8 =	13-7+5 =	(4X6)/2 =
8-1+4 =	(7X6)/2 =	19+2-3 =	11-7+4 =
12+3-7 =	8-3+7 =	(6X5)/10=	(6/3)X7 =
8-4+11 =	(12/6)X7=	(16/4)X3=	(8X2)/4 =
(7X4)/2 =	9-4+12 =	(25/5)X7=	7+11-3 =
(8/2)X7 =	8+3-6 =	8-5+6 =	(9/3)X8 =
9+5-3 =	(2X12)/4=	14+2-7 =	7-5+12 =
(3X8)/6 =	(12/4)X6=	(21/3)X4=	(3X6)/2 =
8-3+7 =	(6X2)/3 =	14-8+2 =	(7X4)/14=
(9/3)X7 =	7+4-6 =	4+9-1 =	13+7-2 =
4+13-7 =	(3o/6)X3=	(6X3)/9 =	18+3-2 =
(18/9)X4=	3+9-2 =	7-4+8 =	5-3+12 =

7+3-2 =	2+9-3 =	(6/3)X7 =	9+5-3 =
11+4-8 =	(2X6)/4 =	(7X4)/2 =	8-3+7 =
(6X7)/2 =	(4X3)/6 =	8+4-5 =	19+2-4 =
(4/2)X8 =	(8/2)X4 =	(3X8)/6 =	(4X5)/2 =
7-5+11 =	2+19-4 =	(6X2)/3 =	3+9-1 =
5+6-8 =	6-3+9 =	12-5+7 =	(12/4)X7=
(2X7)/1 =	7-4+8 =	3+8-2 =	(3X8)/12=
(4X6)/3 =	(12/6)X3=	(7X4)/14=	16+2-7 =
(12/3)X2=	(6X2)/3 =	(6/2)X3 =	5-2+13 =
13-4+6 =	14+3-7 =	16-4+1 =	(9/3)X7 =
5-2+8 =	(16/4)X2=	2+13-5 =	(10/5)X3=
8+6-3 =	8-3+6 =	8-5+12 =	(3X6)/9 =
(24/4)X2=	11+3-4 =	(6X3)/9 =	8-3+7 =
19-3+1 =	13-7+1 =	(7X4)/2 =	3+13-5 =
7+4-11 =	(3X6)/9 =	(24/4)X2=	(4X7)/2 =

7÷4-2 =	(6X3)/2 =	7-3+8 =	9÷3-4 =
(2X3)/6 =	5-3÷13 =	(4/2)X7 =	(5X4)/10=
(10X3)/5=	(12/3)X4=	(12/6)X3=	6÷3-7 =
5-3÷9 =	9+6-8 =	13-7+5 =	(4X6)/2 =
8-1÷4 =	(7X6)/2 =	19÷2-3 =	11-7÷4 =
12÷3-7 =	8-3÷7 =	(6X5)/10=	(6/3)X7 =
8-4÷11 =	(12/6)X7=	(16/4)X3=	(8X2)/4 =
(7X4)/2 =	9-4+12 =	(25/5)X7=	7+11-3 =
(8/2)X7 =	8+3-6 =	8-5÷6 =	(9/3)X8 =
9÷5-3 =	(2X12)/4=	14÷2-7 =	7-5÷12 =
(3X8)/6 =	(12/4)X6=	(21/3)X4=	(3X6)/2 =
8-3÷7 =	(6X2)/3 =	14-8+2 =	(7X4)/14=
(9/3)X7 =	7+4-6 =	4+9-1 =	13÷7-2 =
4÷13-7 =	(30/6)X3=	(6X3)/9 =	18+3-2 =
(18/9)X4=	3÷9-2 =	7-4+8 =	5-3+12 =

IMPRESSIONS of the EXPERIMENT

social security number: _____

1. To what extent were you able to predict the occurrence of the noise bursts ?

```
|____|____|____|____|____|____|
1    2    3    4    5    6    7
```
no predictability   complete
of noises at all   predictability
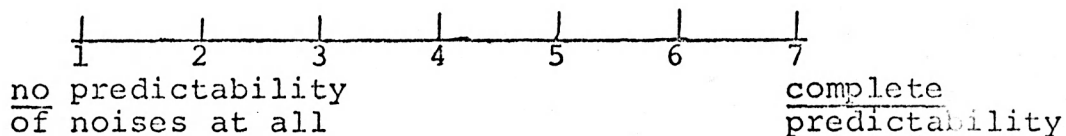
2. How unpleasant was the noise ?

```
|____|____|____|____|____|____|
1    2    3    4    5    6    7
```
very   very
unpleasant   pleasant
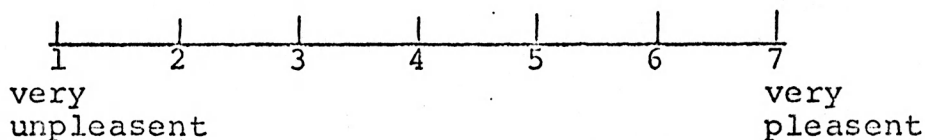
3. How important do you think this research is ?

```
|____|____|____|____|____|____|
1    2    3    4    5    6    7
```
very   very
unimportant   important
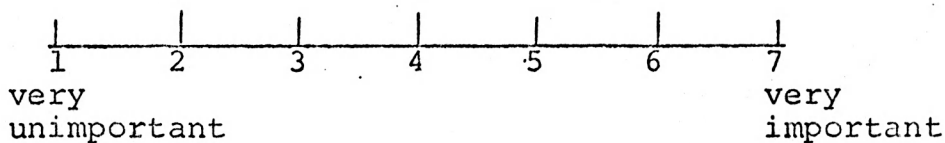
4. Rate your mood during the task.

```
|____|____|____|____|____|____|
1    2    3    4    5    6    7
```
angry   mellow

```
|____|____|____|____|____|____|
1    2    3    4    5    6    7
```
happy   depressed

```
|____|____|____|____|____|____|
1    2    3    4    5    6    7
```
frustrated   not frustrated

```
|____|____|____|____|____|____|
1    2    3    4    5    6    7
```
relaxed   tense
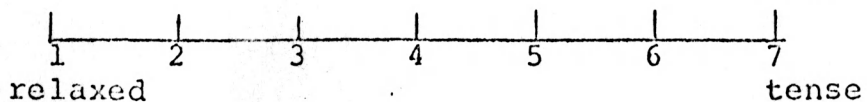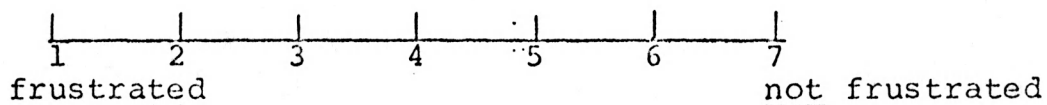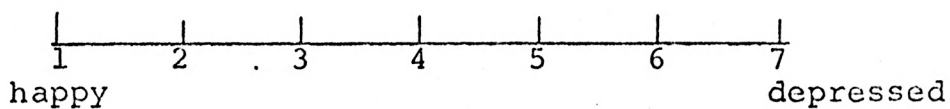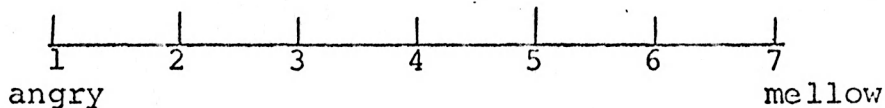
Symptomchecklist

Check the extent to which you experienced each of
the following symptoms during the experiment.

For example: if you experienced a fairly painful
toothache, you would answer:

Toothache

```
  L___L___L___L___L___Y___L
   1   2   3   4   5  /6\  7
no                       severe
Toothache               Toothache
```

_____

Headache

```
  L___L___L___L___L___L___J
   1   2   3   4   5   6   7
no                       severe
Headache                 Headache
```

Racing heart

```
  L___L___L___L___L___L___J
   1   2   3   4   5   6   7
no                       severe
Racing heart             Racing heart
```

Itch

```
  L___L___L___L___L___L___J
   1   2   3   4   5   6   7
no                       severe
Itch                     Itch
```

Shortness of breath

```
  L___L___L___L___L___L___J
   1   2   3   4   5   6   7
no                       severe
Short. of br.            Short. of br.
```

Ringing ears

```
  L___L___L___L___L___L___J
   1   2   3   4   5   6   7
no                       severe
Ringing ears             Ringing ears
```

Upset stomach

```
  L___L___L___L___L___L___J
   1   2   3   4   5   6   7
no                       severe
Upset stom.              Upset stom.
```

Congested nose

```
  L___L___L___L___L___L___J
   1   2   3   4   5   6   7
no                       severe
Cong. nose               Cong. nose
```

Sweaty hands

```
  L___L___L___L___L___L___J
   1   2   3   4   5   6   7
no                       severe
Sweaty h.                Sweaty h.
```

Eyes water

                    1   2   3   4   5 6   7

no   severe

Eyes water   Eyes water

Chest pains

                    1   2   3   4   5 6   7

no   severe

Chest pains   Chest pains

Stiff muscles

                    1   2   3   4   5 6   7

no   severe

Stiff mus.   Stiff mus.

Flushed face

                    1   2   3   4   5 6   7

no   severe

Flushed f.   Flushed f.

Dizziness

                    1   2   3   4   5 6   7

no   severe

Dizziness   Dizziness

Cold hands

                    1   2   3   4   5 6   7

no   severe

Cold hands   Cold hands

Fatigue

                    1   2   3   4   5 6   7

no   severe

Fatigue   Fatigue

1.   Did the noise disrupt your task performance ?

```
   |      |      |      |      |      |      |
   1      2      3      4      5      6      7
definitely                            definitely
no                                    yes
```
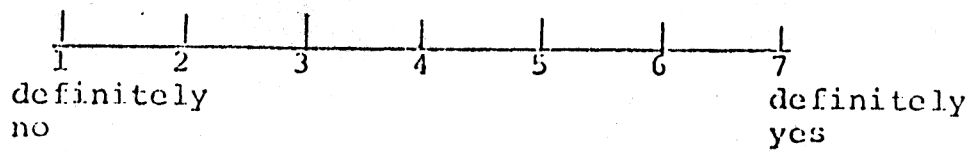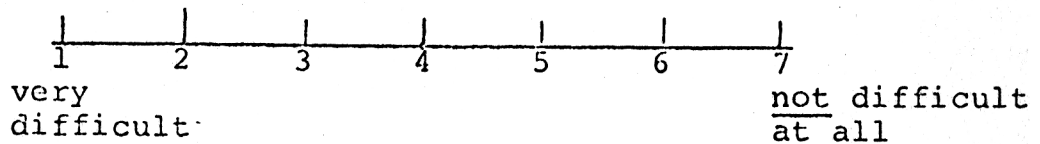
2.   Did the physical symptoms you experienced during
      the task disrupt your task performance ?

```
   |      |      |      |      |      |      |
   1      2      3      4      5      6      7
definitely                            definitely
no                                    yes
```
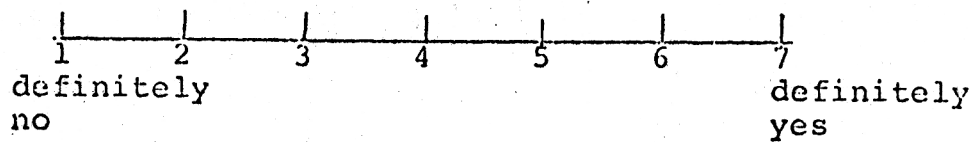
3.   How difficult was it to work on the task with
      the noise background ?

```
   |      |      |      |      |      |      |
   1      2      3      4      5      6      7
very                                  not difficult
difficult                             at all
```

VITA

Gerdi Weidner was born in Mainz, West-Germany in May 1954. She was awarded the Vordiplom in 1976 from the Justus Liebig University at Giessen, West-Germany, and the M. S. in 1978 from Kansas State University at Manhattan. She is currently living with her friends in Manhattan. Her major hobby is travelling and she hopes to explore the rest of the world after spending a few more years in the USA.

This thesis was typed by her friend, Rosalie.

THE TYPE A CORONARY-PRONE BEHAVIOR PATTERN AND THE REPORT
OF PHYSICAL SYMPTOMS ELICITED BY UNPREDICTABLE EVENTS

by

GERDI WEIDNER

Vordiplom, Justus Liebig Universität, Giessen 1976

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Psychology

KANSAS STATE UNIVERSITY
Manhattan, Kansas

·1978

ABSTRACT

Recent research has suggested that the coronary-prone
behavior pattern Type A affects the reporting of one physical
state, fatigue. Although Type A men put greater effort into
a strenuous physical task, they report less fatigue than Type
B men (Carver, Coleman, & Glass, 1976). Type A's also sup-
press fatigue when they are not near the completion of an
arduous task (Snyder & Glass, 1974). It was predicted, there-
fore, that Type A's who expect to continue working on a task
suppress a variety of physical symptoms as well as fatigue
relative to Type A's who believe that they have completed
their work.

Another factor that might affect symptom reporting in
general was investigated: unpredictability vs. predictability
of aversive events. Unpredictable and uncontrollable events
are associated with a variety of illnesses. Although un-
controllable aversive events are causally linked to the
reporting of physical symptoms by humans (Pennebaker, Burnam,
Schaeffer, & Harper, 1977), there is no direct evidence that
unpredictable events can cause reporting of symptoms. The
present research tested the hypothesis that the degree of
reported physical symptoms is affected by the unpredictability
of an aversive event.

To test these notions, 120 Type A and B undergraduate

women expected to compute simple arithmetic problems for either four or eight minutes while listening to three different levels of noise (ambient noise of the room, loud predictable noise, or loud unpredictable noise). Thus there were a total of 12 experimental groups with 10 subjects per cell. All groups worked for four minutes only and then completed a 14-item symptom checklist. Blood pressure, hand temperature, and fatigue level of the subjects were also measured immediately prior to working and after completing the problems.

The results confirmed the hypotheses. The degree of reported symptoms increased in the following order: no noise, predictable, and unpredictable noise groups. Type A's expecting to continue working on the task reported less subjective fatigue and fewer symptoms than Type A's who completed their work or Type B's in either task duration condition. In addition, Type A's suppressed a subset of symptoms associated with the cardiovascular system.

It was suggested that the Type A's suppression of symptoms may be due to either an intentional strategy to avoid failure or loss of control or to focusing attention on the task at hand with resulting loss of attention to the body. Symptom suppression of Type A's might play a role in the etiology and course of heart disease by not allowing them to use body symptoms as a cue to alter behavior or to seek early intervention treatment. Therapeutic programs

for individuals at high risk for heart disease would profit by training clients to attend to their body symptoms.